

A358

**Taunton to Southfields
Dualling Scheme**

Technical Appraisal Report

(updated 3 April 2017)

Technical Appraisal Report – List of Amendments

The following changes have been made since the version issued on 28 March 2017.

Corrections

Version	Page	Paragraph / Table / Figure	Comment
28 March 2017	10	Table 0.1	Adjusted BCRs for Options 1+NFS and 8+NFS corrected to 1.866 and 1.636 respectively. BCRs for all options now shown to three decimal places.
	100	Section 7.3	Correction to BCR ranges for initial and adjusted BCRs
	101	Table 7.3	Adjusted BCRs for Options 1+NFS and 8+NFS corrected to 1.866 and 1.636 respectively. BCRs for all options now shown to three decimal places.
	124	Section 9.6, third paragraph, third sentence.	“online scheme” corrected to “online section”.
	124	Section 9.7, first paragraph, last sentence	“online option” corrected to “online section”.
	131	Section 10.3, first paragraph	Present value cost for option 2A/2B corrected to £284.094 million.
	133	Section 10.3, Buildability and Maintenance, final sentence	Final sentence deleted

Formatting

Version	Page	Paragraph / Table / Figure	Comment
28 March 2017	-	-	Format of page numbers corrected throughout document

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Executive Summary

Introduction

The A303/A30 corridor forms part of the strategic road network and together with the A358, a strategic link between the south-west peninsula and the rest of the south, south-east and London. More than a third of the corridor is single carriageway which causes significant congestion particularly during peak periods such as holidays, the summer and weekends. This is consistent with its wide use as a route for weekly commuting and holiday traffic.

Dualling of the A358 between Taunton and Southfields has been identified in the *Road Investment Strategy: for the 2015/16-2019/20 Period* (Department for Transport, December 2014, updated March 2015). This would create a dual carriageway link between the M5 at Taunton and the A303. This section of the A358 is currently maintained by Somerset County Council.

The Department for Transport aspires for the strategic road network to be smoother, smarter and sustainable by 2040 and this scheme supports these aspirations.

Existing conditions

The A358 is located in the county of Somerset in the Taunton Deane and South Somerset Districts. It lies to the north of the Blackdown Hills Area of Outstanding Natural Beauty (AONB) and south of the Somerset Levels. It passes through a predominantly rural area consisting mainly of arable farmland and through the civil parishes of Ruishton, Thornfalcon, West Hatch, Hatch Beauchamp, Bickenhall, Ashill and Horton.

There is a significant wealth of assets with designated environmental status near the existing route including landscape, ecological and historical features.

Both the A358 and the A303/A30 route across the Blackdown Hills suffer traffic congestion and poor journey time reliability particularly in the summer months and at weekends, consistent with weekly commuting and summer holiday traffic.

Option identification

A total of 26 route options/route option variants were identified during the option identification stage, which were subject to a sifting process. Following the sift and a further value for money exercise, four routes were selected to be taken forward for further assessment. These were:

- Option 1/1B + NFS (north facing slips)
- Option 2A/2B
- Option 8/8B + J25
- Option 8/8B + NFS

Traffic

The last regional traffic model to be developed for this area was the South West Area Multi Modal Study (SWARMMS) in 2002. A South West Regional Traffic Model is currently being developed but was not scheduled to be ready in time for use in modelling traffic for the scheme at this stage. A local traffic model was therefore developed for appraising this scheme using data from several sources.

Analysis of highway journey times shows relatively small flow differences on the new A358 to the east of the M5 for Option 1/1B + NFS, Option 8/8B + J25 and Option 8 + NFS. Option 2A/2B attracts the most traffic to the new A358 (54,600 AADT), with most of this traffic (73%) accessing the M5 and Taunton via the new link to junction 25.

Analysis of highway journey times demonstrates that each of the four scheme options would improve access times along the A358 corridor between the A303 at Ilminster and the M5 at Taunton.

The traffic model represents a neutral month weekday (in accordance with Department for Transport guidance), rather than when peak traffic occurs on Fridays, weekends and bank holidays due to weekly commuting and holiday traffic. These models were validated in accordance with WebTAG guidance. Further modelling of the weekends and holiday periods will be considered in the next stage of scheme development.

Road standards

The dual carriageway option layouts that have been developed in the option identification stage are fully compliant with geometric standards, although permitted relaxations have been employed where this has been deemed to be appropriate.

The aspirations of the *Road Investment Strategy* are that the A303/A30 corridor should be an expressway. Design standards for expressways have yet to be published but Highways England have provided provisional guidance in the form of a Technical Note. The route options have been designed so as not to hinder provision of expressway standards in the long term. It is also expected that the road improvement will become a high load route and headroom clearances for overbridges have been designed accordingly.

The junction strategy is provisional at this stage, the intention being that this can be refined during subsequent stages. In view of the likely high mainline flows that are expected all junctions have been designed to be fully grade separated. This approach will be reviewed in subsequent stages.

Economic Appraisal

An economic appraisal has been carried out in accordance with the Department for Transport's web-based *Transport Analysis Guidance* (WebTAG). Journey time reliability has been assessed using the method set out in TAG A1.3 Appendix C5 and the environmental impacts on noise, air quality and greenhouse gases have been monetised.

The results of the economic appraisal are presented in Table 0.1.

Table 0.1: Analysis of Monetised Cost Benefits (£000s)

Item	Opt 1 + NFS	Opt 8 + NFS	Opt 8 + J25	Opt 2A/2B
Accidents (not assessed by TUBA) ¹	6,977	-314	9,666	10,184
Roadworks (not assessed by TUBA) ²	-28,162	-54,916	-54,691	-58,676
Greenhouse Gases (not assessed by TUBA) ³	-22,330	-21,791	-16,589	-18,969
Noise (not assessed by TUBA) ⁴	315	-837	2204	493
Air Quality (not assessed by TUBA) ⁵	76	71	180	-136
<hr/>				
Economic Efficiency: Consumer Users (Commuting)	103,727	95,830	108,557	122,843
Economic Efficiency: Consumer Users (Other)	111,111	98,781	127,916	159,928
Economic Efficiency: Business Users and Providers	218,925	200,801	239,090	283,355
Wider Public Finances (Indirect Taxation Revenues)	36,496	33,533	28,412	30,474
Present Value of Benefits (PVB)	427,135	351,158	444,745	529,496
<hr/>				
Broad Transport Budget / Present Value of Costs (PVC)	256,945	243,851	266,270	284,094
<hr/>				
OVERALL IMPACTS				
Net Present Value (NPV)	170,190	107,307	178,475	245,401
Initial Benefit to Cost Ratio (BCR)	1.662	1.440	1.670	1.864
<hr/>				
Reliability Benefits	52,269	47,738	53,621	62,545
Adjusted BCR	1.866	1.636	1.872	2.084

Notes: All monetary values are expressed in 2010 prices discounted to 2010. 1 - From COBALT; 2 - From QUADRO; 3 - TAG Unit A3 Chapter 2; 4 TAG Unit A3 Chapter 3; 5 - TAG Unit A3 Chapter 4

Safety Assessment

A Strategic Safety Action Plan has been prepared based on a desk top safety assessment of the four alignment options, supplemented by a site visit. A number of issues were raised which will need to be taken into account in further development of the design in subsequent stages of the scheme development.

Overall, the main issues highlighted for further consideration related to junction arrangements and side road alignments. The only option-specific issues were proximity of junctions on the M5 for options 2A/2B and 8/8B + NFS, and the new highway link to M5 J25 in options 2A/2B and 8/8B + J25, which would introduce a new arm to the J25 roundabout. All the issues raised will be considered further at the next stage.

A buildability and maintenance assessment, carried out by contractors specialising in constructing highway works also concluded that none of the options would be more complex to build or maintain than any of the others.

This qualitative assessment is backed up by the QUADRO and COBALT results in the economic appraisal, which show Option 2A/2B to have the greatest dis-benefits due to roadworks in construction and the greatest long term accident savings.

Environmental and Social Assessment

In the quantitative appraisal of environmental and social benefits, all route options show dis-benefits in terms of greenhouse gases primarily due to a change in vehicle-kms relative to the Do Minimum scenario, but the differences between the options are small.

All options show local improvements in ambient air quality due to reduced congestion on the affected road network. This is balanced against predicted regional increases in emissions due to overall traffic growth. For Option 2A/2B, the regional increases outweigh the local improvements, resulting in a small dis-benefit for this option with small benefits for the other options.

All options have the potential to decrease noise in local residential areas, apart from option 8 NFS which has the potential to increase noise in local residential areas. These are represented by benefits in the quantitative appraisal, except for option 8 NFS which shows a dis-benefit.

In the qualitative assessment, all options perform similarly apart from option 1 NFS, which is anticipated to have a significantly larger effect on the landscape due to its proximity to the Blackdown Hills AONB, and introduction of a new road corridor within a tranquil area. It is also anticipated to have a significantly larger adverse effect on biodiversity due to its proximity to Thurlbear Wood and Quarrylands Site of Special Scientific Interest (SSSI).

Overall, the environmental and social assessment concluded variable results across the different route options, but with Option 1 NFS performing substantially worse in its effect on the landscape and biodiversity.

Consultation with stakeholders

Identifying and engaging with stakeholders has been an integral element of the options generation and development process.

A stakeholder mapping exercise was undertaken during July and August 2015 followed by the first of a series of workshops with key statutory stakeholders in December 2015. The workshop was attended by representatives from:

- Local Authorities: Somerset County Council, South Somerset District Council and Taunton Deane Borough Council
- Statutory environmental bodies: Environment Agency, Natural England and Historic England
- Non-statutory consultee, the National Trust, who were invited due to key interests in this area

In addition to the stakeholder workshops, a group was formed to assist with the development of a non-statutory Statement of Community Consultation (SoCC). The SoCC development group comprised local authority communications, planning and community engagement officers.

A period of stakeholder engagement commenced during the summer of 2016 with a series of meetings with key and statutory stakeholders. The information and views captured during the meetings contributed to route option development and planning of the public consultation period.

Early consultation has been held with local parishes along the route. Parish Council Area Group (PCAG) Meetings were held in November 2016 with all of the parish councils within the vicinity of the proposed scheme extents.

Scheme opportunities and constraints were discussed with key stakeholders as part of meeting presentations. Route corridor options were discussed and stakeholders were able to provide feedback on a number of relevant topics including environmental, economic and social elements of the proposal. There is widespread consensus among key stakeholders that there is a need to upgrade this section of the A358 to increase traffic capacity, reduce congestion and improve motorised and non-motorised accessibility for local communities.

Programme

Key programme dates are:

- Commence public consultation March 2017
- Preferred Route Announcement (latest date) October 2017
- Application for Development Consent Order June 2018
- Publish Development Consent Order (latest date) November 2019
- Secretary of State decision (latest date) November 2019
- End of legal challenge period January 2020
- Start of construction (entry by negotiation) March 2020
- Scheme open to traffic March 2023

Recommendations

Option 8/8B + NFS is recommended to be taken forward to public consultation as it would provide improved opportunities for future growth in housing and employment leading to increased prosperity. The provision of an additional junction on the south side of Taunton would help relieve pressure on Junction 25, reduce journey times and queue lengths. Route resilience would be improved by providing alternative route opportunities between the A378 and the M5. Reduced traffic through Henlade will improve air quality.

1. Introduction

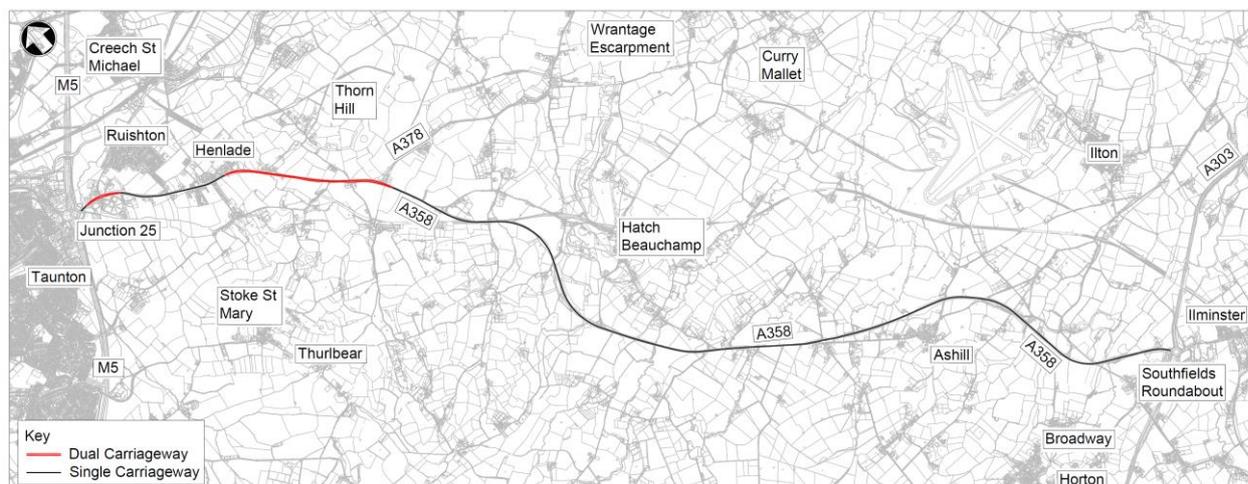
1.1. Scheme background

The A303/A30 is part of the strategic road network and together with the A358 forms a key strategic link between the south-west peninsula and the rest of the south, south-east and London. A scheme plan is shown in Figure 1.1. About 37% of the existing A303/A30 corridor is single carriageway (S2) creating multiple bottlenecks resulting in significant congestion, particularly during peak periods such as the summer and weekends.

The A358 between Taunton and Southfields is one of these single carriageway sections. As well as high congestion, there are several locations along the A358 where clusters of accidents have been observed. The accident types were predominantly shunts, vehicles turning in or out of side roads or head-on collisions. In addition, a number of Public Rights of Ways (PRoWs), undesignated paths and cycle routes have been severed by construction of the existing road.

Dualling of the A358 between Taunton and Southfields was identified in the *Road Investment Strategy for the 2015/16 – 2019/20 Road Period* (Department for Transport, December 2014, updated March 2015). It is one of three schemes identified to improve the A303/A303/A358 corridor between London and Exeter by creating a dual carriageway link between the M5 at Taunton and the A303.

Figure 1.1: A358 existing road layout



Source: MMSJV. This Map is based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Highways England 100030649 2016.

The A358 in this location is currently maintained by Somerset County Council. A previous scheme which considered dualling of existing sections of the A358 between South Petherton and Taunton was promoted by the Highways Agency (now Highways England) in 2006/7 and was taken to public consultation but not progressed further.

1.2. Scheme description

The proposed scheme would provide a dual carriageway between the M5 motorway at Taunton and the A303, as part of a £2 billion long-term commitment to create an expressway to the south west. The scheme would be likely to include grade separated interchanges and, with the purpose of providing a high quality free flow journey for those using the route, the removal of at-grade junctions and direct accesses.

1.3. Report purpose and structure

The Technical Appraisal Report is a product required under Highways England's Project Control Framework. It also forms a part of the Department for Transport's *Transport Appraisal Process*. It has been prepared in accordance with the *Guidance on Technical Appraisal Report Initial Scheme Preparation* (Highways Agency (now Highways England), April 2009) and *Transport Analysis Guidance – The Transport Appraisal Process* (Department for Transport, January 2014).

In accordance with *Guidance on Technical Appraisal Report Initial Scheme Preparation*, this report presents the technical aspects of the highway problem and the sustainable alternative solutions. *The Technical Appraisal Report brings together the traffic, economic, safety and environmental assessments, and is the basis for deciding which option(s) should be included in the Public Consultation. The purposes of the report are broadly to:*

1. Validate the need for the scheme under the terms of reference set out in the scheme brief.
2. Identify and evaluate sustainable options having regard to the Government's 'New Approach to Appraisal', economic assessment and value for money, engineering, safety, and effect on the economy, social and environmental factors.
3. Describe with relevant detail all alternatives investigated and set out reasons for rejection of any of those alternatives.
4. Recommend options for public consultation.

This report follows the guideline contents structure suggested in Annex A of the *Guidance on Technical Appraisal Report*. It differs slightly in the following respects:

- The economic assessment is broadened from transport user benefits and cost benefit analyses to include quantitative assessments of roadworks during construction and environmental impacts. This is as agreed with Highways England's Professional and Technical Services.
- The safety assessment includes a section on buildability.
- The safety assessment also includes a section on maintenance which ensures that the broader aspects of the *Construction (Design and Management) Regulations 2015* are covered, not just construction management.

2. Planning Brief

2.1. Road Investment Strategy objectives

Part 1 chapter 2 of the *Road Investment Strategy for the 2015/16 – 2019/20 Road Period* (Department for Transport, December 2014, updated March 2015) sets out the Department for Transport's aspiration for the strategic road network to be smoother, smarter and sustainable by 2040. The Department for Transport aims to achieve this by focussing on eight key performance areas as set out in part 3 chapter 1 of the *Road Investment Strategy*. These are:

- Making the network safer
- Improving user satisfaction
- Supporting the smooth flow of traffic
- Encouraging economic growth
- Delivering better environmental outcomes
- Helping cyclists, walkers and other vulnerable users of the network
- Achieving real efficiency
- Keeping the network in good condition

2.2. Scheme objectives

The objectives for the A358 Taunton to Southfields scheme are outlined below.

Transport and operational objectives

The scheme will be developed as a high quality dual carriageway making an essential contribution to the 'expressway' link between the south-east and south-west. It is anticipated that future enhancements will make this section 'expressway' compatible to support the long-term aspirations of the *Road Investment Strategy*.

The specific transport objectives identified at the strategy, shaping and prioritisation stage value management workshop are:

- Support economic growth
 - Facilitate growth in employment at key locations and centres along the A303/A358/A30 corridor and to the south-west region
 - Facilitate growth in housing at key development hotspots along the corridor
- Capacity
 - Reduce delays and queues that occur during peak hours and at seasonal times of the year
- Resilience
 - Improve the resilience of the A303/A358/A30 route corridor

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- Safety
 - Improve safety along the A303/A358/A30 route corridor
 - Improve safety along the A358 Taunton to Southfields route for NMUs
 - Connectivity
 - Improve the connectivity of the south west to the rest of the UK, to reduce peripherality and improve business and growth prospects
 - Environmental
 - Avoid unacceptable impacts on the surrounding natural and historic environment and landscape and optimise the environmental opportunities and mitigations that the intervention could bring
 - Reduce severance on local communities
 - Promote opportunities to improve the quality of life for local communities

Throughout the design and delivery stages, the scheme should ensure that customers and communities are fully considered. Specifically, this should include:

- Understanding the needs of all segments of customers (including vulnerable users), stakeholders and partners.
- Responding to those needs such that the end product delivers an improved customer experience.
- Assessing the impact of works on roads users and communities, minimising disruption and delivering appropriate mitigation measures. This assessment should also look at issues through customers' eyes.

Organisational objectives

- During construction the effect on the customer impact Key Performance Indicator (KPI) should be taken into account and close dialogue held with the Regional Intelligence Unit (RIU), Operations Directorate (OD) and Somerset County Council to consider traffic delay.
- During design close working with OD to consider future maintenance requirements to ensure the scheme is maintainable in a safe manner.
- Current known maintenance requirements are picked up in construction of the scheme and that following completion there is a minimum 5-year maintenance free period to protect customer expectation.
- All asset data to be handed over within a reasonable timescale following agreed handover to maintenance.

3. Existing conditions

This chapter describes existing conditions both along the existing A358 corridor between Taunton and Southfields and also within the area of interest for potential improvement schemes. All references in this chapter to options relate to the proposed route options described in Chapter 5 of this report.

3.1. Description of the locality

3.1.1. Introduction

The existing A358 is located within the county of Somerset in the south-west of England. The road runs in a north-west/south-east direction between the towns of Taunton and Ilminster. At Taunton the A358 connects to the M5 motorway at Junction 25 and connects to the A303 at Ilminster.

The A358 passes through the civil parishes of Ruishton, Thornfalcon, West Hatch, Hatch Beauchamp, Bickenhall, Ashill and Horton. As the route travels from west to east between Hatch Beauchamp and Ashill it also crosses the boundary of the districts of Taunton Deane and South Somerset.

The scheme area lies to the north of the Blackdown Hills Area of Outstanding Natural Beauty (AONB) and to the south of the Somerset Levels. To the west the scheme area is bounded by the M5 motorway and to the east by the A303. The location provides significant challenges from an engineering perspective due to both the undulating nature of the terrain in certain sections and the number of watercourses crossing the scheme from south to north as they traverse down from the Blackdown Hills towards the Somerset Levels. Environment Agency mapping indicates that many of these watercourses exceed bank-full conditions during times of high flow leading to flooding of the surrounding land.

From an environmental perspective the scheme area presents further challenges due to its proximity to the Blackdown Hills AONB as well as containing several pockets of ancient woodland and Sites of Special Scientific Interest (SSSI). The area also contains an Air Quality Management Area (AQMA) and many Noise Important Areas (NIAs). The environmental aspects of the scheme are discussed further in Section 3.12.

The scheme area passes through five identified landscape character regions within the districts of Taunton Deane and South Somerset. Further details are given in Sections 3.5.1 and 3.12.4.

3.1.2. Governance and Demographics

Approximately half the scheme lies within the district of Taunton Deane and half lies within South Somerset District. South Somerset is the largest district in Somerset covering an area of 959km². It is generally rural with significant levels of arable farming taking place. The 2011 census gives the population of South Somerset District as 162,113 which gives a resultant population density of 169 people per km². Taunton

Deane has a smaller area of 462km² and a smaller population of 110,187, as given in the 2011 census. The resultant population density however is higher than South Somerset at 240 people per km². This reflects the more built-up character of Taunton Deane which includes the county town of Taunton and adjacent villages.

The town of Taunton is the administrative centre of Taunton Deane Borough Council. Somerset County Council is also based in the town, at County Hall.

The largest age group across the districts were people aged 45-64. This age group accounted for approximately 28% of all residents in each district. Most notable perhaps is that over 1 in 5 people in each district are ages 65+ (21.6% in South Somerset and 20% in Taunton Deane). This is higher than the national average of 16.4%.

The area in general is prosperous with low levels of unemployment, compared to the national average, amongst the working age population. However average gross weekly incomes are below the national average.

3.1.3. Landmarks

Barrington Court, a Tudor manor house and National Trust site, lies 7km east of the southern section of road.

Hatch Court, a Grade I listed mansion with extensive grounds, is located in the village of Hatch Beauchamp approximately 1km to the north-east of the existing A358. The mansion also contains a military museum.

3.1.4. Taunton

Transport links

The area has benefited from the establishment of extensive transport links which have contributed to its historical and current role in economy and commerce.

The Bridgewater and Taunton Canal and Grand Western Canal were constructed through Taunton in the early to mid 19th century, and the London to Penzance rail line reached Taunton in the mid 19th century. The construction of the M5 motorway in the 1970s provided a continuous motorway connection between Taunton and cities such as Exeter, Birmingham and beyond connecting to London via the M4. The route corridor of the A303/A358 has formed a major link from London to the south west for centuries and is the shortest route on the strategic road network connecting the south east and south west.

History

Taunton is situated on River Tone and local records suggest that the town has origins as far back as the Bronze Age. Of particular note are recent finds at Cambria Farm (now the site of a park and ride site adjacent to Junction 25 of the M5) where Bronze Age, Roman and Iron Age artefacts were found.

The town has a wealth of religious and military history, including a monastery dating back to the 10th century and Taunton Castle, which has origins in the Anglo Saxon period. There are several notable places of worship, including the Parish Church of St Mary Magdalene (with its original 15th/16th century tower) and the Parish Church of St James which dates back to the 14th century.

There has been a permanent military presence in the town since the nineteenth century, and the town is currently home to 40 Commando Royal Marines, based at the Norton Manor Camp to the north-west of the town.

Economy and Regeneration

Taunton was named as a 'Strategically Important Town or City' in the government's Regional Spatial Strategy, allowing Somerset County Council to receive funding for large-scale regeneration projects. In 2006, the council revealed plans which it called "Project Taunton" to regenerate the areas of Firepool, Tangier, the Retail town centre, the cultural quarter and the River Tone with the aim of sustaining Taunton as a central hub for business in the south west. It was noted in this objective that the government sees Taunton's traffic congestion problems as a serious obstacle to its continuing economic growth.

As part of the regeneration plans for Taunton, a strategic employment site has been identified in the vicinity of Junction 25 of the M5 which has the potential to be a significant influence on the western end of the scheme. This is due to start construction as early as 2017 to attract inward investment and new employers to Taunton and is expected to create up to 4,000 jobs once fully occupied.

Prominent local employers in the town include The United Kingdom Hydrographic Office, located on Admiralty Way, Somerset County Council and Taunton Deane Borough Council.

Culture

Taunton lacks a public building such as an assembly room or municipal hall that might be expected for a town of its size. However, there is a cinema at the Hankridge Farm Retail Park and a small theatre and arts centre near the town centre.

Sport and recreation

Taunton is one of the largest shopping centres in the area, with a large selection of high street shops in the town centre and a number of retail parks, the largest of which is situated at Hankridge Farm, adjacent to Junction 25 of the M5.

The town is home to Somerset County Cricket Club and Taunton Racecourse, both of which host national sporting events. The cricket ground is currently undergoing redevelopment that will enable international cricket to be played there from 2017 onwards. There are also football, rugby league, rugby union, basketball and volleyball teams based in the town.

There are large numbers of recreational routes in and around the area. These include Sustrans Route 33 which passes through Hatch Beauchamp, and an associated local cycle route which connects Sustrans Route 33 to Taunton and the Blackdown Hills. The East Deane Way runs generally in a north-south direction through the scheme area and there is a circular route known locally as the Neroche Herepath which is suitable for walking, horse-riding and mountain-biking.

3.1.5. Ilminster

Ilminster is located at the far eastern end of the scheme in the district of South Somerset close to the River Isle and the A303. The town has a population of approximately 5,800 people and can be found in documents dating back to the year 725AD. Notable buildings in Ilminster include a sixteenth-century grammar school, which acts as the town's art gallery and concert hall and the Church of St Mary which dates back to the 15th century. There is a small selection of shopping available in the town centre and a Tesco superstore just outside the town centre.

3.1.6. Other local Villages

Ruishton, Thornfalcon, West Hatch, Hatch Beauchamp, Bickenhall, Ashill and Horton are all villages of varying size which lie along the existing A358. The largest of these is Ruishton with a population of 1,473 whilst the smallest is Thornfalcon with a population of just 119. All the villages listed lie in the district of Taunton Deane with the exception of Ashill and Horton which are located in the district of South Somerset. Several of the villages have some historical importance dating back to as far as the Roman era.

Many of these villages have benefited from historical upgrades of the A303 and A358 which have resulted in significant levels of traffic being removed from the village centres. However, Ruishton and Henlade are notable exceptions to this. Traffic levels, and the associated impacts such as congestion, noise and air quality are contentious issues in these two villages.

3.2. Existing highway network

3.2.1. The A303/A30 corridor

The A303/A30 forms part of the strategic road network and is a strategic link between the south-west peninsula and the rest of the south, south-east and London. The route is comprised of multiple road standards including dual 2-lane all purpose (D2AP), single carriageway 2 lane (S2) and single carriageway sections with overtaking lanes (S2+1) together with associated varying speed limits (from 40mph to 70mph).

About 37% of the existing A303/A30 corridor is single carriageway (S2) creating multiple bottlenecks resulting in significant congestion, particularly during peak periods such as the summer and weekends.

3.2.2. Existing A358 between Taunton and Southfields

The existing section of the A358 between Taunton and Ilminster is approximately 14km long. The route predominantly comprises of single carriageway with a short section of dual carriageway (approximately 1.3km) between Henlade and Mattock's Tree Green. This is preceded for 500m to the east by a shorter section of single carriageway with overtaking lane as the road rises up to the crest at Mattock's Tree Hill. There is also a short section of dual carriageway on the approach to the M5 Junction 25 at the western end of the section.

At the western limit of the scheme, the A358 forms one of five arms of the M5 Junction 25 roundabout which is a partially-signalised three-lane roundabout under the M5 motorway. This junction allows access from the A358 to the M5 north/southbound and into the east of Taunton. At the eastern end of the scheme, the A358 forms one of five arms of the Southfields Roundabout which is situated on the A303 at the western end of the Ilminster Bypass. This junction provides access into Ilminster, Horton Cross or to the A303 east/westbound. Along the A358 there are numerous at-grade local road junctions, the most notable of which is the traffic signal controlled junction with the A378 at Mattock's Tree Green. Other local roads provide access to local villages such as Ilton, Ashill, Hatch Beauchamp, Bickenhall, Thornfalcon, Ruishton and Henlade.

There is one grade-separated crossing of the A358. This carries the A358 Hatch Beauchamp Bypass over Griffin Lane on a significant structure which has recently been reinforced following the identification of potential weaknesses during an inspection.

There are 12 known watercourse crossings along the route. A number of these are considered minor and hence accommodated by piped culverts. However Back Stream, Cad Brook, Venner's Water, Fivehead River and Broughton Brook are more significant and are accommodated by larger structures such as underpasses or bridges.

The existing A358 has been the subject of a number of upgrades. The short dualled section at Mattock's Tree Green appears to have been upgraded in the 1960s or 1970s, possibly in response to the poor vertical alignment and associated visibility through this section which is likely to have made overtaking and turning manoeuvres at the A378 junction particularly dangerous on the single carriageway. The single carriageway section around Hatch Beauchamp was constructed as a bypass in the 1980s, the original route of the A358 having passed through the centre of the village. Similarly the section of single carriageway around the village of Ashill was constructed as a bypass in the 1990s. The geometric standards at the time of the construction of the Hatch Beauchamp and Ashill Bypasses were similar to current standards. However, the build-up of the bypasses, particularly the carriageways and structures, may be approaching the end of the original design life.

3.3. Traffic Data

A358 Traffic Data

Automatic Traffic Count (ATC) data for the A358 has been analysed from the counts carried out by Nationwide Data Collection (NDC), commissioned to capture the traffic situation in the study area. ATCs were used for two weeks in the month of October 2015 using a site between Southfields Roundabout and the junction connecting on to the A378 shown by Site 1 labelled in Figure 3.1. Table 3.1 shows the average daily traffic flow (two-way) on the A358 for an average Monday to Thursday, Friday, Saturday, and Sunday in the neutral month of October. The table shows lower daily flows at weekends but higher flows on a Friday compared with an average Monday to Thursday.

Figure 3.1: NDC ATC – Locations

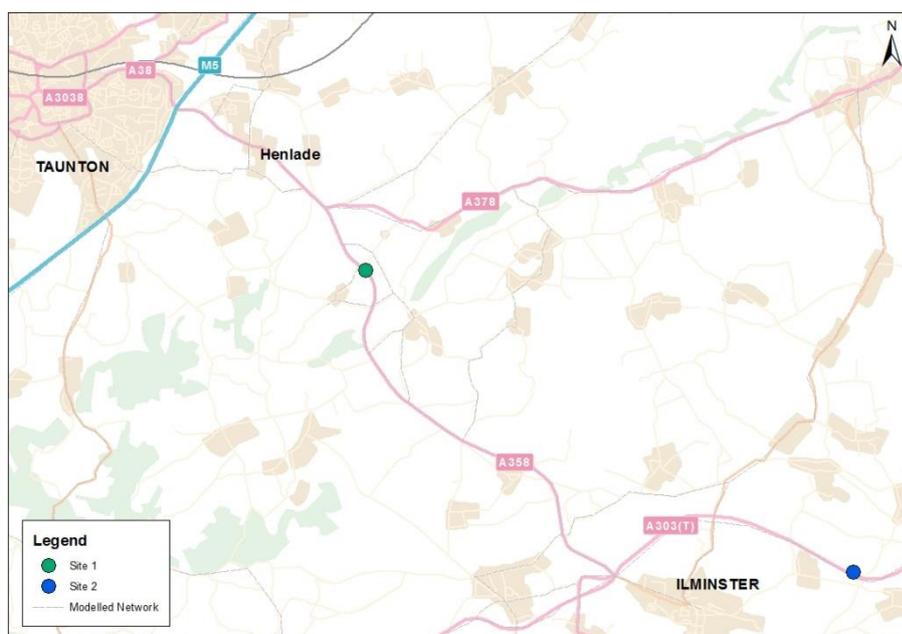


Table 3.1: A358 ATC Automatic Traffic Counts October 2015

Location: Site 1 (A358 between A378 and Southfields Roundabout)	October 24 hour 2-way daily flow
Mon–Thurs Avg 2015	23,800
Friday Avg 2015	26,600
Saturday Avg 2015	19,600
Sunday Avg 2015	19,100

All daily flows have been rounded to the nearest 100.

In Figure 3.2 and Figure 3.3 below we can see the hourly two-way traffic flow profile on an average working day in October and a comparison of the flow profiles of different days in a week respectively. In Figure 3.2 it can be seen that the A358 follows a typical highway peak pattern in a working week, with higher flows in the AM and PM peaks due

to regular working week commuter traffic. Figure 3.3 shows that during an October Friday high traffic flows occur from 11am to 6pm. Which occurs due to the weekly commuting traffic present in the south west region. It is noted that traffic flows are highest in the morning peak period on all other weekdays excepting Fridays.

As there is no relevant long term ATC data available for the A358 between Taunton and Ilminster, no comparison between a neutral month and a peak period month has been carried out.

Figure 3.2: NDC ATC – A358 Average Working Weekday Averages October 2015 (Two Way Traffic Flows)

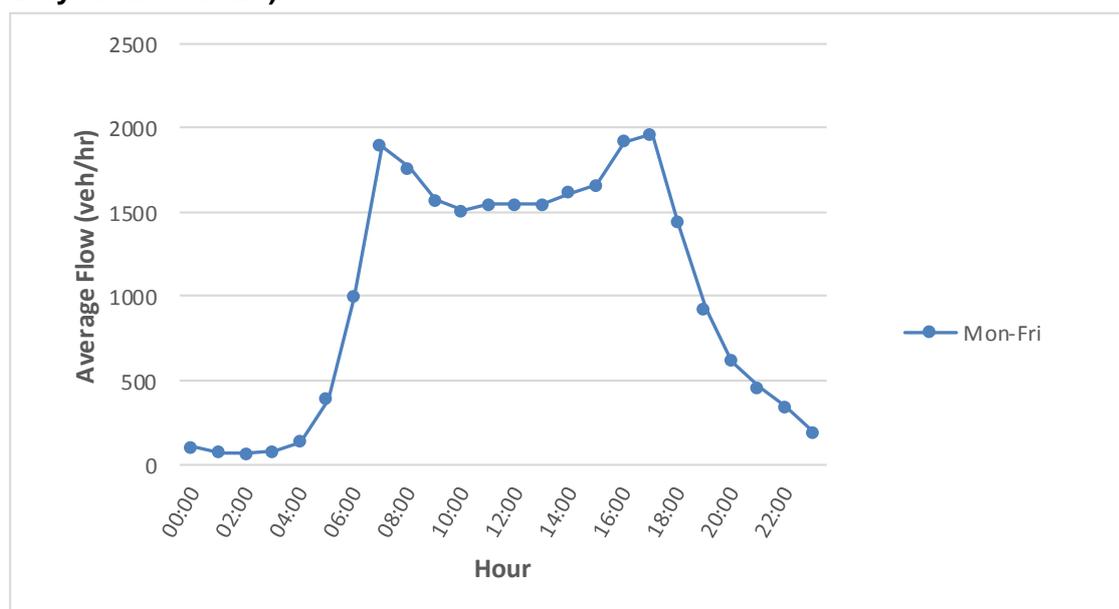
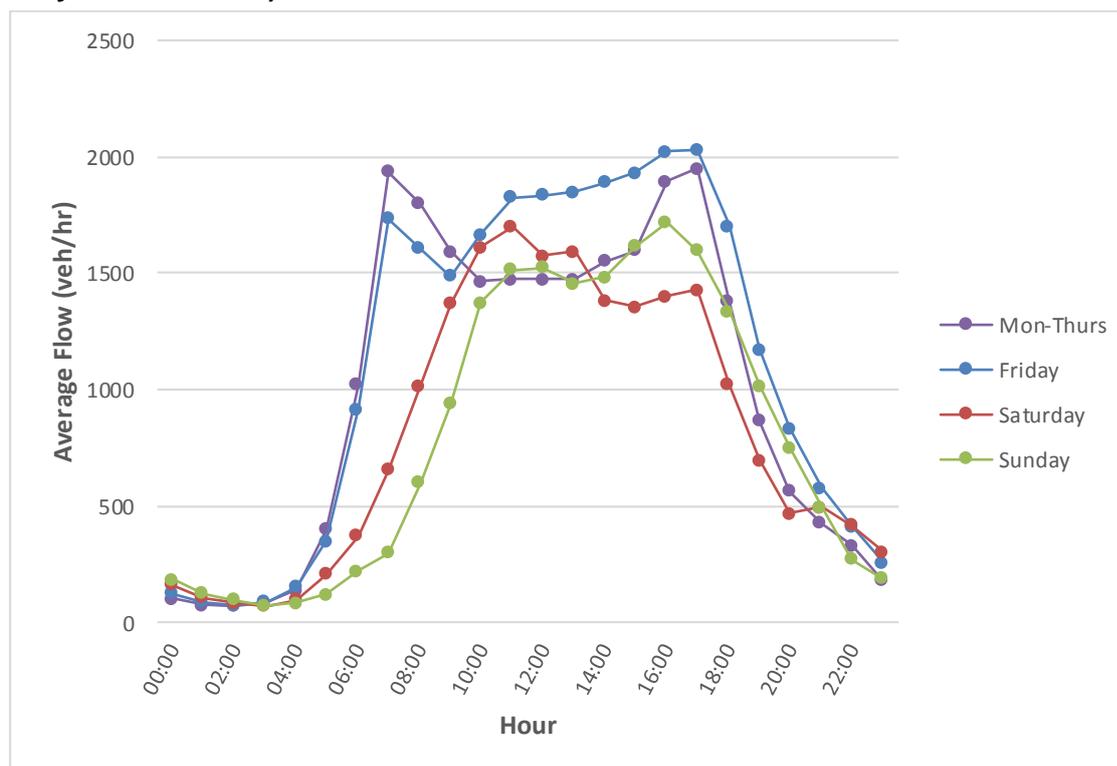


Figure 3.3: NDC ATC – A358 Average Working Weekday Averages October 2015 (Two Way Traffic Flows)



A303 Traffic Data

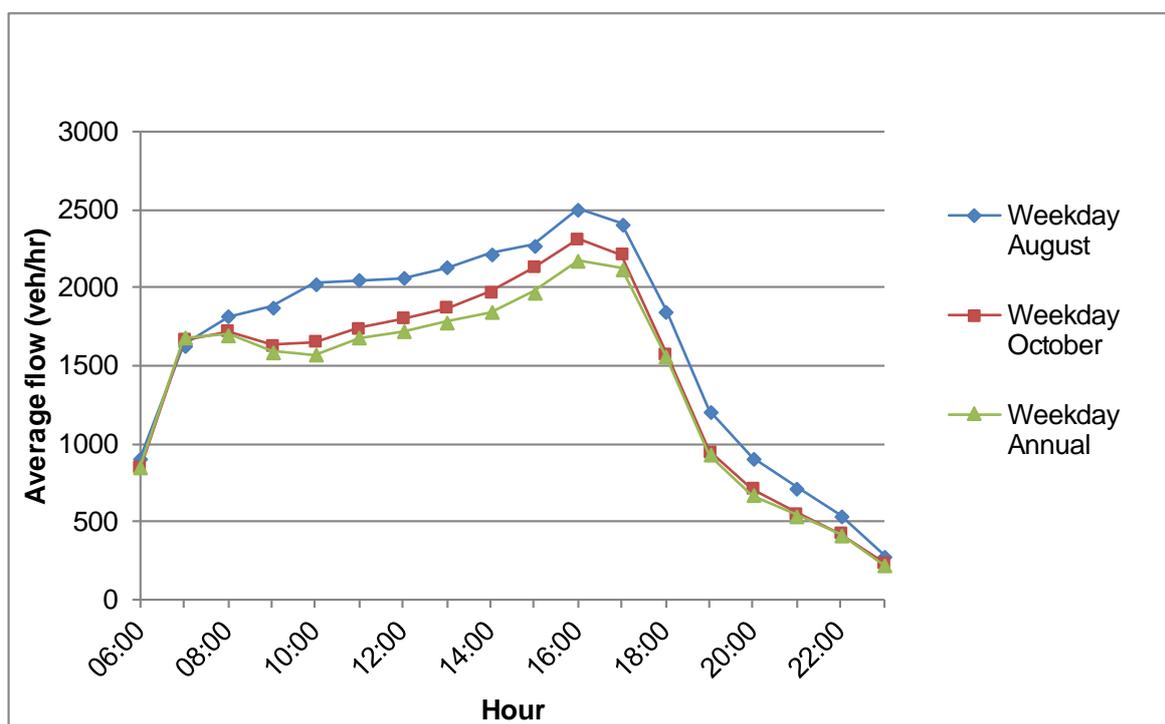
Along the A303 there are a number of Highways England Open Data Automatic Traffic Count (ATC) sites. As the new scheme is proposed to provide a route for trunk road, an analysis of a Highways England Open Data site on the A303 close to A358 has been undertaken represented by Site 2 in Figure 3.1 to show the characteristics of A303 traffic. That data has been obtained for October 2015 and August 2015 to assess the traffic levels and to analyse the daily flow profiles in both a neutral and peak month as during summer months the traffic flows have been observed to increase significantly. The average daily flows for August and October on the A303 are shown in Table 3.2 below for different days of the week. This shows that daily flows on a Friday in October are substantially higher than Monday–Thursday flows and that weekend flow levels are not much lower than Monday to Thursday flows. Flows on all days of the week in August are much higher due to holiday traffic. All daily flows have been rounded to the nearest 100.

Table 3.2: A303 2015 Automatic Traffic Counts

Location: Site 2 (A303 east of Ilminster)	October 24 hour 2-way daily flow	August 24 hour 2-way daily flow
Mon–Thurs Avg 2015	26,900	30,400
Friday Avg 2015	35,600	39,400
Saturday Avg 2015	24,300	34,700
Sunday Avg 2015	23,100	26,600

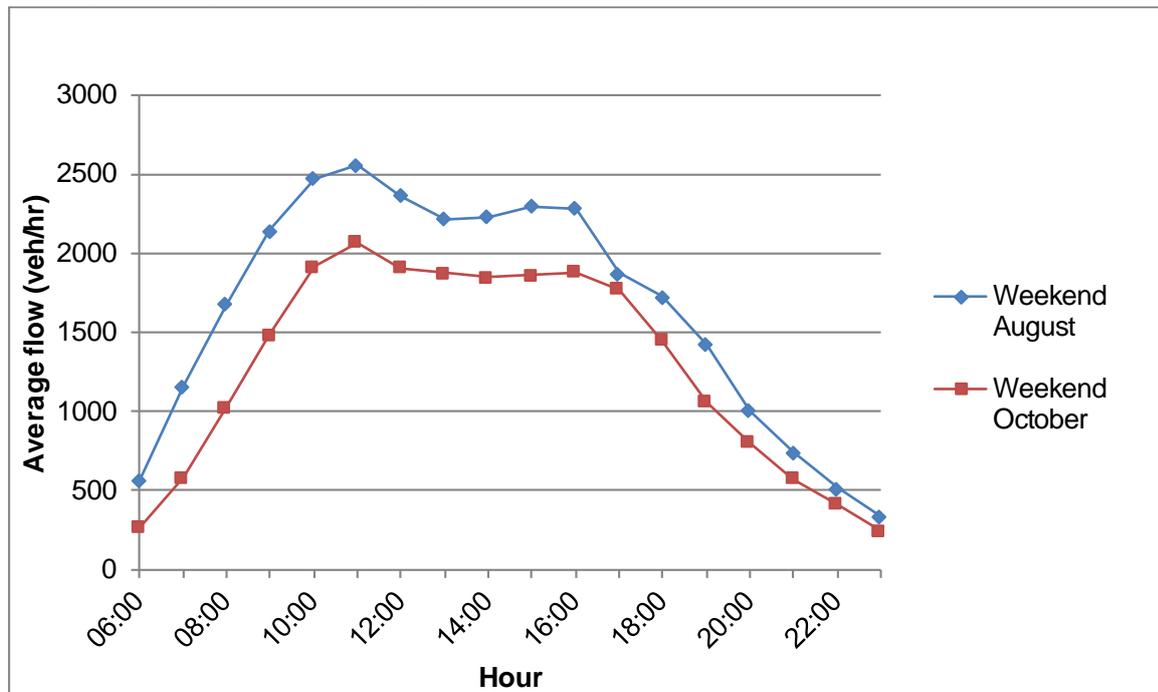
The A303 suffers from congestion and queuing problems and is recognised as one of the long-standing road congestion hotspots in the country. During the summer months the traffic flows increase significantly along the route. Figure 3.4 below shows the average weekday flow profile against the profiles for October and August. This confirms that October follows a close resemblance to the annual average flow profile, and that the August profile is considerably higher. It should also be noted that the profiles do not display the usual morning and evening peaks and that the interpeak traffic flow is higher than the AM 'peak' traffic. Figure 3.5 gives a comparison of average daily flow profiles over a weekend (Saturday and Sunday) between October and August. This shows universally higher flows on the A303 during August in all time periods.

Figure 3.4: A303 - Average Annual Weekday 24 Hour Flow against October and August 2015 (Two Way Traffic Flows)



Source: MMSJV

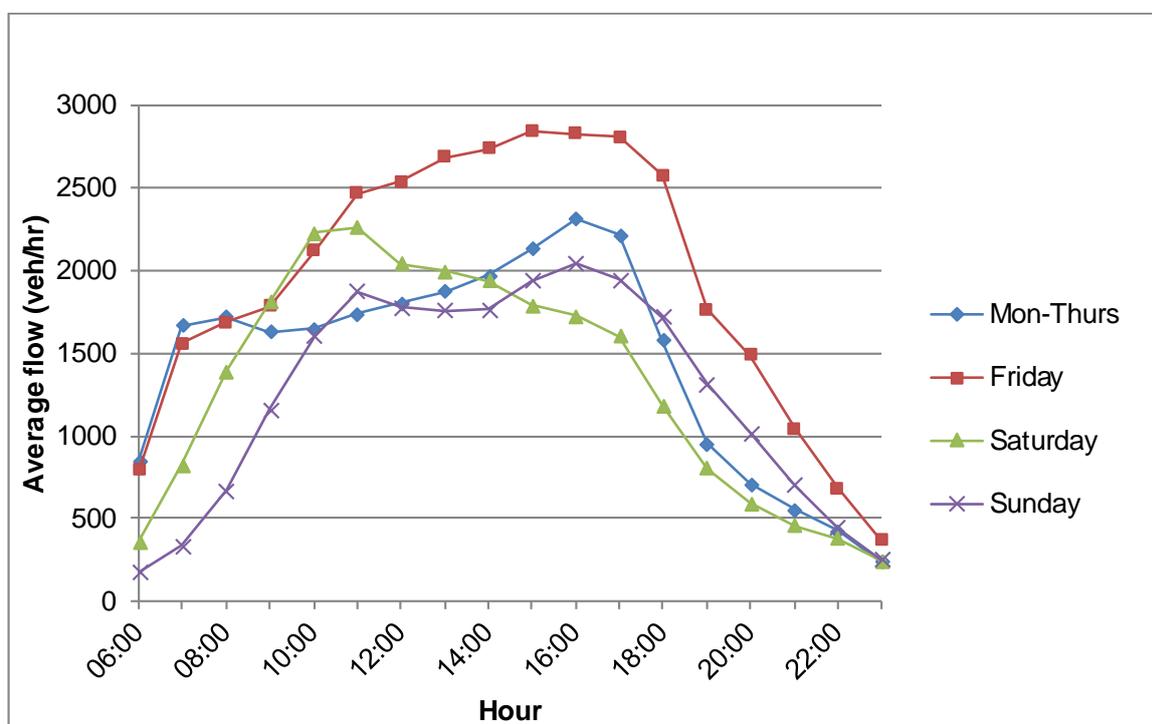
Figure 3.5: A303 - Average Annual Weekday 24 Hour Flow against October and August 2015 (Two Way Traffic Flows)



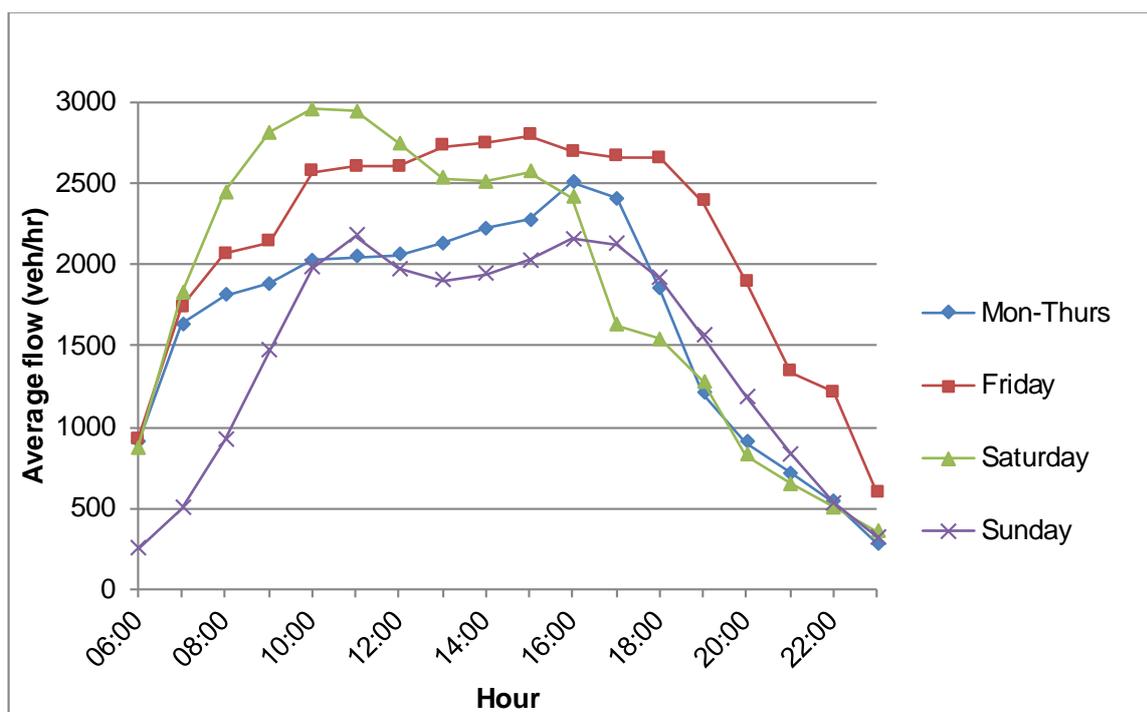
Source: MMSJV

Average hourly flow profiles for different days of the week in October 2015 and August 2015 are shown in **Figure 3.6 and Figure 3.7**. These graphs demonstrate that there is a significant increase in Friday flow levels as compared to the rest of the working week in both months, particularly in the PM peak. Peak flows at weekends are considerably higher in August reaching almost 3,000 vehicles per hour in the Saturday AM peak in August. None of the traffic flow profiles demonstrate typical commuting peak profiles.

Figure 3.6: A303 - Annual Average 2-way Flow Week Profile October 2015



Source: MMSJV

Figure 3.7: A303 - Annual Average 2-way Flow Week Profile August 2015

Source: MMSJV

3.4. Accidents and journey time reliability

3.4.1. Accidents

STATS 19 Personal Injury Accident (PIA) data was obtained from Highways England, Devon County Council and Somerset County Council for the study area for the latest full 5-year period available (January 2010 to December 2014). The collision data loaded into *KeyAccident v7.2* (software from Keysoft Solutions) where the raw data was processed and cleaning processes were carried out such as removing duplicates of the same accident.

Total accident numbers by location have been calculated by severity (fatal, serious and slight) for the A358, A303/A30 and M5 in the simulated model area as well as the two A358 junctions with the A303 (Southfields roundabout) and M5 (Junction 25 at Taunton). A summary of the accidents by severity is presented in Table 3.3. Accidents at junctions are those that occurred within 20m of the junction.

Table 3.3: Accidents by severity (1 January 2010 to 31 December 2014)

Location	Fatal	Serious	Slight	Total
A358 - between M5 Junction 25 and the A303	1	20	42	63
M5 Junction 25	0	0	18	18
Southfields roundabout (A358 / A303 junction)	0	4	16	20
A303 – Southfields roundabout to A303	1	10	40	51
A30 – A303 to M5 Junction 29	4	19	86	109
M5 – Junction 25 to Junction 29	7	15	115	137
TOTAL	13	68	317	398

On the A358, between the Southfields roundabout at Ilminster and the M5 at Junction 25, a total of 63 accidents occurred in the five year period analysed, of which one was fatal, 20 were serious and 42 were slight. The one fatality involved a motorcycle travelling eastbound colliding with another eastbound vehicle, throwing the rider from the motorcycle. The accidents were distributed fairly evenly along the corridor, with the exception of the following small clusters:

- 6 accidents occurred between Cad Road and Broadway Road, approximately 1km north of the Southlands roundabout. The accidents all resulted in slight injury. 5 of the accidents involved vehicles turning in or out of the side roads. The sixth accident involved a shunt.
- 5 accidents occurred in the vicinity of the Park Barn Lane crossroads junction. These consisted of 4 slight and 1 severe accident. 3 of the accidents involved shunts and two were head-on collisions.
- 7 accidents occurred in Henlade between the Stoke Road / Lipe Lane crossroads and the commencement of the dual carriageway section. 2 resulted in serious injury and the remainder resulted in slight injury. 3 accidents involved a shunt; 3 involved a vehicle turning out of a side road or drive and 1 accident involved overtaking.
- 4 accidents occurred in the vicinity of the Bushy Cross Lane junction, west of Henlade. 3 resulted in slight injury and one in serious injury. Two of these accidents involved traffic turning off the main road, one involved a head-on collision, and one involved a shunt.

At the M5 Junction 25 a total of 18 accidents occurred in the time period analysed. All resulted in slight injury. The majority of accidents involved a shunt but one accident at this location involved a side-swipe.

At the Southfields Roundabout, a total of 20 accidents occurred in the time period analysed, 16 of which were slight and four of which were serious. The collisions appear to have been the result of a mixture of manoeuvres and vehicle types with contact made between various parts of the vehicles in question.

3.4.2. Journey Time Reliability

Journey time data was extracted from Trafficmaster¹ for an average October 2015 weekday average (Monday to Thursday) in order to check that the travel time that vehicles are taking to travel through the model is realistic. The Trafficmaster data was extracted for the Ordnance Survey Integrated Transport Layer covering the Fully Modelled Area of the A358 model layer and has been subject to manipulation to accurately match the local model network topology.

A summary of current journey times is provided in Table 3.4 of the three main journey time routes on the A358, A303/A30, and M5 corridors as shown in Figure 3.8.

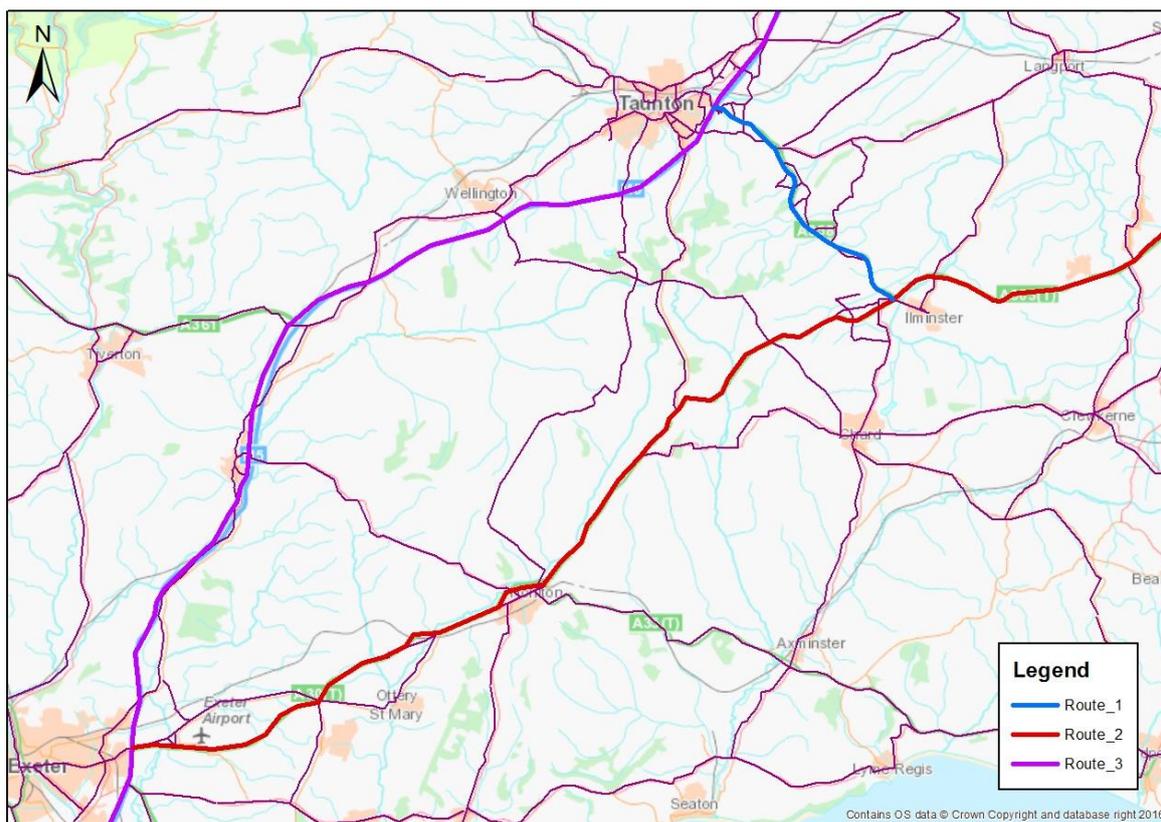
Table 3.4: Observed Journey times for A358 model.

Route Number	Road	Direction	Journey time (min) – AM Peak	Journey time (min) – Inter Peak	Journey time (min) – PM Peak
1	A358	EB	16.89	14.64	14.96
1	A358	WB	22.60	15.11	14.37
2	A303/A30	EB	35.14	35.74	34.07
2	A303/A30	WB	37.73	36.50	35.66
3	M5	EB	24.38	24.10	23.40
3	M5	WB	24.15	24.26	23.66

Source: MMSJV

¹ Trafficmaster data is GPS-based data available from the Department for Transport

Figure 3.8: A358 Model – Journey Time Routes - Annual Average 2-way Flow Week Profile October 2015



Source: MMSJV

The stress-based approach set out in TAG A1.3 Appendix C.5 can be used as an approximation of journey time reliability, with change in stress essentially a proxy for change in reliability. In October 2015, the A358 has stress levels of 91% in the eastbound direction and 75% in the westbound direction.

3.5. Topography, land use, property and industry

3.5.1. Topography

The existing A358 is generally located in a low lying area and crosses a number of watercourses. Its highest point is approximately 59m above ordnance datum (AOD) as it passes to the south-east of Hatch Beauchamp and its lowest point is approximately 12m AOD as it crosses the Broughton Brook flood plain just to the east of the M5 motorway.

Many of the watercourses that are crossed by the A358 have associated flood plains and are tributaries of watercourses associated with the Somerset Levels. In particular the River Tone flood plain lies approximately 500m to the north of the A358 at Ruishton, the West Sedgemoor wet meadow lies 4km to the north-east at Wrantage, and the River Isle flood plain lies approximately 1km east of the Southfields Roundabout. The A358 crosses flood plains of tributaries of each of these watercourses.

In contrast, the Blackdown Hills lie approximately 4km to the south west of the existing A358. Staple Hill, which is situated at its northern edge, is the highest point of the Blackdown Hills at a height of 315m AOD and a prominence of 212m. Tributaries of the Rivers Tone, Isle and West Sedgemoor, radiate outwards from the Blackdown Hills, separated by two prominent ridges. The western ridge includes the feature known as Mattock's Tree Hill which the A358 passes over. A smaller ridge known as Stoke Hill protrudes from this ridge just south of Mattocks Tree Hill, for approximately 2km westwards towards Taunton. The eastern ridge includes the Wrantage Escarpment, a wooded slope that is referred to in the Taunton Deane Landscape Character Assessment. Most of the notable features of this escarpment lie to the north of the existing route, although the ridge line accounts for the highest point of the existing carriageway.

3.5.2. Land use, property and industry

Land use within the eastern suburbs of Taunton includes post-war residential, employment and retail developments, all of which occupy land to a relatively high density right up to the M5 motorway boundary. The villages of Ruishton and Henlade are situated just to the east of Taunton.

The built up boundary of Ilminster is slightly remote from the scheme limits, being separated from the A303 and A358 by the River Isle and associated flood plain. Land use within the town includes a mixture of retail, industry and residential, although much of the property is older than in the eastern suburbs of Taunton.

Between Taunton and Ilminster most of the land within the scheme area is rural, much of it in agricultural use. Agricultural land use is a mixture of arable and livestock farming and is mostly of grade three ('good to moderate') quality, according to the Agricultural Land Classification Map, South West Region (Natural England, August 2010). Villages, hamlets, farmsteads and individual dwellings occupy land within this agricultural area, including Henlade, Hatch Beauchamp and Ashill. The A358 passes directly through Henlade leading to properties having direct access/egress from both sides of the carriageway. Space for modification and particularly widening of the existing A358 through Henlade would be limited without significantly impacting upon residential buildings.

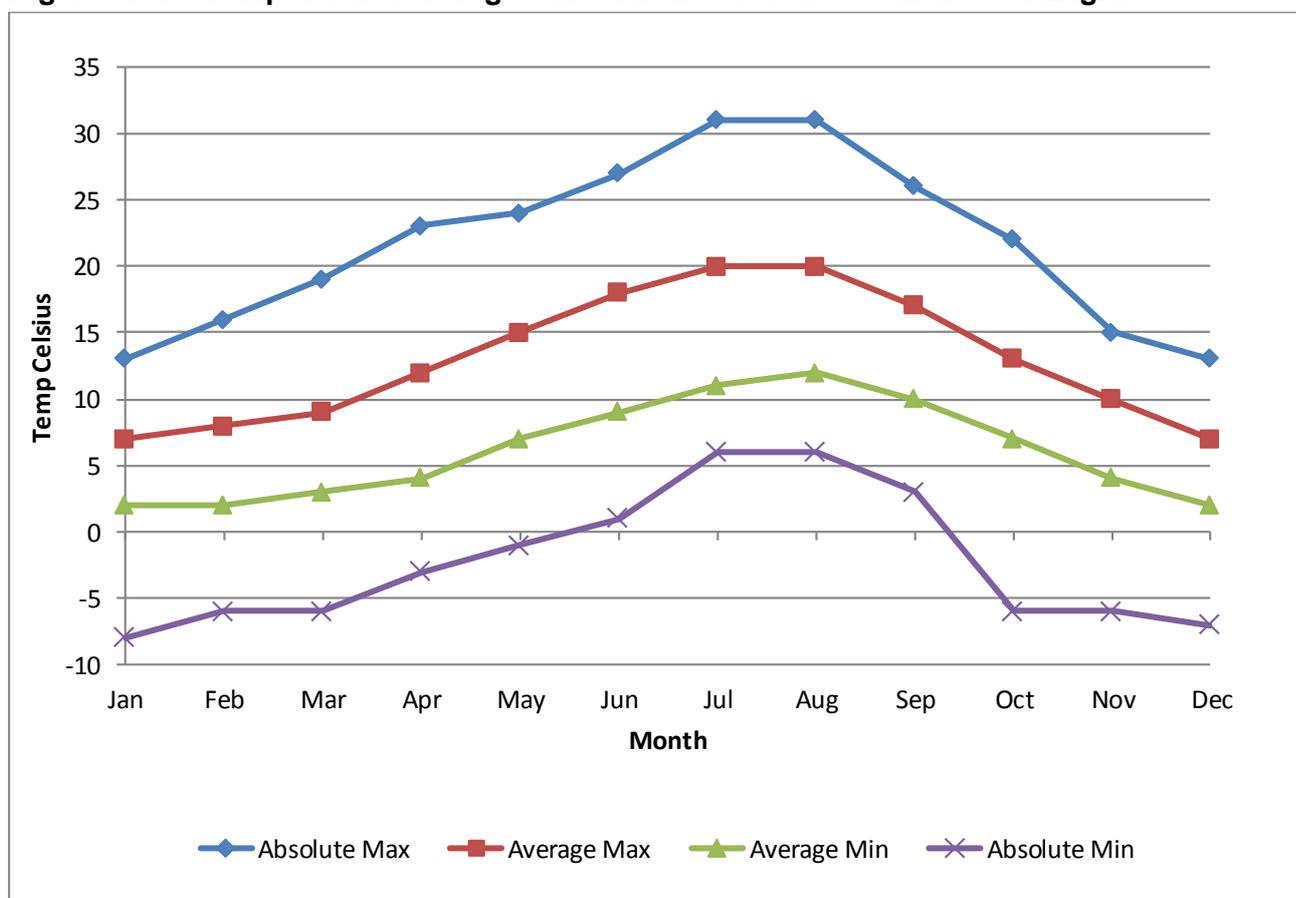
There is currently very little industrial land use within a close vicinity to the scheme area. However, an employment site is proposed near Junction 25 of the M5 as part of Taunton's regeneration. This is due to start construction as early as 2017 and would take up approximately 60 acres. Alongside this there is a recently constructed Park and Ride in a similar location which provides access to and from Taunton.

3.6. Climate

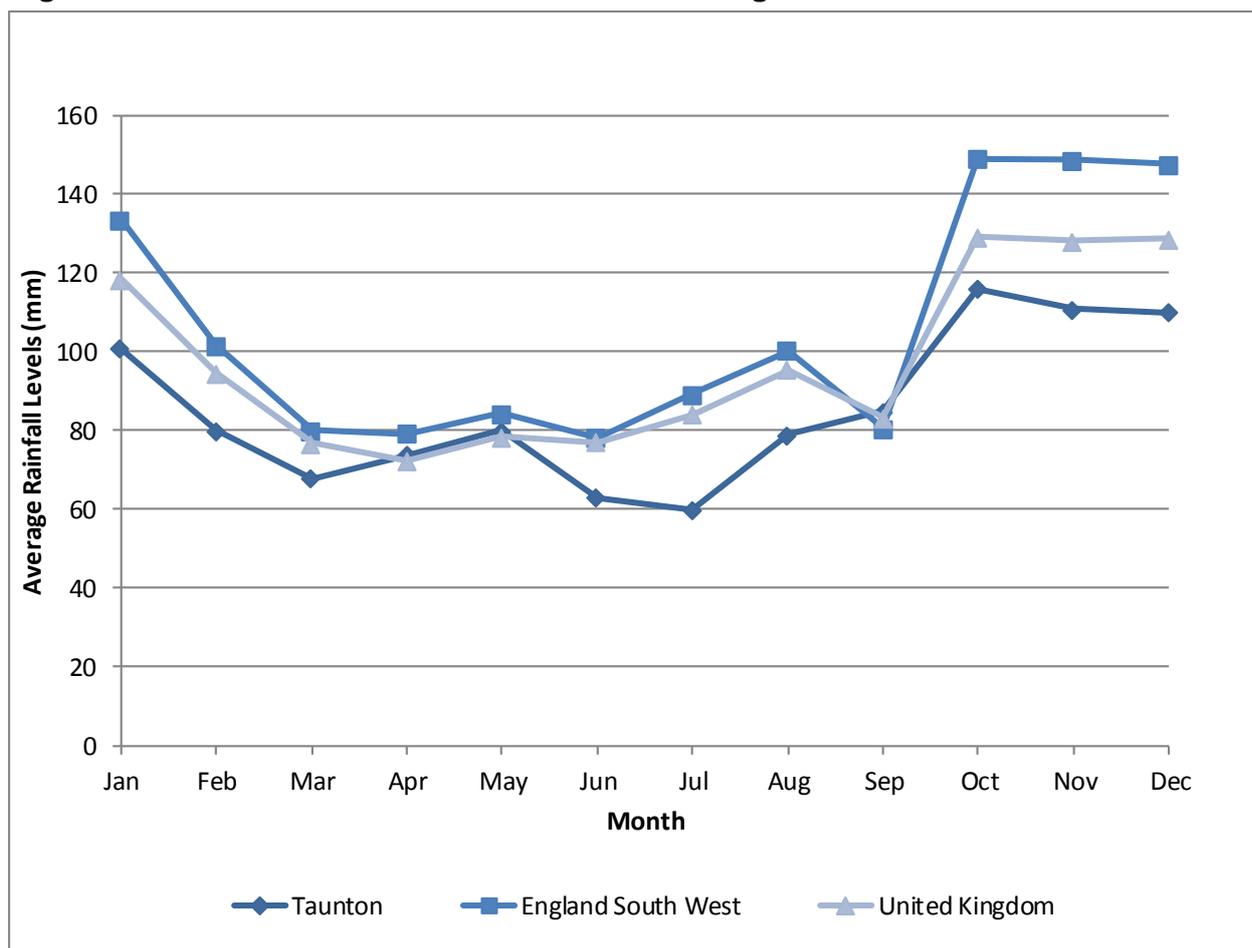
The south-west region of England in which the proposed scheme lies experiences an oceanic climate, which is typified by being mild with no dry season. The adjacent sea temperature leads to a less extreme seasonal variation than most parts of United Kingdom. Average temperature of all months is lower than 10°C (50.0°F), with the summer months of July and August being the warmest (mean daily maximum of 21°C (68.8°F) (Figure 3.9). During winter, a mean minimum temperature of 1°C (33°F) is common.

Figure 3.9 compares consolidated data of two decades of monthly average rainfall levels between Taunton, the south-west of England and UK-wide. It is important to highlight that this analysis was made based on public information available from the websites www.metoffice.gov.uk (UK and south-west England) and www.myweather2.com (Taunton). The south-west is representative of the wider UK rainfall patterns, but Figure 3.10 indicates that Taunton does receive slightly less rainfall than the UK average. This is reflective of Taunton's comparatively low lying position, in the lee of higher ground to the west, north and south.

Figure 3.9: Temperature: averages and extremes for the south-west of England



Source: <http://www.myweather2.com> (Consulted in March/2016).

Figure 3.10: Rainfall levels for the south-west of England

Source: UK and England South West data: <http://www.metoffice.gov.uk>; Taunton: <http://www.myweather2.com>

3.7. Drainage

3.7.1. Hydrology

The scheme area is located within the catchments of three Main Rivers; the River Tone, the River Parrett and the River Isle. Whilst the existing A358 does not cross these watercourses, it does cross a number of their tributaries, most of which are indicated on Environment Agency mapping as having flood zones. At the west, the main tributaries of the River Tone that are directly affected by the scheme are Broughton Brook and Black Brook. The tributary of the River Parrett that is affected by the scheme is Widness Rhyne. This watercourse flows into the Parrett via the West Sedgemoor wet meadow. The eastern section of the scheme passes across the Fivehead River, Venners Water, Cad Brook and Back Stream, all of which are tributaries of the River Isle.

3.7.2. Road drainage

The existing drainage network along the section of the A358 between Taunton and Ilminster varies as the road switches from urban to rural categorisation. To the western end of the scheme the road is urban in character and hence the carriageway is kerbed on both sides of the road with kerb inlet gullies. The drainage system through this area is expected to have evolved periodically in line with the general urbanisation of the area,

and it is unclear where the water drains to once underground. However, it is assumed that road runoff eventually drains untreated into the River Tone via either storm-water sewers, combined sewers or one of the many streams and drainage channels in the area.

To the east of Thornfalcon the A358 becomes more rural in character. The drainage network here generally consists of splayed precast kerbs or surface water concrete channels when the road is at ground level or on embankment and filter drains when the road is in cutting. Intermittent gullies are located with kerbs and in the inverts of the concrete channels. There are also several drainage ponds located along this eastern section which are used to store and treat surface runoff water before gradually releasing it into the neighbouring watercourses, namely the Widness Rhyne, Fivehead River, Cad Brook and the River Isle.

This section of the A358 was upgraded in the 1980s and 1990s as part of the Hatch Beauchamp and Ashill Bypass schemes. Some record drawings obtained from Somerset County Council confirm that the road drainage system was comprehensively redesigned and constructed as part of these schemes. The drainage along these sections is therefore likely to be more sophisticated than the existing drainage systems to the west of Thornfalcon for which no records exist. It is likely that, west of Thornfalcon, the drainage has been upgraded over time on a piecemeal basis and may therefore not be as easy to integrate into the proposed scheme as the Ashill and Hatch Beauchamp Bypass drainage systems.

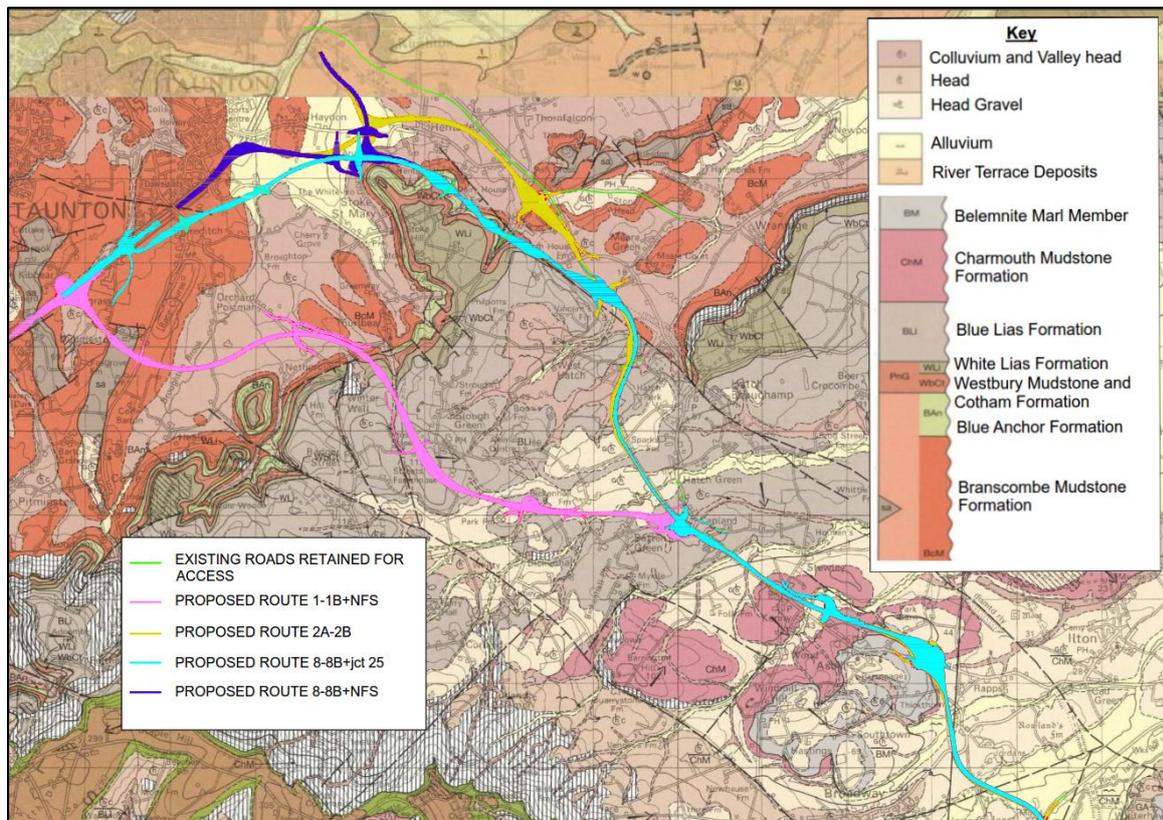
Away from the A358, the M5 near Junction 25 currently drains into the Black Brook which subsequently flows into the River Tone whilst the A303 near Southfields roundabout drains into the River Isle.

The proposed drainage for each route option is explained in more detail as part of the Description of the Route Options in Chapter 5.

3.8. Geology

This section provides a brief overview of the geology of the area in the vicinity of all the proposed route options. The area is represented in the excerpt of the 1:50,000 scale British Geological Survey (BGS) geological sheets 311 and 295 as shown in Figure 3.11 below. Please note that scheme options cross the boundaries of two BGS sheets. BGS sheet 295 to the north is awaiting an update and indicates more alluvium and drift deposits than sheet 311, hence the sheets don't overlap entirely.

Figure 3.11: Existing geology



Source: MMSJV based on extract from 1:50,000 BGS geological sheet 311 Wellington Bedrock and Superficial edition, (2009) and 1:50,000 BGS geological sheet 295 Taunton Solid and Drift (1984). This Map is based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Highways England 100030649 2016.

Superficial deposits

BGS mapping indicates limited expanses of superficial deposits along the proposed routes. The superficial deposits likely to be encountered across the site comprise:

- Alluvium (clay, silt and gravel), present at the ends of all the routes within the floodplains, and watercourses.
- Colluvium and Valley Head (clay and sand), present variably throughout the routes.
- Head (gravel), present variably throughout the routes particularly within the River Isle basin.

According to the BGS mapping, no made ground is identified. However variable made ground associated with historical features and the existing road network is anticipated.

Given the scale of the proposed works and uncertainty of the geological mapping, it is considered that local areas of unmapped superficial deposits may also be encountered.

Solid geology

The solid geology of the site according to the BGS web-based *Geology of Britain Viewer* comprise:

- Branscombe Mudstone Formation
- Blue Anchor Formation
- Westbury Mudstone and Cotham Formation
- White Lias Formation
- Blue Lias Formation
- Charmouth Mudstone Formation

3.9. Mining

According to records on the BGS web-based Coal Authority Interactive Viewer (*Coal Authority Coal and Brine*) it is unlikely that any coal mine workings present or past are in the vicinity of the route options. Metalliferous mining does not affect the area of study.

3.10. Public utilities

Enquiries have been undertaken in accordance with Appendix C2 of the *Code of Practice "Measures Necessary where Apparatus is affected by Major Works" (Diversionary Works)* (Department for Transport, June 1992) to determine the location of public utilities within the scheme area.

The results of the C2 enquiry highlight that several undertakers have equipment that may require protection or diversion as a result of the proposed options. These are described below.

3.10.1. Wessex Water

Wessex Water's records indicate a relatively extensive domestic supply network. Their waste network is more localised, confined to built-up areas and some of the larger settlements within the rural areas.

Records for waste water indicate a sewer running across the scheme area from south to north through Orchard Portman. This crosses Stoke Road before running underneath the M5 motorway just south of Haydon Lane. There is also a sewer running across the scheme area from Stoke St Mary into Henlade.

The villages of Henlade, Ruishton, Hatch Beauchamp and Rapps are well served by mains sewers. Whilst these villages are close to the scheme area, the sewers appear to have local outfalls or tanks meaning that they are unlikely to be affected by the project.

Ashill also has a local sewage system although this is more likely to be affected as it drains underneath the existing A358 Ashill Bypass to a local sewage treatment works alongside its northern verge.

Records for water supply indicate a relatively extensive supply network in most settlements, connected along local roads (including the A358 through Henlade) between Taunton and the A378 junction at Mattock's Tree Green. From Mattock's Tree Green the supply runs into Hatch Beauchamp along the original A358 and then into West Hatch, Hatch Green and Capland.

At Capland the supply re-joins the current A358 briefly to reach Ashill where it again follows the original A358 through the village. To the east of Ashill there are several crossings of the A358 to supply villages such as Rapps and Broadway.

3.10.2. Western Power Distribution (WPD)

WPD's records indicate a number of high and low voltage overhead and underground cables across the site. The following are likely to be directly affected by the scheme:

- Overhead high voltage cables crossing land between Henlade, Haydon and Taunton.
- An overhead high voltage cable running roughly parallel to the A358 (to the south) between Ash and Henlade. This cuts across Stoke Road.
- A north-south overhead high voltage cable to the west of the village of Ash and up to the A378 junction at Mattock's Tree Green.
- A low voltage overhead crossing of the existing A358 at Bath House Farm.
- An overhead high voltage crossing of the A358 Hatch Beauchamp Bypass, to the north of Griffin Lane.
- Overhead high and low voltage cables in the verge of the existing A358 between Capland and Ashill.
- Overhead high voltage crossing of the existing A358 between Capland and Ashill.
- Underground high voltage crossing of the A358 Ashill Bypass (providing supply to the Ashill Sewage Works which are just to the north of the road).
- A north-south overhead cable running adjacent to the Ashill Bypass at Rapps, with a spur running across the A358.
- A high voltage underground crossing of the existing A358 at Southfields Roundabout.

3.10.3. National Grid

National Grid have provided records indicating the presence of two National High Pressure (NHP) gas mains towards the southern end of the scheme. One of the pipelines appears to cross the existing A303 Ilminster Bypass approximately 100m east of the Southfields Roundabout, and the second crosses the A358 approximately 1.5km north of the roundabout.

3.10.4. Scottish and Southern Energy (SSE)

SSE's records show that they have a telecommunications cable running in the southern verge of the A303 Ilminster Bypass. At the Southfields Roundabout this cable continues within the circulatory carriageway across the A358 arm and then continues in the southern verge of the local road into Horton Cross.

3.10.5. BT Openreach

BT's records indicate an extensive network of underground and overhead cables throughout the scheme area.

Cables run alongside the majority of local roads through Henlade, Ruishton, Haydon and Stoke St Mary, and also alongside the A358 through Henlade and up to the A378 junction at Mattock's Tree Green. From Mattock's Tree Green the cables follow the original A358 into Hatch Beauchamp rather than around the Hatch Beauchamp Bypass.

The cables run through Hatch Beauchamp and then re-join the current A358 at Capland. The cables run along the current A358 briefly until Ashill. Once in Ashill the cables again follow the original A358 carriageway through the village rather than around the Ashill Bypass, and then through Rapps and Horton. There are a number of overhead feeds to adjacent property and settlements along the entire length of the cable from Henlade to Horton many of which cross over the current A358.

3.10.6. Vodafone

Vodafone have provided information indicating that they have a cable running in the northern verge of the existing A358 from the Junction 25 roundabout through Henlade, Mattock's Tree Green, around the Hatch Beauchamp Bypass and on to Ashill. At the western end of the Ashill Bypass the cable crosses the road and from that point onwards the cable runs in the southern verge of the original A358 through Ashill village until it re-joins the current A358 carriageway.

3.10.7. Instalcom

Instalcom, representing Global Crossing (now Level 3 Communications) have provided records indicating a fibre optic cable following the A303 Ilminster Bypass and up the A358 as far as the local road known as Greenway Lane (just west of the A378 junction). At this point the cable follows Greenway Lane and Haydon Lane, crossing the M5 in the deck of Haydon Lane overbridge.

3.10.8. Wales & West Utilities

The search of Wales & West Utilities records revealed that the domestic gas supply network is relatively limited within the scheme area.

There is a well-established supply network within residential areas of Taunton, to the west of the M5 corridor. This extends across the M5 in the decks of the Stoke Road and

B3170 overbridges to supply property properties in Haydon and Orchard Portman and passes through Junction 25 to provide supply to Ruishton and Henlade.

There is a small local gas supply in the village of Hatch Beauchamp, although this appears to be fed from a pipeline to the north of the scheme, beyond the limits of the search that was undertaken.

Mapping has been obtained from Wales & West for the southern section of the scheme including areas around the villages of Ashill, Ilton and Rapps, and this indicates that there are no mains gas supplies in these rural areas.

3.11. Environmental status (designated areas)

There are no internationally designated sites of nature conservation or heritage value within the scheme extents or within 2km of the proposed scheme options. However, nationally and locally designated sites of historical, landscape and nature conservation interest are located within the footprint of the scheme options. They are as follows:

- The Blackdown Hills Area of Outstanding Natural Beauty (AONB) is located 2.1km south of the A358. This is nationally designated under the Countryside and Rights of Way Act 2000 in recognition of its national conservation importance and to ensure that its character and qualities are protected for all to enjoy.
- Three nationally designated Conservation Areas (the closest being Thornfalcon Conservation Area located 520m east) and one Registered Park and Garden (Hatch (Beauchamp) Court Grade II Listed located 600m east) are located within 1km of the existing A358 corridor. These are designated under the Planning (Listed Buildings and Conservation Areas) Act 1990.
- Hestercombe House Special Area of Conservation (SAC), Bracket's Coppice SAC, Exmoor & Quantock Oakwoods SAC, and Beer Quarry and Caves SAC are all designated for bat populations and are located within 30km of all proposed options.
- One nationally designated Site of Special Scientific Interest (SSSI) is located within 1km of the existing A358 (Thurlbear Wood and Quarrylands SSSI). SSSIs are designated for reason of any of its flora, fauna, geological or physiographical features.
- Approximately 30 designated Local Wildlife Sites (LWS) are located within the likely footprint of all proposed options.

In addition, Henlade Air Quality Management Area (AQMA), located on the existing A358, has been declared for exceedances in the national NO₂ annual mean objective.

3.12. Environment

3.12.1. Noise

Eleven Noise Important Areas (NIAs) are located within 500m of the proposed scheme options. These are located as follows:

- Three within the footprint of Option 1 + NFS

- 10 within 500m of Options 2A/2B,
- 10 within 500m of Option 8 + NFS and
- 10 within 500m of Option 8 +Jct 25

There are several sensitive receptors within 500m of the four scheme options. These include between 300-1000 residential properties, 10-20 farms and 10-15 commercial properties.

There is currently no baseline noise data within the vicinity of the scheme. Therefore, in support of the scheme and future environmental assessment, baseline noise monitoring would be undertaken at locations representative of sensitive receptors within the study area. This would be undertaken in future stages prior to the production of the Environmental Statement.

3.12.2. Local air quality

Based on 2015 roadside NO₂ concentration projected by the Defra Pollution Climate Mapping model, as well as information available on the Departments for Environment Food and Rural Affairs website (Defra, 2016) no links exceeding 40ug/m³ are present within 10km of the A358 Taunton to Southfields, and the highest concentration within that area is 33.9 ug/m³.

There is one Air Quality Management Area (AQMA) named Henlade AQMA, located within 1km of the Options 2A/2B, 8 + NFS and 8 + Jct25. There are no AQMAs within the study area of Option 1 + NFS; the nearest is 2.5km north of this option. Taunton Deane Borough Council has registered within their Air Quality Progress Report and Action Plan Progress Report (2011), two exceedances of the annual mean nitrogen dioxide (NO₂) objective in 2010. Both exceedances occurred in the East Reach AQMA, which is situated approximately 1km from the scheme options. Cullompton AQMA is located approximately 26km southwest of the Scheme alignments and was also declared due to exceedances of the NO₂ annual mean AQO.

There is currently no baseline air quality data in the vicinity of any of the scheme options, and therefore an air quality monitoring survey is currently being undertaken in support of the scheme on behalf of Highways England.

There are several residential properties representing sensitive receptors within the vicinity of all four scheme options.

3.12.3. Greenhouse gases

The baseline for the WebTAG Greenhouse Gases Appraisal is derived from the vehicle flows in the Do-Minimum Traffic scenario.

3.12.4. Landscape

There are no National Parks or Heritage Coastlines located within the study area for all proposed options. However, the Blackdown Hills located to the south and west of the

existing A358 is nationally designated as an Area of Natural Outstanding Beauty (AONB) and lies within 200m of the Option 1.

All of the proposed scheme options sit within four National Character Areas (NCAs), which are 140 Yeovil Scarplands (NE557), 143 Mid Somerset Hills (NE564), 146 Vale of Taunton and Quantock Fringes (NE550) and 147 Blackdowns (NE566). Those NCAs comprise a diverse and complex landscape with considerable local variation representing physical and economic influences; much of it has been formed and maintained by human activity, in particular through agricultural practices.

The landscape character within the vicinity of the existing A358 is largely rural, with a varied agricultural land use system and arrangement of villages, hamlets and scattered farms and dwellings. The landscape topography also varies along the A358 length, with two relatively flat areas (the Vale of Taunton in the northwest and the upper vale of the River Isle in the southeast) connected by the foot slopes of the Blackdown Hills. Broughton Brook and the River Tone are notable features within the Vale of Taunton landscape, both situated alongside the M5.

There are many visual receptors located within the scheme's likely Zone of Theoretical Visibility (ZTV), including approximately 228 footpaths, 21 bridleways and five restricted byways. There are also a number of elevated views outside of the 1km study area.

3.12.5. Townscape

Several settlements in combination with a varied agricultural land use system lie along of the existing A358 at the villages of Ashill, Stewley, Hatch Beauchamp, Stoke St Mary and Henlade. In addition, the proposed option 1 + NFS is near the villages of Bickenhall and Orchard Portman.

3.12.6. Heritage and historic resources

Poundisford Park Pale Scheduled Monument and Poundisford Park Grade II Registered Park and Garden are located within 300m of Option 1 + NFS. There is a Cross in St. Aldhelm and St. Eadburga churchyard Scheduled Monument within 1km of Options 2A/2B, 8 + NFS and 8 + Jct25.

There are many listed buildings within the 1km of all four scheme options, consisting of Grade I, Grade II and Grade II* listed buildings. In addition, Hatch Beauchamp and Taunton Conservation Areas are located within 1km of Options 2A/2B, 8 + NFS and 8 + Jct25.

There are many records of archaeological events and finds within 1km of the proposed options, many of which run along the existing A358. For example, the archaeological assets for Options 2A/2B, 8 + NFS and 8 + Jct25 includes properties from medieval and roman age, a 13th century church, a 16th century mansion and prehistoric settlement. Along the line of Option 1 + NFS, the archaeological assets includes a medieval and 18th century Deer Park, 17th century Corn Mill and a 14th century Moat. Also, a

medieval potsherd is recorded approximately 900m from the proposed Option 1 + NFS at Ashill.

3.12.7. Biodiversity

There are no Special Areas of Conservation (SACs), Special Protection Areas (SPAs) or Ramsar designated sites within 2km of all four scheme options, however Thurlbear Wood and Quarrylands Site of Special Scientific Interest (SSSI), lie within 200m of Option 1 + NFS. There are also no National Nature Reserves (NNRs) or Royal Society for the Protection of Birds (RSPB) Reserves within 1km of all proposed scheme options. However, four SACs designated for bat populations are located within 30km of all four scheme options. These include Hestercombe House SAC, Bracket's coppice SAC, Exmoor & Quantock Oakwoods SAC, and Beer Quarry and Caves SAC. In addition, there are between 25 and 34 Local Wildlife Sites (LWS) scattered within 1km of all four options. Further, three Local Nature Reserve (LNR) are located within the study area of the proposed options.

Various habitats have been recorded within the study area during the Extended Phase 1 Habitat Survey, undertaken between March and May 2016. In addition, this survey work in combination with the desktop study has identified habitats suitable to support bats, breeding birds, barn owls, kingfisher, badgers, dormouse, reptiles, white clawed crayfish, great crested newts, otters, and water voles.

Biodiversity Action Plan (BAP) Priority Habitats are also located within 1km of all four scheme options which include Ancient Woodland, Deciduous Woodland, Wood-pasture and Parkland, Lowland Calcareous Grassland, Coastal and Floodplain Grazing Marsh, Traditional Orchards and Lowland Meadows.

3.12.8. Water environment

The Environment Agency's indicative flood mapping shows that the four scheme options are partially situated within Flood Zones 2 and 3. Flood Zone 2 comprises land assessed as having between a 1-in-100 and 1-in-1000 (1%-0.1%) chance of flooding from fluvial sources each year. Flood Zone 3 comprises land assessed as having a 1% or 1-in-100 or greater chance of flooding from fluvial sources (>1%) each year. The indicative flood mapping also shows that there are areas within the study area at risk of flooding from surface water, particularly along the existing A358 within areas identified as Flood Zones 2 and 3. Based on the Water Framework Directive (WFD) (Directive 2000/60/EC) it is not considered that the risk of groundwater flooding is significant, as the aquifers within the catchments are generally at some depth. There are seven WFD waterbodies within proximity to the Scheme options the Rivers Ding, Isle, Verne's water, Fivehead River, Broughton Brook - South and West Somerset, Black Brook and Tone Ds Taunton.

None of the four scheme options fall within a Surface Water Nitrate Vulnerable Zone and there is no underlying groundwater protection zone within the study area for all four scheme options.

Two main rivers are within 1km of the four scheme options: The River Isle, the River Black Brook and several ponds have been identified within the study area of all scheme options.

3.12.9. Physical fitness

There are several Public Rights of Ways (PRoWs) and restricted byways within the vicinity of the four scheme options. The number of these within 200m of each option are as follows:

- Option 1 + NFS: 73 footpaths, 2 Sustrans cycle routes, 12 bridleways and 2 long distance paths;
- Option 2A/2B: 54 footpaths, 2 Sustrans cycle routes, 10 bridleways and 2 long distance paths;
- Option 8 + NFS: 77 footpaths, 2 Sustrans cycle routes, 10 bridleways; and 2 long distance paths; and,
- Option 8 + Jct25: 57 footpaths, 2 Sustrans cycle routes, 10 bridleways and 2 long distance paths.

3.12.10. Journey ambience

The view from the road to the north and the south of the existing A358 is largely rural, with varied agricultural land use, as well as view of settlements combined with the undulating and elevated topography of the surrounding landscape.

At present the A358 between Taunton and Southfields can experience delays and congestion during peak times.

3.13. Accessibility

3.13.1. Option values

An option value is the willingness to pay to preserve a transport service option not currently undertaken by other transport modes, beyond the expected value of any future use. The below text provides an overview of the existing conditions of transport services present within the vicinity of all scheme options.

The nearest railway line is present to the south of Bathpool, situated 1km to the north of options 2A/2B and Option 8/8B (Core + J25), 2.2km to the north of option 8/8B (Core + NFS) and 3.3km to the north of option 1/1B (Core + NFS). Taunton Railway Station is the nearest railway station, located approximately 3km to the north of the four options. Royal Naval Air Station (RNAS) Merryfield (formerly known as RAF Merryfield) is situated approximately 1km to the east of all scheme options. A large number of bus and coach services are known to utilise the existing A358 between Taunton and Ilminster, with bus stops on the A358 between Taunton and Thornfalcon, and additional stops at Hatch Beauchamp and Ilminster. There is also a Park and Ride facility located to the south of M5 Junction 25 which provides further bus services into the centre of Taunton.

3.13.2. Severance

Many Public Rights of Ways (PRoWs), undesignated paths and cycle routes are situated within the vicinity of all scheme options, a number of which have been severed by the construction of the existing A358, A303 and M5 roads. Crossings suitable for non-motorised users (NMU) are not common features in the area. There is an NMU bridge over the M5 at Poundisford Park, a signalised crossing of the A358 at the Park and Ride and two uncontrolled crossings at Henlade. Footways run alongside the A358 between the M5 Junction 25 and Henlade, with no further facilities alongside the A358 until Southfields Roundabout in the south. There are also a number of community facilities either side of the A358 such as schools, public houses, places of worship and shops. There is potential for existing traffic flows on the A358 to significantly impede NMU movements, potentially including vulnerable social groups.

3.13.3. Access to the transport system

Vulnerable social groups are likely to be present throughout the scheme area. The area to the west of the A358 and south of the M5 is predominantly rural and therefore there may be people who rely on public services to maintain accessibility to essential services. People with children are another vulnerable social group likely to be present within the local area. Somerset Progressive School is located adjacent to the A358, whilst Ashill Community Primary School is situated approximately 100m south of the scheme options.

The A358 corridor is known to be utilised by a number of bus and coach services which connect Taunton and Ilminster to the rest of the south west region. Approximately 14 bus or coach service routes have been identified which operate along roads within the vicinity of the scheme options. These include Somerset service numbers 29, 30, 51, 54, 55, 96C, 98, 99, 99A, 901, N10, N10C, Superfast 2 and the Taunton Park & Ride. Key destinations served by these public transport corridors and also within the vicinity of all scheme options include Taunton, Ilminster, Ruishton, Henlade, Ash, Hatch Beauchamp and Ashill with additional services to isolated properties in part.

3.14. Integration

3.14.1. Transport Interchange

The existing A358 ties in with the M5 Junction 25 to the northern extents of the scheme at Taunton and to the A303 at Southfields Roundabout close to Ilminster. The A378 extends eastward toward Langport from the A358 to the south of Thornfalcon. There are no other connections to major road networks along this section of the A358, although there are a large number of minor roads which meet the A358 and four bridges over the M5 within the vicinity of all scheme options.

Taunton Bus Station is located in the City Centre to the north of Tower Lane. The majority of operators connect to this public transport hub and together provide a well-developed service both locally and further afield to the south west region, London and the north. Companies including National Express, Buses of Somerset and Stagecoach

South-West all pass through Taunton. There are also two Park and Ride sites, namely Silk Mills to the west of Taunton and Taunton Gateway situated near the M5 Junction 25 which provide services into the centre of Taunton.

Taunton Railway Station is situated approximately 1km to the north of the Bus Station and is managed by Great Western Railway. In 2014-2015 it served approximately 1.315 million trips providing services to London Paddington in the east and Penzance furthest west.

3.14.2. Land use policy for South Somerset District Council and Taunton Deane Borough Council administrative areas

The South Somerset District Council (SSDC) Local Plan 2006- 2028 was adopted in 2015 and is a collection of policies which set out the long term vision and strategic context for managing and accommodating growth within South Somerset until 2028. Taunton Deane Borough Council's (TDBC) Core Strategy 2011- 2028 sets out their long term strategy with regard for developments over the next 15 years, whilst also including policies for the control of development across the Borough. Somerset County Council's (SCC) Future Transport Plan sets out SCC's long term strategy for getting the best from transport. Together, these documents set out local requirements with respect for land use policy, for accessibility and the integration of different forms of transport in Somerset.

Table 3.5 below identifies policies with respect to land use, accessibility and transport integration and provides a summary of relevant policies. Further information on local planning and land use policies can be found in Section 4.2.3 of this report.

Table 3.5: Land use, accessibility and transport integration summary for SCC, SSDC and TDBC

Local Policy	Policy Summary
Somerset County Council Future Transport Plan 2011- 2026	
Policy SUS2 Bus and Community Transport Services	SCC will ensure that essential services are maintained where possible in the early years of the plan and work to improve the way services work together in the later years of the plan.
Policy SUS 3 Smarter Choices	SCC will help people make smarter travel choices through providing high quality transport information and encouraging organisation to develop Transport Plans.
Policy SUS 4 Cycling	SCC will support the provision of appropriate and well connected cycling facilities.
Policy SUS 5 Walking	SCC will help people make more trips on foot and see the benefits of walking.
Policy SUS 6 Rights of Way	SCC will work to maintain Rights of Way and improve information available to use them.
Policy SUS 7 Rail	SCC will work with the rail industry and stakeholders to encourage traveling by train.
Policy HLT 1 Stay Active	SCC will give more opportunities to travel in a healthy way, such as by walking or cycling.
South Somerset District Council Local Plan 2006- 2028 (Adopted 2015)	
Policy TA1: Low Carbon Travel	New residential and employment developments should where possible provide: Travel Information Packs, charging points for electric vehicles, Green Travel Vouchers for 1 year to use sustainable transport, cycle parking facilities, Travel Plans and ensure sustainable transport measures are in place. New residential dwelling developments should enable ease of working at home. Where new residential/ employment sites would impact existing public transport planning obligations improved public transport connections increasing accessibility should be delivered.
Policy TA2: Rail	The council will encourage the promotion and protection of land for rail infrastructure development.
Policy TA4: Travel Plans	Travel Plans will be required depending on the size and scale of a development. SSDC sets out the thresholds for development size determining which type of Travel Plan should be in place.
Policy TA5: Transport Impact of a New Development	All new developments are required to address transport implications and to maximise the potential for sustainable transport through safeguarding existing and new transport infrastructure, securing inclusive, safe and convenient NMU access, ensuring the predicted nature and volume of traffic and parked vehicles generated by the development would not have a detrimental impact on the character or amenity of the area, ensure that proposals which require access to the strategic road network are well located on the network, assessing the transport impact of a development with larger schemes to prepare Transport Assessments and require car parking/ vehicle servicing at levels appropriate to the development.
Taunton Deane Borough Council Adopted Core Strategy 2011- 2028 (Adopted 2012)	
Policy CP 5 Inclusive Communities	Developments will promote sustainable development that creates social cohesive and inclusive communities, reduce inequalities, promote well-being and address accessibility to health, inclusive housing, training, education, places of worship, leisure and other community facilities.
Policy CP 6 Transport	Developments should contribute to reducing the need to travel, improve accessibility to jobs, services and community facilities and mitigate and adapt to climate change.
Policy CP 7 Infrastructure	TDBC will work with partners to ensure that infrastructure is in place at the right time and supports growth set out in the Core Strategy. It will also secure developer contributions towards provision of physical, social and green infrastructure.

3.14.3. Other government policies

The National Planning Policy Framework (NPPF) and National Policy Statement for National Networks (NPSNN) both require applicants to promote sustainable transport, improve accessibility and integrate transport modes. The government requires local

authorities to work with transport providers and neighbouring authorities to develop strategies for the provision of large scale roadside facilities to support growth of ports, airports or other major generators of travel demand in their areas and maximise sustainable transport modes. A Transport Statement or Transport Assessment is required for all developments that generate significant movements of traffic. Decisions will consider whether opportunities for sustainable transport modes have been taken up, safe and suitable access to sites can be achieved for all people, whilst requiring decisions to only be prevented or refused on transport grounds where residual cumulative impacts of development are severe. Furthermore, the protection and enhancement of public rights of way and access is encouraged, for instance where the national road network severs communities and community facilities and acts as a barrier for walking and cycling, developers are expected to correct historic problems and ensure easier and safer access for NMUs. The government's strategy for improving accessibility for disabled people is set out in *Transport for Everyone*, which is an action plan to improve accessibility for all. Compliance with the Equalities Act (2010) is also expected.

Further information on guidance at a national level can be found in Section 4.2.2 of this report.

3.15. Maintenance and repair statement

The M5 motorway (including works along the A358 on the approaches to Junction 25) was constructed in the early 1970s. The A303 Ilminster Bypass was constructed in the late 1980s. The southern section of the A358 between Mattocks Tree Hill and Southfields comprises two bypasses – the Ashill Bypass which was constructed in the early 1990s and the Hatch Beauchamp Bypass which was constructed in the mid-1980s. The existing dual carriageway section through Thornfalcon and into Henlade appears to comprise of a succession of upgrades to the original route, probably dating back to the 1960s and 1970s.

The M5 motorway and the A303 Ilminster Bypass are part of Area 2 of Highways England's Strategic Road Network and are currently maintained by Skanska under an Asset Support Contract. The A358 between Taunton and Southfields is part of Somerset County Council's road network. However the *Road Investment Strategy* states that improved sections will be brought into the Strategic Road Network and so the new A358 proposal would be adopted by Highways England following construction of the scheme.

Discussion has taken place with Skanska who have confirmed that the Area 2 maintenance programme is needs driven with a value management process in place to prioritise rehabilitation schemes over a 1 – 2 year timeframe.

The surfacing of the A303 Ilminster Bypass appears to consist of the original jointed concrete pavement. Good records of the existing A303 and M5 road drainage systems exist on the Highways Agency Drainage Data Management System (HADDMS).

Inspections of the majority of structures expected to be affected by the scheme previously promoted on this route were undertaken in 2004 in order to inform the development of that scheme. Reports from these inspections show the majority of structures to be in good condition with no signs of distress. However the capacity of the two bridges that carry the M5 carriageway over the Junction 25 gyratory is reduced due to a shear failure at corner bearings. It was also noted that the columns fail under collision loading. It is not clear if these problems have been resolved since 2004. Furthermore, the Griffin Lane Underbridge was found to be inadequate for permanent loading due to shear failure in the voided central span of the deck. This bridge carries the A358 Hatch Beauchamp Bypass over Griffin Lane near West Hatch. Strengthening work has been undertaken on this structure since, although it is not clear if this would be sufficient to enable the structure to be incorporated into the works.

No further information is available regarding the condition of the A358.

Further liaison will be required with Highways England's Asset Support Contractor and Somerset County Council. Further details of the condition of the road and associated infrastructure, particularly for sections of online widening where there is an opportunity to integrate the existing carriageway into the scheme as one half of the proposed dual carriageway should be explored further. In these circumstances it will be necessary to determine the residual life of the existing pavement and structures in order to assess the level of rehabilitation needed to incorporate them into the works.

4. Planning factors

4.1. Option constraints

Constraint mapping has been undertaken and has identified the following constraints within the surrounding area of the existing A358 between Taunton and Southfields and within the vicinity of the Blackdown Hills:

- Environmental constraints:
 - Air Quality Management Areas
 - Ancient woodland
 - Archaeological events and finds
 - Areas of Outstanding Natural Beauty
 - Areas susceptible to flooding (Flood Zones 2 and 3)
 - Authorised and Historic Landfills
 - Conservation Areas
 - Listed buildings
 - Local Geological Sites
 - Local Nature Reserves
 - Local Wildlife Sites
 - Noise Important Areas
 - Public Rights of Way
 - Registered Common Land
 - Registered Parks and Gardens
 - Rivers and areas of water
 - Scheduled Monuments
 - Sites of Special Scientific Interest
 - Utilities
- Political constraints:
 - Areas of tourism such as the Blackdown Hills
 - Planning applications
 - Strategic Development Areas

The environmental constraints plan can be found in Appendix B and provides an illustration of the existing A358 between Taunton and Ilminster in relation to statutory and non-statutory environmental designations within the vicinity of the proposed scheme options. In addition, a Geographical Information System (GIS) called GiGi has been created. GiGi allows users to view a map of the Taunton area and then overlays the proposed scheme options and constraints.

4.1.1. Summary of the constraints

South of the A358 the landscape is characterised by the Blackdown Hills Area of Outstanding Natural Beauty (AONB). Sizeable woodland pockets are common in this area, many of which are ancient woodland and/ or Local Wildlife Sites. A strong hedgerow network is also present. Poundisford Park Registered Park and Garden and Scheduled Monument are situated to the southern fringes of Taunton, with Taunton Racecourse an important facility nearby. There is also one Site of Special Scientific Interest (SSSI) to the south of the A358 (Thurlbear Wood and Quarrylands) as well as one National Nature Reserve (NNR) and Local Nature Reserves (LNRs). Stoke Hill is a prominent landscape feature and provides far reaching views to the north as far as the Quantock Hills AONB. Land situated to the south of the A358 is predominantly agricultural and is either used as pasture or for arable production.

The conurbation of Taunton is situated to the northern extents of the scheme. Two Air Quality Management Areas (AQMA) namely East Reach and Henlade AQMAs are present within Taunton, along with a number of Noise Important Areas (NIAs), whilst Cullompton AQMA is situated 26km to the southwest of the scheme options. The local area is predominantly residential with properties situated alongside the A358. Furthermore, three LNRs are situated just to the west of the M5 in Taunton, with several landfill sites also within the vicinity of Taunton. Broughton Brook and the River Tone are other notable features within the local landscape, both situated alongside the M5.

The northern section of the A358 runs along a low ridge through Henlade, separating a tributary valley from the River Tone floodplain. The A358 then gently rises to join the A378, just to the south of Thorn Hill, before converging into the lowland West Sedge Moor (Somerset Levels and Moors Special Protection Area (SPA) and Ramsar). This is contained to the south-west by the Wrantage Escarpment. The northern slopes of this feature are extremely steep and form a densely wooded escarpment, stretching from Hatch Court Park Registered Park and Garden at its brow, through to Curry Rivel in the east. The landscape gradually merges into the gently undulating slopes of the Blackdown Hills to the west of Hatch Beauchamp. Here, the landscape encompasses large fields and droves. The hilltop village of Ashill is situated to the south of the A358 with two NIAs to the north of the village. Several small tributaries of the River Isle are situated within the vicinity of Ilminster causing much of the land to be susceptible to flooding. (RNAS) Merryfield (formerly known as RAF Merryfield) is an additional constraint to the east of Ashill.

Settlements are present within the vicinity of the scheme including Taunton, Ruishton and Creech St Michael to the north, Ilminster, Horton and Iton to the south and Hatch Beauchamp approximately halfway between the A303 and M5. A large number of hamlets and isolated residential properties are also present within the vicinity of the scheme.

The scheme as a whole is located in four National Character Areas (NCA): 143 Mid Somerset Hills, 140 Yeovil Scarplands, 147 Blackdowns and 146 Vale of Taunton and Quantock Ridges. This rural landscape encompasses a varied topography, with a series of ridges and steep broad-leaf woodland scarps. Local materials are used as building resources throughout, for example the Blue Lias stone is widely used in Ashill.

4.2. Legislation and guidance

4.2.1. International

Relevant international, European and national land use planning and environmental legislation applicable to the scheme constraints has been listed in Table 4.1 below².

Table 4.1: Key International, European and National Environmental Legislation

Topic	Key International, European and National Environmental Legislation
Air Quality	<p>International and European</p> <p>The Ambient Air Quality Directive (2008/50/EC) - Sets legally binding limits for concentrations in outdoor air of major air pollutants that impact public health such as particulate matter (PM₁₀ and PM_{2.5}) and nitrogen dioxide (NO₂).</p> <p>The proposed options have the potential to reduce air quality. The scheme would need to ensure that pollutant limits are not exceeded.</p> <hr/> <p>National</p> <p>The Air Quality Standards Regulations 2010 – Implements the EU's Directive 2008/50/EC and transposes the Directive's binding limit values into 'air quality standards' (AQSs) with attainment dates in line with the Directive. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive groups or on ecosystems.</p> <p>The scheme would need to ensure that pollutant limits are not exceeded and that sensitive receptors are not adversely affected.</p> <p>Air Quality (England) Regulations 2000 and Air Quality (England) (Amendment) Regulations 2002 – Set out objectives to reach a certain level of air quality within a given time period and work alongside Part IV of the Environment Act 1995, which required the Secretary of State to produce an action plan (the AQS) and for local authorities to monitor the air quality in their area.</p> <p>The proposed options have the potential to reduce air quality. The scheme would need to ensure that air quality objectives are met.</p> <p>There are two AQMA's within the study area of the proposed scheme; Henlade AQMA to the north of the proposed options, East Reach AQMA to the north west of the proposed options in the centre of Taunton and Cullompton AQMA 26km to the south west of the options.</p> <p>The Environmental Protection Act 1990, Section 79(1)(d) - Defines one type of 'statutory nuisance' as <i>'any dust, steam, smell or other effluvia arising on</i></p>

² The legislation included in Table 4.1 contains key relevant legislation and is not exhaustive.

Topic	Key International, European and National Environmental Legislation
	<p><i>industrial, trade or business premises and being prejudicial to health or a nuisance</i>'. Where a local authority is satisfied that a statutory nuisance exists, or is likely to occur or recur, it must serve an abatement notice.</p> <p>The construction stage of any of the proposed options has the potential to cause nuisance.</p>
Cultural Heritage	<p>International and European No legislation applicable</p> <hr/> <p>National</p> <p>The Ancient Monuments and Archaeological Areas Act 1979 – Provides for the protection of Scheduled Monuments through a designated schedule of monuments and also allows the Secretary of State to designate areas of archaeological importance.</p> <p>Relevant with regard to the impact upon the setting of the Scheduled Monuments that have the potential to be affected by the proposed scheme.</p> <p>The Planning (Listed Buildings and Conservation Areas) Act 2009 – Provides for the protection of Listed Buildings and Conservation Areas.</p> <p>Relevant with regard to the impact upon the setting of the Listed Buildings that have the potential to be affected by the proposed scheme.</p>
Landscape	<p>International and European No legislation applicable</p> <hr/> <p>National</p> <p>Countryside and Rights of Way (CROW) Act 2000 – Places a duty on Government Departments to have regard for the conservation of biodiversity and maintain lists of species and habitats for which conservation steps should be taken or promoted. Specifically, the Act places a statutory duty on relevant authorities to have regard to the purpose of conserving and enhancing the natural beauty of the AONB when exercising or performing any functions affecting land in the AONB.</p> <p>There are habitats and species of conservation importance within the footprint of all of the proposed options. Blackdown Hills AONB lies just to the south of the proposed options.</p>
Nature Conservation and Biodiversity	<p>International and European</p> <p>The Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) – The Convention has three 'pillars' of activity: the designation of wetlands of international importance as Ramsar sites; the promotion of the wise-use of all wetlands in the territory of each country; and international co-operation with other countries to further the wise-use of wetlands and their resources.</p> <p>There is a Ramsar Site approximately 3.5km to the north of the proposed options.</p> <p>The EC Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna ('Habitats Directive 1982') (as amended) (92/43/EEC) – Promotes the maintenance of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species listed on the Annexes to the Directive at a favourable conservation status, introducing robust protection for those habitats and species of European importance.</p>

Topic	Key International, European and National Environmental Legislation
	<p>There are protected habitats and species within the footprint of all of the proposed options.</p> <p>The EC Directive on the Conservation of Wild Birds ('Birds Directive 1979') (as amended) (79/409/EEC) - Provides a framework for the conservation and management of, and human interactions with, wild birds in Europe.</p> <p>There are habitats suitable for wild birds, including nesting and breeding birds, within the footprint of all of the proposed options.</p> <hr/> <p>National</p> <p>Wildlife and Countryside Act 1981 (as amended) – Protects all wild birds, certain wild animals and certain wild plants.</p> <p>There are habitats and species of conservation importance within the footprint of all of the proposed options.</p> <p>Conservation of Habitats and Species Regulations 2010 – Provide for the designation and protection of 'European sites', the protection of 'European protected sites', and the adaptation of planning and other controls for the protection of European sites.</p> <p>There are four Special Areas of Conservation designated for their bat populations within 30km of the existing A358, namely Hestercombe House SAC, Bracket's coppice SAC, Exmoor & Quantock Oakwoods SAC, and Beer Quarry and Caves SAC.</p> <p>Countryside and Rights of Way (CRoW) Act 2000 – Places a duty on Government Departments to have regard for the conservation of biodiversity and maintain lists of species and habitats for which conservation steps should be taken or promoted.</p> <p>There are habitats and species of conservation importance within the footprint of all of the proposed options.</p> <p>Natural Environment and Rural Communities (NERC) Act 2006 – Requires public bodies, including local authorities, 'to have regard to the conservation of biodiversity in England' when carrying out their normal functions.</p> <p>There are habitats and species of conservation importance within the footprint of all of the proposed options.</p>
Noise and Vibration	<p>International and European</p> <p>EC Directive on the assessment and management of environmental noise (2002/49/EC) - Sets out a common approach to avoid, prevent and reduce the effects on human health of exposure to noise, through an assessment of noise in Member States. Such information should be made available to the public.</p> <p>Both construction and operation phases for all of the proposed options have the potential to increase noise levels and adversely affect sensitive receptors.</p> <hr/> <p>National</p> <p>The Environmental Protection Act 1990, Part III – Under Part III of the Act, certain matters are declared to be 'statutory nuisances', including 'noise that is prejudicial to health or a nuisance and is emitted from or caused by a vehicle, machinery...'</p>

Topic	Key International, European and National Environmental Legislation
Road Drainage and the Water Environment	<p>Construction activities associated with the proposed options could lead to a statutory nuisance if best practice measures are not undertaken to prevent noisy and dust-creating works.</p> <hr/> <p>International and European</p> <p>The EC Water Framework (WFD) Directive (2000/60/EC) – Sets an overarching programme to deliver long-term protection of the water environment and to improve the chemical and ecological health of all waters (groundwater and surface water) and associated wetlands.</p> <p>There are seven WFD waterbodies within close proximity to the scheme options.</p> <p>The EC Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna ('Habitats Directive 1982') as amended (92/43/EEC) – Promotes the maintenance of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species listed on the Annexes to the Directive at a favourable conservation status, introducing robust protection for those habitats and species of European importance.</p> <p>There are rivers, streams and areas of standing water with the potential to support biodiversity that require protection.</p> <p>The EC Directive on the Conservation of Wild Birds ('Birds Directive 1979') as amended (79/409/EEC) - Provides a framework for the conservation and management of, and human interactions with, wild birds in Europe.</p> <p>There are a large number of waterbodies with the potential to support wild birds that require protection.</p> <hr/> <p>National</p> <p>The Water Environment (WFD) (England and Wales) Regulations 2003 – Implements the WFD Directive into UK Legislation to ensure that the objectives of the Water Framework Directive are met.</p> <p>There are seven WFD waterbodies within close proximity to the proposed options.</p> <p>The Flood and Water Management Act 2010 – Makes provisions about water, including provision about the management of risks in connection with flooding and coastal erosion.</p> <p>The proposed options lie within Flood Zones 2 and 3.</p>
People and Communities	<p>International and European</p> <p>Not applicable</p> <hr/> <p>National</p> <p>Not applicable</p>
Geology, Soils and Materials	<p>International and European</p> <p>The EC Water Framework Directive (WFD) (2000/60/EC) - Sets an overarching programme to deliver long-term protection of the water environment and to improve the chemical and ecological health of all waters (groundwater and surface water) and associated wetlands.</p> <p>There are seven WFD waterbodies within close proximity to the proposed options.</p> <p>The EC Framework Directive on Waste (2008/98/EC) – Requires member states to take appropriate measures</p>

Topic

Key International, European and National Environmental Legislation

to encourage the prevention or reduction of waste production and its harmfulness, and secondly the recovery of waste by means of recycling, re-use or reclamation or any other process with a view to extracting secondary raw materials, or the use of waste as a source of energy.

The construction activities associated with all of the proposed options will lead to the production of some waste.

National

The Environmental Protection Act (EPA) 1990, Part II

– This section sets out a regime for regulating and licencing the acceptable disposal of controlled waste on land. Controlled waste is any household, industrial and commercial waste. Part II stipulates that controlled waste must be treated, stored and disposed of in a manner that is not likely to cause pollution of the environment or harm to human health.

The construction of the scheme will require the disposal of some controlled waste.

The Environmental Protection Act (EPA) 1990, Part IIA

– Part IIA principally deals with sites where individual historic contamination linkages present a “Significant Possibility of Significant Harm” (SPOSH) or a “Significant Possibility of Significant Pollution to Controlled Waters” (SPOPCOW) representing an unacceptable level of contamination risk for each linkage.

There are a number of historic landfills and one authorised landfill in close proximity to all of the proposed options with the potential for contaminated land to be present.

The Contaminated Land (England) Regulations 2006

(as amended) – Set out provisions relating to the identification and remediation of contaminated land under Part 2A of the Environmental Protection Act 1990.

There are a number of historic landfills and one authorised landfill in close proximity to all of the proposed options with the potential for contaminated land to be present.

Waste (England and Wales) Regulations 2011 (as amended)

– Require organisations to confirm that they have applied the Waste Hierarchy, ensuring that waste is dealt in the priority of prevention, preparation for re-use, recycling, other recovery, and disposal.

Any waste generated during the construction of the proposed scheme is to be dealt with in line with the Waste Hierarchy.

The Hazardous Waste (England and Wales) Regulations 2009

– Define what constitutes hazardous waste and set out the controls on handling such wastes. The movement of hazardous waste is to be documented by a system of consignment notes.

The construction of the scheme may lead to the production of some hazardous waste.

Environmental Protection (Duty of care) Regulations 1991

– Sets out the documentary requirements as part of waste management. Transfers of waste must be accompanied by a transfer note containing a description of the waste, details concerning the ‘transferer’ and the ‘transferee’, and the place and time of the transfer.

Topic	Key International, European and National Environmental Legislation
	<p>The construction of the scheme will require the disposal of some controlled waste.</p> <p>Clean Neighbourhoods and Environment Act 2005 – Sets out new provisions for local environmental and social issues such as litter, fly-tipping and anti-social behaviour.</p> <p>Will be of particular relevance during the construction of the proposed scheme.</p> <p>Landfill (England and Wales) Regulations 2002 (as amended) – Aims to reduce the negative environmental and health impacts associated with landfilling waste.</p> <p>The scheme has the potential to produce waste that cannot be used and will therefore need to be landfilled.</p> <p>Control of Substances Hazardous to Health Regulations 2002 (COSHH) and Construction and Design Management (CDM) Regulations 1994 – Under these sets of regulations, where a developer knows or suspects the presence of contaminated soil, provision must be made to ensure that risks to the public and site works are controlled.</p> <p>There are a number of historic landfills and one authorised landfill in close proximity to all of the proposed options with the potential for contaminated land to be present.</p>
Environmental Planning	<p>International and European</p> <p>The Environmental Impact Assessment (EIA) Directive (2011/92/EU) (as amended) – Before development consent is given, Member States must take all measures necessary to make sure that projects likely to have significant effects on the environment by virtue of their nature, size or location are subject to an Environmental Impact Assessment (EIA).</p> <p>The scheme will be subject to an EIA as this type of development falls within Annex 1 of the EIA Directive.</p> <p>National</p> <p>The Planning Act 2008 – Establishes a system to deal with Nationally Significant Infrastructure Projects (NSIPs) and also to introduce a community infrastructure levy that can be charged on developers by local authorities.</p> <p>The area of development for the proposed options is, on average, 80 hectares, which exceeds the relevant threshold of 12.5 hectares in section 22 (4) (b) of the Planning Act 2008 for the construction or alteration of highways, other than motorways, where the speed limit for any class of vehicle is expected to be 50 miles per hour or greater. The scheme is therefore considered an NSIP for the purposes of sections 14 (1) (h) and 22 of the 2008 Act.</p> <p>The Highway and Railway (Nationally Significant Infrastructure Project) Order 2013 – Made amendments to the Planning Act 2008 to ensure that highway-related development is only considered an NSIP where it exceeds specific limits and or is likely to have significant effects on the environment.</p> <p>As described above, the scheme is considered to be an NSIP.</p> <p>The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (as amended) – These regulations are in accordance with the Planning Act 2008 and impose various procedural requirements, in</p>

Topic	Key International, European and National Environmental Legislation
	<p>particular the carrying out of an EIA in relation to applications for development consent and subsequent consent.</p> <p>The scheme will be subject to an EIA as this type of development falls within Annex 1 of the EIA Directive.</p>

4.2.2. National policy

Policy at the national level for each environmental topic is set out in the National Planning Policy Framework (NPPF), National Planning Practice Guidance (NPPG), and the National Policy Statement for National Networks (NPSNN). A summary of each is given below, and Table 4.2 provides a summary of the guidance relevant to each environmental topic contained within the documents.

National Planning Policy Framework (NPPF) and National Planning Practice Guidance (NPPG)

The National Planning Policy Framework (NPPF) and guidance within the National Planning Practice Guidance (NPPG) forms the national planning policy guidance. The NPPF was published in March 2012 and sets out the Government's planning policies for England and how these are expected to be applied. The framework acts as guidance for local planning authorities and decision-makers, both in drawing up plans and making decisions about planning applications. Subsequent to this, the NPPG was launched in March 2014 brings together planning guidance on various topics into one place. Listed below (Table 4.2) are the policies from the NPPF of relevance to each environmental topic.

National Policy Statement for National Networks (NPSNN)

There are no specific policies for nationally significant infrastructure projects in the NPPF. The Secretary of State determines these in accordance with the Planning Act 2008 and relevant national policy statements (NPSs) for major infrastructure, as well as any other matters that are considered both important and relevant. Policies within the NPSNN will be particularly relevant should the scheme be promoted as a Nationally Significant Infrastructure Project (NSIP), requiring a Development Consent Order (DCO) application.

Table 4.2: National Policy

Topic	Relevant National Policies
Air Quality and Greenhouse Gases	<p>NPPF</p> <p>Compliance with EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas (AQMA) and the cumulative impacts on air quality from individual sites in local areas is a requirement. Developments which contribute to or put at an unacceptable risk from, unacceptable levels of air pollution should be prevented.</p> <hr/> <p>NPSNN</p> <p>Where (after considering mitigation) a project would lead to a significant air quality impact in relation to EIA and/or lead to deterioration in air quality in a zone/agglomeration, substantial air quality considerations should be given. The Secretary of State should refuse consent</p>

Topic	Relevant National Policies
	<p>where, after taking into account mitigation, the air quality impacts of the scheme will either result in a zone/agglomeration which is currently reported as being compliant with the Air Quality Directive becoming noncompliant, or affect the ability of a non-compliant area to achieve compliance.</p>
Cultural Heritage	<p>NPPF</p> <p>Significant weight should be given to the conservation of heritage assets, and where development will lead to less than substantial harm to the significance of a designated heritage asset, the harm should be weighed against the public benefits of the proposal. Refusal of consent is required when a scheme would result in the substantial harm or total loss of significance of a designated heritage asset, unless substantial public benefits outweigh that harm or loss.</p> <hr/> <p>NPSNN</p> <p>The Secretary of State should identify and assess the particular significance of any heritage asset that may be affected by a development, whilst the significance of the heritage asset and value they hold now and in the future should also be considered. Substantial harm to or loss of designated assets of the highest significance should be wholly exceptional. Where a proposed development would lead to the substantial harm or total loss of significance of a heritage asset, the Secretary of State should refuse consent unless it can be demonstrated that substantial public benefits outweigh the loss or harm.</p>
Landscape	<p>NPPF</p> <p>The planning system should contribute to and enhance the natural and local environment by protecting and enhancing valued landscapes, geological conservation interest and soils, whilst decisions should encourage the effective use of land by re-using land which has been previously developed.</p> <hr/> <p>NPSNN</p> <p>The scheme assessment should consider any relevant national and local development policy, significant effects during construction and operation, and visibility and conspicuousness. Compliance with the respective duties in section 11A of the National Parks and Access to Countryside Act 1949 and section 85 of the Countryside and Rights of Way Act 2000 is required. Local designations should be given consideration in decision making by the Secretary of State, and the Secretary of State will judge whether visual effects on sensitive receptors outweigh the benefits of the development.</p>
Nature Conservation and Biodiversity	<p>NPPF</p> <p>Paragraph 118 states that if significant harm (to biodiversity) cannot be avoided, adequately mitigated, or (as a last resort) compensated then consent should be refused. Consent should also be refused if irreplaceable habitats such as ancient woodland and/ or veteran trees are lost or deteriorate in quality as a result of the scheme, unless the need for and benefits of the development clearly outweigh the loss. Additionally, where a project would be likely to adversely affect a SSSI, the development would not ordinarily be permitted, unless the benefits of the development clearly outweigh impacts on the features of the qualifying features of the SSSI. Projects on land within or outside an ecological designation, but likely to have an adverse effect upon the site are not favoured.</p> <hr/> <p>NPSNN</p> <p>The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity conservation interests including appropriate mitigation measures. Prior to granting Development Consent, the Secretary of State must, under the Habitats Regulations, consider whether the project would be likely to have a significant effect on the objectives of a European site, or on any site to which the same protection.</p>
Noise and Vibration	<p>NPPF</p> <p>Paragraph 123 requires projects to avoid noise giving rise to significant adverse impacts on health and quality of life, to mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise, and to identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason. Developments which contribute to unacceptable levels or place unacceptable risk of adverse effects from noise pollution should be prevented.</p> <hr/> <p>NPSNN</p> <p>Developments to be undertaken in accordance with the statutory requirements for noise. Applicants should ensure that the development avoids significant adverse noise impacts on health and quality of life, and mitigates/ minimises other adverse impacts on health and quality of life from noise, and contributes to improvements to health and quality of life through</p>

Topic	Relevant National Policies
	effective management and control of noise. For most national network projects, the relevant Noise Insulation Regulations will apply.
Road Drainage and the Water Environment	<p>NPPF</p> <p>Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, a Flood Risk Assessment (FRA) should support the proposal. The planning system should contribute to and enhance the natural and local environment by preventing both new and existing development from contributing to or being adversely affected by unacceptable levels of water pollution.</p> <p>NPSNN</p> <p>Applications for schemes in Flood Zones 2 and 3 should be accompanied by a FRA. In addition, applications for schemes that are located within Flood Zone 1 and are 1 hectare in area or greater, or subject to other sources of flooding (local watercourses, surface water, groundwater or reservoirs), or where the Environment Agency has notified the local planning authority that there are critical drainage problems, should also be accompanied by an FRA. For projects which may be affected by, or may add to flood risk, sufficiently early pre-application discussions should be sought between the applicant and the Environment Agency, and, where relevant, other flood risk management bodies. Surface water flood issues also need to be understood and then taken account of.</p>
People and Communities	<p>NPPF</p> <p>The government is committed to ensuring that the planning system does everything it can to support sustainable economic growth. Planning decisions should guard against the unnecessary loss of valued facilities and services, particularly where this would reduce the community's ability to meet its day-to-day needs, whilst protection and enhancement of Public Rights of Way (PRoW) and access and seeking opportunities to provide better facilities for users, for example by adding links to existing rights of way networks should be sought by the applicant.</p> <p>NPSNN</p> <p>For the development of the national road networks to be sustainable they should be designed to minimise social and environmental impacts to improve quality of life. Evidence should be provided by applicants, demonstrating that reasonable opportunities have been considered to deliver environmental and social benefits as part of schemes. Existing open space should not be developed unless the land is surplus to requirements or the loss would be replaced by equivalent or better provision in terms of quantity and quality in a suitable location. PRoWs, National Trails, and other rights of access to land (e.g. open access land) are important recreational facilities for walkers, cyclists and equestrians. Applicants should consider appropriate mitigation measures to address adverse effects on coastal access, National Trails, other PRoWs and open access land and, where appropriate, to consider what opportunities there may be to improve access.</p>
Geology, Soils and Materials	<p>NPPF</p> <p>The planning system should contribute to and enhance the natural and local environment by protecting and enhancing valued landscapes, geological conservation interest and soils, whilst local planning authorities should consider the benefits (such as economic) of the best and most versatile (BMV) land. Where significant development is demonstrated to be necessary, local planning authorities should seek to use areas of poorer quality land in preference to that of higher quality.</p> <p>NPSNN</p> <p>Where necessary, land stability should be considered in respect of new development, as set out in the NPPF and supporting planning guidance. Specifically, proposals should be appropriate for the location, including preventing unacceptable risks from land instability. The decision-maker should take into account the economic and other benefits of the best and most versatile agricultural land.</p>

Road Investment Strategy and Highways England Strategic Business Plan

In addition to the above national guidance documents, the *Road Investment Strategy: for the 2015/16-2019/20 Period* (Department for Transport, December 2014, updated March 2015), outlines a long-term programme to improve England's motorways and major roads (the 'strategic road network'). The *Road Investment Strategy* comprises:

- A long-term vision for England's motorways and major roads, outlining how the Department for Transport will create smooth, smart and sustainable roads;
- A multi-year investment plan that will be used to improve the network and create better roads for users; and,
- High-level objectives for the first roads period 2015 to 2020.

There is substantial provision within the RIS to ensure that the programme of investment is delivered in a way that minimises impact on the environment. The Strategic Business Plan (Highways England, 2014) sets out how Highways England will deliver the investment plan and performance requirements set out within the government's RIS over the coming five years. One of the key objectives of the Strategic Business Plan is for an 'improved environment', where the impact of the activities are further reduced ensuring a long-term and sustainable benefit to the environment. With this in mind, Highways England has created a series of ring-fenced funds, to address a range of specific issues over and above the traditional focus of road investment. These funds allow for actions beyond business as usual and will help the Company invest in retrofitting measures to improve the existing road network as well as maximising the opportunities offered by new road schemes to deliver additional improvements at the same time. Those of relevance to the scheme include:

- Environment: A £300 million Environment Fund to deliver specific enhancements to the network. This will enable the Company to deliver the improved environmental outcomes. In particular, the fund will be used to mitigate the worst impacts of noise on those living close to the network, support the transition to low-carbon road transport, improve local water quality and resilience to flooding, maintain an attractive landscape, and work to halt the loss of biodiversity.

Highways England strives to do even more to deliver improved outcomes for those living and working near the network, for example through the provision of new crossings and also the intention to produce their first National Cycling Strategy by the end of 2015.

Highways England has also ring-fenced £250 million in a Cycling, Safety and Integration Fund to help deliver improvements in these areas through both bespoke interventions, as well as enhancements to new and existing schemes. This includes investing £100 million to improve cycling provision on at least 200 sections of the network, as well as ensuring all new schemes are cycle-proofed. Another £105 million will be spent on additional measures to boost safety that extend beyond the high safety standards already in place.

Highways England have also stated that the SRN must be easier to get over, under or around to ensure that roads serve communities instead of severing them. Around £45 million of the Cycling, Safety and Innovation fund is therefore dedicated to improving all elements of integration.

4.2.3. Local policy

Local planning and land-use policy of relevance to the scheme is outlined below.

South Somerset District Council Local Plan 2006-2028

The South Somerset District Council (SSDC) Local Plan 2006-2028 was adopted in 2015 and defines the spatial implications of economic, social and environmental change. The Local Plan includes a collection of policies which set out the long-term vision and strategic context for managing and accommodating growth within South Somerset. Policies based around environmental protection include the following:

- **Policy EQ1: Addressing Climate Change in South Somerset** – The Council will support proposals for new development where they have demonstrated how climate change mitigation and adaptation will be delivered, through the inclusion of a number of measures.
- **Policy EQ2: General Development** – ‘Development will be designed to achieve a high quality, which promotes South Somerset’s local distinctiveness and preserves or enhances the character and appearance of the district.
- **Policy EQ3: Historic Environment** – ‘Heritage assets will be conserved and where appropriate enhanced for their historic significance and important contribution to local distinctiveness, character and sense of place.
- **Policy EQ4: Biodiversity** - All proposals for development, including those which would affect sites of regional and local biodiversity, nationally and internationally protected sites of geological interest will:
 - Protect the biodiversity value of land and buildings and minimise fragmentation of habitats and promote coherent ecological networks;
 - Maximise opportunities for restoration, enhancement and connection of natural habitats;
 - Incorporate beneficial biodiversity conservation features where appropriate;
 - Protect and assist recovery of identified priority species; and,
 - Ensure that Habitat Features, Priority Habitats and Geological Features that are used by bats and other wildlife are protected and that the design including proposals for lighting does not cause severance or is a barrier to movement.
- **Policy EQ5: Green Infrastructure** – Development proposals should provide and/or maintain a network of connected and multifunctional open spaces that meet particular policy requirements.
- **Policy EQ6: Woodland and Forests** – The loss of ancient woodland as well as ancient or veteran trees should be protected against loss wherever possible.
- **Policy EQ7: Pollution Control** - Development that, on its own or cumulatively, would result in air, light, noise, water quality or other environmental pollution or harm to amenity, health or safety will only be permitted if the potential adverse effects would be mitigated to an acceptable level by other environmental controls, or by measures included in the proposals.

A major part of the local plan is the identification of broad locations for employment and housing growth and accompanying policies for assessing development proposals,

taking account of the Government's NPPF and the NPPG. Land has been set aside for three employment development sites at Ilminster comprising Local Plan site ME/ILMI/3 (Application 09/04401/FUL gives approval for half of the site for a Highways Agency maintenance depot, whilst a caravan business has been approved for part of the site), site ME/ILMI/4 (the proposed development has outline approval (09/00051/OUT) for 16.7ha of employment land (B uses) that was permitted subject to Section 106 agreements in 2010) and site ME/ILMI/5 proposes 5.1ha of land to be allocated as employment land (B1, B2 and B8 uses).

These development sites are covered by Policy SS3 Delivering New Employment Land and Policy EP1 Strategic Employment Sites. Ilminster is also recognised as a development area within the Local Plan (covered by Policy SS1 Settlement Strategy, Policy SS3 Delivering New Employment Land and Policy SS5 Delivering New Housing Growth), with the strategy for direction of growth (Policy SS34 Delivering New Employment Land, Policy SS5 Delivering New Housing Growth and Policy PMT3 Ilminster Direction of Growth) to the south west of the town. No further development land has been allocated within the Local Plan between Ilminster and Hatch Beauchamp.

Taunton Deane Borough Council Adopted Core Strategy 2011- 2028

The Adopted Core Strategy for Taunton Deane Borough Council (TDBC) was adopted in 2012 and sets out their long term strategy with regard for development over the next 15 years. The Core Strategy along with the Taunton Town Centre Action Plan (2008) have replaced the majority of policies within the Taunton Deane Local Plan, which previously provided a comprehensive planning basis for development related decisions until 2011. The status of Local Plan policies are set out in Appendix 1 of the Adopted Core Strategy. The Core Strategy also includes a collection of policies which set out TDBC's long term strategy for development until 2028. Policies based around environmental protection include the following:

- **Policy 3.1 Presumption in Favour of Sustainable Development** – TDBC will take a positive approach that reflects the presumption in favour of sustainable development contained in the NPPF, to ensure that proposals secure development that improves economic, social and environmental conditions in the area.
- **Policy 3.2 Climate Change** – Development proposals should result in a sustainable environment, and will be required to demonstrate that the issue of climate change has been addressed by a number of factors.
- **Policy 3.9 Environment** – The Council is committed to conserving and enhancing the natural and historic environment and will not support proposals which will have an adverse impact on a Natura 2000 and/ or Ramsar site. Developments will be permitted that:
 - Are in accordance with national, regional and local policies for development within rural areas (including those for protected Natura 2000 and Ramsar sites);
 - Are appropriate in terms of scale, siting and design;
 - Protect, conserve or enhance landscape and townscape character whilst maintaining green wedges and open breaks between settlements;

- Protect, conserve or enhance the interests of natural and historic assets;
 - Do not exacerbate, and where possible improve the quality, quantity and availability of the water resource, reduce flood risk (fluvial and surface water);
 - Protect habitats and species, including those listed in UK and Local Biodiversity Action Plans, and conserve and expand the biodiversity of the Plan Area; and,
 - Provide for any necessary mitigation measures
- **Policy 6.1 General Requirements:** Additional road traffic arising, would not lead to environmental degradation by fumes, noise vibration or visual impact. Proposals will not lead to harm to protected species or their habitats. The appearance and character of any affected landscape, settlement, building or street scene will not be unacceptably harmed by the development. Potential air pollution, water pollution, noise, dust, lighting, glare, heat, vibration and other forms of pollution or nuisance will not unacceptable harm public health or safety or the amenity of dwelling or other elements of the local or wider environment.
 - **Policy 6.2 Development in the Countryside:** Developments outside of defined settlement limits will be supported when there is an identified local need, class B Business use in appropriate locations as well as various other criteria relating to holiday and tourism, agriculture and forestry, replacement dwellings, affordable housing, conversion of existing buildings and essential utilities infrastructure.

Taunton Deane Borough Council Strategic Housing Land Availability Assessment 2015 (SHLAA)

TDBC most recently produced a SHLAA in 2015, which provides a snapshot of deliverable and developable housing plots and will inform the forthcoming Site Allocations and Development Management Plan and Development Management processes. A number of housing sites have also been identified within the SHLAA. Notable developments include Comeytrowe (SHLAA Ref TA095 and TA149 which has planning permission in part subject to a Section 106 agreement)) which could provide up to 4250 dwellings, Monckton Heathfield (SHLAA Ref TA019) which proposes 2061 dwellings and Land at Staplegrove (SHLAA Ref TA161) which proposes up to 1618 dwellings.

Somerset County Council's Future Transport Plan 2011-2026

Somerset County Council's (SCC) Future Transport Plan sets out SCC's long term strategy for getting the best from transport. The Future Transport Plan covers the period between 2011 and 2026 and replaces Somerset's Second Local Transport Plan, which finished in March 2011. Improvements to the A303 and A358 and the Henlade bypass are identified as initiatives within Appendix B of the transport plan. The Transport Plan contains a schedule of policies that include the following:

- **SUS 1 Climate Change:** An annual action plan will be published explaining how SCC will lead Somerset's response to climate change;
- **SUS 10 Landscape and Biodiversity:** Enhancing the landscape and biodiversity of the local area;

- **ECN Sustainable Development:** Ensuring that sustainable development is at the forefront of thinking;
- **SAF 1 Road Safety:** Improving the road safety around Somerset; and,
- **HLT 3 Air Quality:** Minimising the effect any changes to Somerset's transport systems have on air pollution.

5. Description of route options

5.1. Option 1 + NFS

5.1.1. Introduction

Option 1/1B + NFS connects to the M5 approximately 4km south of Junction 25 at a free flowing interchange. A variation of this option, with south facing interchange links only, has previously been considered, hence the suffix “NFS” (North Facing Slips) that distinguishes this version. This option joins the route of the existing A358 approximately half way along its length, and then follows the A358 through to the Southfields Roundabout (the A303/A358 junction at Ilminster). This option has the most significant section of offline construction of all the four options under consideration.

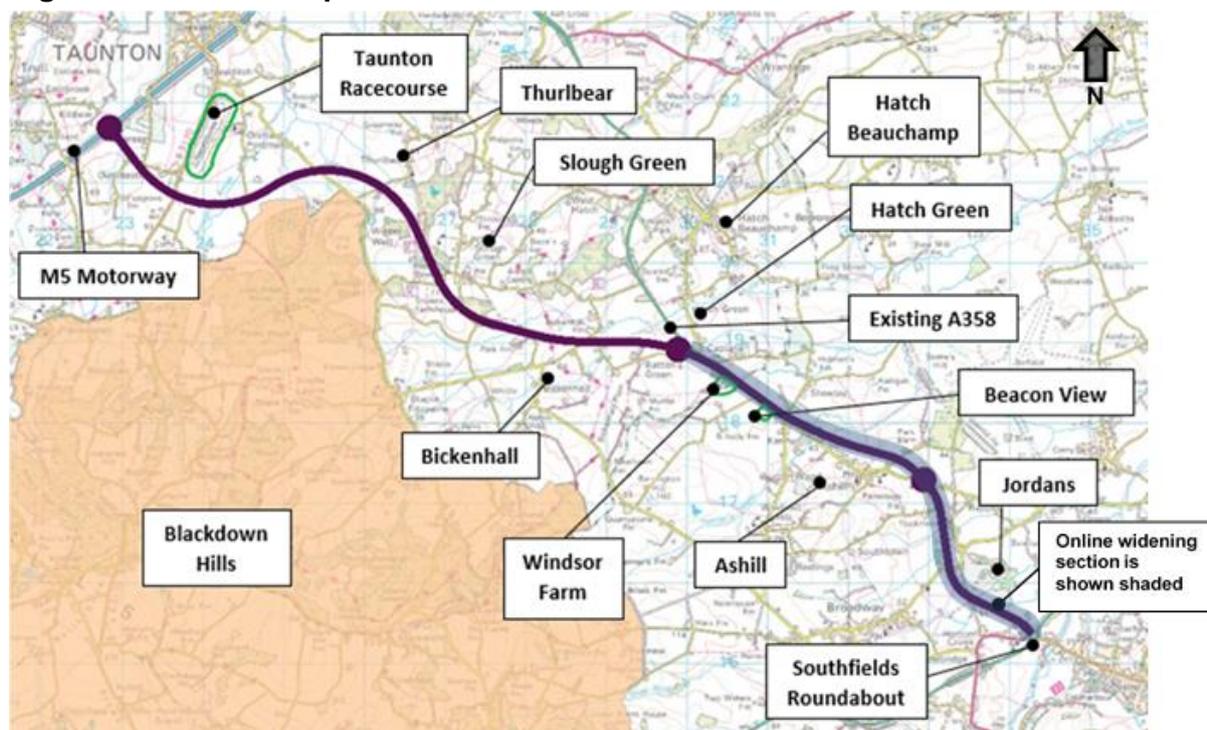
5.1.2. Description of route

Option 1/1B + NFS connects to the M5 Motorway via a three-way all movements grade separated junction approximately 4km south of Junction 25, adjacent to Taunton Racecourse. The new road initially takes a south-easterly course to run south of the racecourse before bearing northwards to avoid the Blackdown Hills AONB. The route takes an arching course between the Blackdown Hills and the villages of Slough Green and Thurlbear. At Bickenhall the expressway then bears east to join the existing A358 carriageway just south of Hatch Green. The offline section is approximately 8.5km in length.

The route then initially runs parallel to the existing A358 (to the north), for approximately 1km, enabling the existing carriageway to be retained as a local road between Ashill and Hatch Beauchamp. This will also enable the retention of access to existing properties along the route such as Windsor Farm and Beacon View.

Once at Ashill, the proposal involves the application of asymmetrical widening (i.e. the use of the existing single carriageway as one half of the new dual carriageway, and the construction of two new lanes alongside as the opposing carriageway) through to Southfields Roundabout. Around the north of Ashill, the existing carriageway will become the westbound carriageway and so the eastbound carriageway will be formed from new construction to the north. This will minimise impact on residential properties in the village. Between Ashill and Southfields this ‘asymmetrical’ widening is reversed to minimise impact on land associated with Jordans Park Local Wildlife Site.

Figure 5.1: Route Option 1/1B + NFS



5.1.3. Possible junctions

An all movements free flowing interchange is proposed at the M5 (Kibbear Farm). An all movements grade separated junction would be provided at Hatch Green to enable interchange with the existing A358 to and from Taunton and access to Hatch Beauchamp. A grade separated junction would be provided at Ashill to provide access to villages near Ashill and Ilton. An at-grade connection would be provided to the Southfields Roundabout with the A303, although local improvements may be required at that junction.

The proposed size and layout of these junctions would be determined during further design development and would be based upon predicted traffic volumes and relevant design standards. Junction locations may also vary to avoid constraints and optimise service to local traffic and non-motorised users.

5.1.4. Structures

Structures, primarily overbridges, will be required at each of the interchanges and junctions highlighted in Section 5.1.3. Structures, again primarily overbridges, will also be required in order to carry side roads across the proposed new road and maintain local road connectivity.

Culverts will be required in order to convey existing watercourses under the proposed road and side roads. In some instances these culverts will comprise simple piped cross sections, although for more significant watercourses these structures may need to have rectangular cross sections or be simple integral bridges. It is noted that watercourses such as Broughton Brook, Venners Water and Fivehead River, all of which are crossed

by the route of Option 1/1B + NFS, have flood plains. Depending upon the flood risk assessment, which will be undertaken in full during Stage 3, the structures associated with these watercourses may be significant.

Retaining walls may be required to minimise impact on adjacent property. For Option 1/1B + NFS it is not anticipated that these walls will be significant in quantity or size.

5.1.5. Compliance with standards

The horizontal and vertical alignment of this option would be fully compliant with geometric design standards for dual two-lane all-purpose roads.

The layout of junctions is generally anticipated to be compliant with the geometric standards for each junction type. However as design development progresses and impact on constraints becomes clear, it may be necessary to relax the standard of provision in which case the appropriate technical approval would be obtained prior to incorporating any reduced elements into the design.

5.1.6. Drainage

Hydrology

From the proposed junction with the M5, the first 5km of this route passes through the Black Brook and Broughton Brook catchments. These watercourses eventually drain to the River Tone just downstream of Taunton. As this section comprises a new offline route and there are flood plains associated with the watercourses it is expected that the drainage scheme through this section, which will include new culverts for watercourses and new outfalls from the highway drainage system, will need to meet stringent performance requirements particularly regarding the control of flooding.

The remaining 3.5km of offline section passes through the Fivehead River catchment, which is a tributary of the River Isle. As this section is also new construction the performance requirements for the drainage are also expected to be particularly high.

Along the online widening sections between Hatch Beauchamp and Southfields works will essentially involve the extension of existing crossings of watercourses such as Fivehead River, Venners Water and other tributaries of the River Isle and modifications to existing drainage outfalls. It has been noted that flood mapping obtained from the Environment Agency indicates that some of the existing watercourse crossings appear to act as a throttle, increasing the extents of existing upstream flood plains.

Requirements for these culverts with regards to alleviating existing flooding problems will need to be considered as design progresses.

Design

Edge of pavement detailing will follow the conventions set out in the Design Manual for Roads and Bridges and Highway Construction Details. Concrete channels will be used for the collection of surface runoff and these channels will outfall to adjacent watercourses via sustainable treatment systems. The treatment measures will vary from

site to site depending upon aspects such as available space and sensitivity of the receiving watercourses, although ponds and basins are expected to be the appropriate method along route Option 1/1B + NFS which runs through a rural area.

Earthworks drainage and pavement foundation drainage will be provided as required in accordance with the Design Manual for Roads and Bridges and where necessitated by geotechnical design.

5.1.7. Summary of benefits

- This option is likely to involve the highest quality alignment as it will not be subject to constraints such as the alignment of the existing A358 around Hatch Beauchamp Bypass.
- More direct route to the south-west peninsula (SWP).
- Significant amount of construction offline therefore simpler to construct than other options;
- This option is likely to improve network resilience as it involves an additional route and new junction with the M5, enabling separation of strategic traffic to the SWP from other traffic, including local traffic at Henlade.
- Based on correspondence with the utility companies, this option would affect the least amount of existing services compared with other route options.

5.1.8. Summary of issues

- This is the option that comprises the most amount of offline construction (8.5km) and so the associated environmental and community impacts are likely to be highest for this option. In particular this route would pass very close to the Blackdown Hills AONB.
- This option includes the greatest potential to impact upon side road and NMU crossings.

5.2. Option 2A/2B

5.2.1. Introduction

This option involves the re-use of the greatest amount of the existing A358 corridor of all four options, taking the route much further north than Option 1/1B + NFS between Hatch Beauchamp and Taunton. The unique feature of this option is that the route passes close enough to the A378 junction at Mattocks Tree Hill to enable direct interchange between the proposed road and the A378.

5.2.2. Description of route

Starting from the west, Option 2A/2B commences at the M5 approximately 2km south of Junction 25. South facing interchange links commence just north of Shoreditch Road Overbridge and pass over the M5 carriageway to become the new road, which initially passes south of Haydon and north of Stoke Hill.

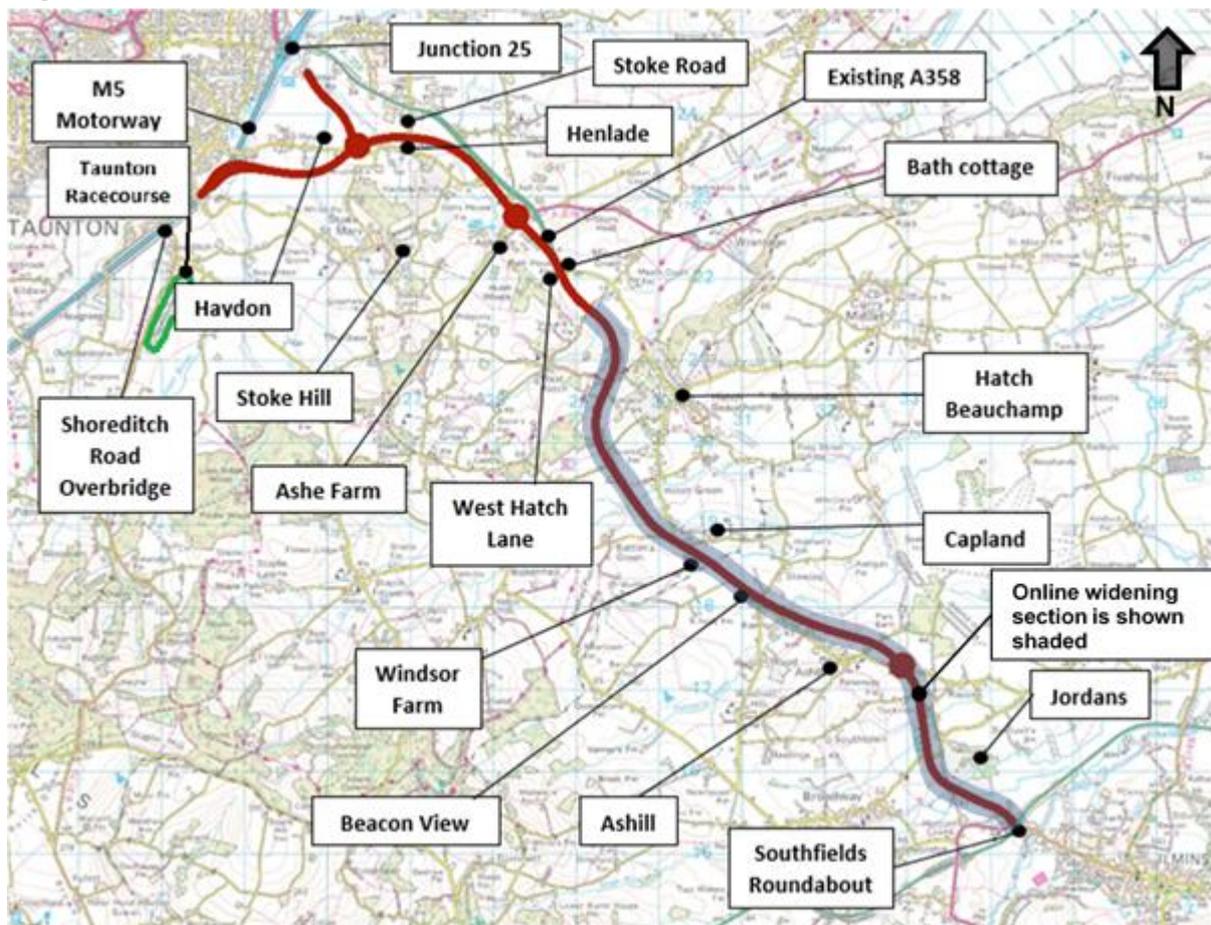
Between Haydon and Henlade a junction is proposed which allows traffic to interchange between the new road and Junction 25 via a new 1.5km dual carriageway link. This link would connect to a new roundabout and link road that are proposed as part of the strategic employment site adjacent to Junction 25.

The main route then passes in a retained cutting through a gap between properties along Stoke Road, Henlade, before running roughly parallel to the existing A358 (approximately 100-200m to the south) and to the north of Diary House Farm and Ashe Farm. The proposed road then meets up with the route of the existing A358 at West Hatch Lane, passing through a gap between Bath Cottage and the Somerset Progressive School. The proposed road then follows the existing A358 Hatch Beauchamp Bypass for 3.5km using asymmetrical widening, the southbound carriageway being formed from the existing road and the northbound carriageway being formed from new construction.

The route is identical to Option 1/1B + NFS from this point onwards. Between Capland and Ashill (approximately 1km) the proposed road takes an offline route just to the north of the existing road. This enables the existing road to be retained as a local route between Ashill and Hatch Beauchamp, and to provide access to existing properties along the route such as Windsor Farm and Beacon View.

Once at Ashill, the proposal involves the application of asymmetrical widening once more through to Southfields Roundabout. Around the north of Ashill, the existing carriageway will become the westbound carriageway and so the eastbound carriageway will be formed from new construction to the north, minimising impact on residential properties in the village. Between Ashill and Southfields this 'asymmetrical' widening is reversed to minimise impact on land associated with Jordans Park Local Wildlife Site.

Figure 5.2: Route Option 2A/2B



5.2.3. Possible junctions

A free flowing interchange is proposed with the M5. However this will cater for limited movements, namely westbound A358 traffic joining the M5 southbound and vice versa. Another limited movements junction will be provided to the east which will enable traffic to interchange between the new road and Junction 25 of the M5, subsequently enabling movements to and from the M5 (north) and to and from Taunton.

An all movements grade separated junction would be provided at Mattocks Tree Green to enable interchange with the existing A378. This junction could also serve communities to the south of the route such as Slough Green, Thurlbear and Stoke St Mary, and Hatch Beauchamp. A grade separated junction would be provided at Ashill to provide access to communities near Ashill and Ilton. An at-grade connection would be provided to the Southfields Roundabout with the A303, although local improvements may be required at that junction.

The proposed size and layout of these junctions would be determined during further design development and would be based upon predicted traffic volumes and relevant design standards. Junction locations may also vary to avoid constraints and optimise service to local traffic and non-motorised users.

5.2.4. Structures

Structures, primarily overbridges, will be required at each of the interchanges and junctions highlighted in Section 5.3.3. Structures, again primarily overbridges, will also be required in order to carry side roads across the proposed new road and maintain local road connectivity.

Culverts will be required to convey existing watercourses under the proposed road and side roads. In some instances these culverts will comprise simple piped cross sections, although for more significant watercourses these structures may need to have rectangular cross sections or be simple integral bridges. It is noted that watercourses such as Broughton Brook, Venners Water and Fivehead River, all of which are crossed by the route of Option 2A/2B, have flood plains. Depending upon the flood risk assessment the structures associated with these watercourses may be significant.

Retaining walls will be required to minimise impact on adjacent property. This will include a retained cutting to the south of Ruishton as the proposed road passes through the gap in property along Stoke Road, and retaining structures to accommodate carriageway widening of the M5 motorway associated with the south facing interchange links. These walls will be necessary to minimise impact upon adjacent residential property, allotments and open space adjacent to the motorway.

5.2.5. Compliance with standards

An objective of the design development of this option will be to maximise retention of the existing A358 alignment, particularly the Ashill and Hatch Beauchamp Bypasses which were constructed in the 1980s and 1990s and as such are relatively high standard single carriageway construction. However the pair of sweeping bends that carry the A358 around the western periphery of Hatch Beauchamp have been assessed to have substandard horizontal and vertical alignment based on relevant geometric standards for the proposed dual carriageway. These elements are also likely to contribute to sub-standard visibility. It is considered that there is sufficient justification for the retention of this alignment on the basis that it would minimise construction disruption, waste and visual intrusion. There is also precedent in the proposal to incorporate this alignment in the proposed scheme as this was the intention in the previous Announced scheme. It is therefore the intention that technical approval will be obtained for this aspect early in Stage 2.

The layout of junctions is generally anticipated to be compliant with the geometric standards for each junction type. However as design development progresses and constraints become clear, it may be necessary to relax the standard of provision in which case the appropriate technical approval would be obtained prior to incorporating any reduced elements into the design.

5.2.6. Drainage

Hydrology

From the proposed junction with the M5, the first 4km of this route passes through the Black Brook and Broughton Brook catchments. These watercourses eventually drain to the River Tone just downstream of Taunton. As this section comprises a new offline route and there are flood plains associated with most the watercourses it is expected that the drainage scheme through this section will need to meet stringent performance requirements, particularly regarding the control of flooding.

The following 3.5km will drain into the Widness Rhyne which, via West Sedgemoor, is a tributary of the River Parrett. A significant flood plain is associated with West Sedgemoor, and this is likely to be a factor in the design of drainage for these sections.

Along the online widening sections between Hatch Beauchamp and Southfields works will essentially involve the extension of existing crossings of watercourses such as Fivehead River, Venners Water and other tributaries of the River Isle and modifications to existing drainage outfalls. It has been noted that flood mapping obtained from the Environment Agency indicates that some of the existing watercourse crossings appear to act as a throttle, increasing the extents of existing upstream flood plains.

Requirements for these culverts with regards to alleviating existing flooding problems will need to be considered as design progresses.

Design

Edge of pavement detailing will follow the conventions set out in the Design Manual for Roads and Bridges and Highway Construction Details. Concrete channels will be used for the collection of surface runoff, and these channels will outfall to adjacent watercourses via sustainable treatment systems. The treatment measures will vary from site to site depending upon aspects such as available space and sensitivity of the receiving watercourses, although ponds and basins are expected to be the appropriate method along the majority of route Option 2A/2B. The exception to this will be the tie in works at the M5 motorway which are likely to be constrained by the need to minimise impact on adjacent property. In this area flood and pollution control measures are likely to comprise more heavily engineered facilities such as enlarged pipes, tanks and valves.

Earthworks drainage and pavement foundation drainage will be provided as required in accordance with the Design Manual for Roads and Bridges and where necessitated by geotechnical design.

5.2.7. Summary of benefits

- This option would use the existing road corridor as much as possible and thus minimise new or increased environmental impact to properties that are remote from the existing road.

- It would include the potential to re-use the existing carriageway construction, subject to condition surveys and geometric design development
- This option is likely to be the optimum solution with respect to impact on local side roads. Furthermore, because it most closely follows the existing route it also offers the greatest potential for remedying severance experienced by communities north and south of the existing A358 as a result of historical upgrades and increases in traffic volumes

5.2.8. Summary of issues

- This option is not as direct as Option 1/1B + NFS with regards to strategic traffic to the SWP.
- This option would benefit³ from the adoption of departures from standards associated with the alignment of two bends around the Hatch Beauchamp Bypass. This would obviously represent a reduction in the quality of the route, although part of the basis of the departures would be that potential safety implications are avoided or adequately mitigated.
- As a result of this option being closest to the existing A358 this option is likely to have the greatest potential impact on traffic during construction.
- Due to its proximity to Henlade and Ruishton this option has the least potential to improve aspects such as noise and air quality to adjacent residents.

5.3. Option 8 +J25

5.3.1. Introduction

The online section for this option is almost identical to that proposed for Option 2A/2B. However the offline section takes a more southerly route than Option 2A/2B, passing to the south of Ashe Farm and Diary House Farm and around the northern slope of Stoke Hill.

5.3.2. Description of route

Option 8/8B +Jct25 commences at the M5 approximately 2km south of Junction 25. South facing interchange links commence just north of Shoreditch Road Overbridge and pass over the M5 carriageway to become the new road, which initially passes south of Haydon. At Stoke Hill a junction is proposed which allows traffic to interchange between the road and Junction 25 via a new 2km dual carriageway link which connects to a roundabout and link road that are proposed as part of the strategic employment site adjacent to Junction 25. The road then continues in a south easterly direction for 2.5km passing to the south of Diary House Farm, Ashe Farm, skirting the northern boundary of Huish Woods and then joining up with the existing A358 corridor at West Hatch Lane.

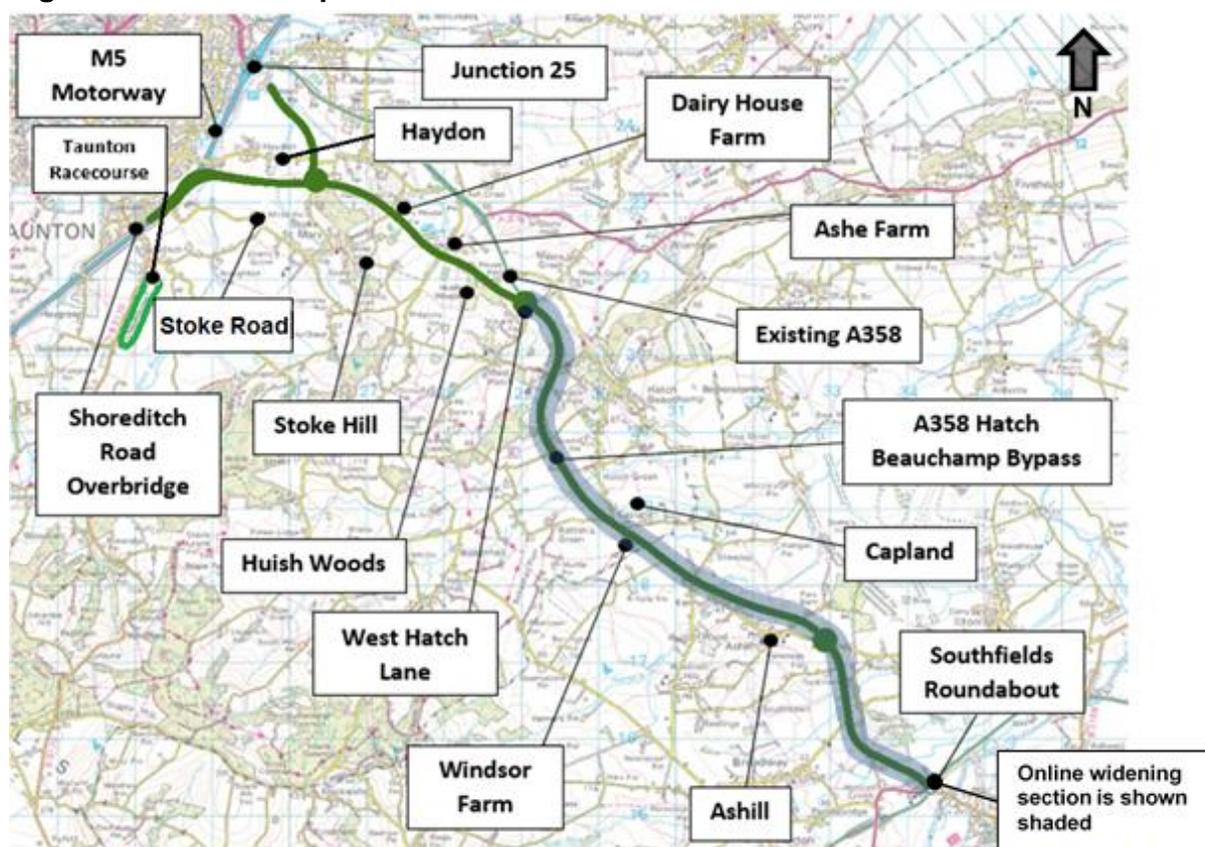
³ Option 2A/2B is not entirely dependent upon the approval of departures. If departures are rejected this will mean that it will be necessary for the route to take a straightened path through the Hatch Beauchamp Bypass, reducing the amount of online widening.

This option is identical to Option 2A/2B from this point onwards.

The proposed road then follows the existing A358 Hatch Beauchamp Bypass for 3.5km using asymmetrical widening, the southbound carriageway being formed from the existing road and the northbound carriageway being formed from new construction. Between Capland and Ashill, approximately 1km, the proposed road takes an offline route just to the north of the existing road. This enables the existing road to be retained as a local route between Ashill and Hatch Beauchamp, and to provide access to existing properties along the route such as Windsor Farm.

Once at Ashill, the proposal involves the application of asymmetrical widening once more through to Southfields Roundabout. Around the north of Ashill, the existing carriageway will become the westbound carriageway and so the eastbound carriageway will comprise new construction to the north, minimising impact on residential properties in the village. Between Ashill and Southfields this 'asymmetrical' widening is reversed to minimise impact on land associated with Jordans.

Figure 5.3: Route option 8/8B + Jct25



5.3.3. Possible junctions

A free flowing interchange is proposed with the M5. This will cater for limited movements, namely westbound A358 traffic joining the M5 southbound and vice versa. Another limited movements junction will be provided to the east which will enable traffic

to interchange between the new road and Junction 25 of the M5, subsequently enabling movements to and from the M5 (north) and to and from Taunton.

An all movements grade separated junction would be provided at West Hatch Lane to enable interchange with the existing A358. This junction would also serve adjacent communities such as West Hatch and Hatch Beauchamp. A grade separated junction would be provided at Ashill to provide access to communities near Ashill and Ilton. An at-grade connection would be provided to the Southfields Roundabout with the A303, although local improvements may be required at that junction.

The proposed size and layout of these junctions would be determined during further design development and would be based upon predicted traffic volumes and relevant design standards. Junction locations may also vary to avoid constraints and optimise service to local traffic and non-motorised users.

5.3.4. Structures

Structures, primarily overbridges, will be required at each of the interchanges and junctions highlighted in Section 5.4.3. Structures, again primarily overbridges, will also be required to carry side roads across the proposed new road and maintain local road connectivity.

Culverts will be required to convey existing watercourses under the proposed road and side roads. In some instances these culverts will comprise simple piped cross sections, although for more significant watercourses these structures may need to have rectangular cross sections or be simple integral bridges. It is noted that watercourses such as Broughton Brook, Venners Water and Fivehead River, all of which are crossed by the route of Option 8/8B + Jct25, have flood plains. Depending upon the flood risk assessment the structures associated with these watercourses may be significant.

Retaining walls will be required to accommodate carriageway widening of the M5 motorway associated with the south facing interchange links. These walls will be necessary to minimise impact upon adjacent residential property, allotments and open space adjacent to the motorway.

5.3.5. Compliance with standards

An objective of the design development of this option will be to maximise retention of the existing A358 alignment, particularly the Ashill and Hatch Beauchamp Bypasses which were constructed in the 1980s and 1990s and as such are relatively high standard single carriageway construction. However the pair of sweeping bends that carry the A358 around the western periphery of Hatch Beauchamp have been assessed to have substandard horizontal and vertical alignment based on relevant geometric standards for the proposed dual carriageway. These elements are also likely to contribute to sub-standard visibility. It is considered that there is sufficient justification for the retention of this alignment on the basis that it would minimise construction disruption, waste and visual intrusion. There is also precedent in the proposal to incorporate this alignment in the proposed scheme as this was the intention in the

previous Announced scheme. It is therefore the intention that technical approval will be obtained for this aspect early in Stage 2.

The layout of junctions is generally anticipated to be compliant with the geometric standards for each junction type. However as design development progresses and constraints become clear, it may be necessary to relax the standard of provision in which case the appropriate technical approval would be obtained prior to incorporating any reduced elements into the design.

5.3.6. Drainage

Hydrology

From the proposed junction with the M5, the first 4km of this route passes through the Black Brook and Broughton Brook catchments. These watercourses eventually drain to the River Tone just downstream of Taunton. As this section comprises a new offline route and there are flood plains associated with most the watercourses it is expected that the drainage scheme through this section will need to meet stringent performance requirements, particularly regarding the control of flooding.

The following 3.5km will drain into the Widness Rhyne which, via West Sedgemoor, is a tributary of the River Parrett. A significant flood plain is associated with West Sedgemoor, and this is likely to be a factor in the design of drainage for these sections.

Along the online widening sections between Hatch Beauchamp and Southfields works will essentially involve the extension of existing crossings of watercourses such as Fivehead River, Venners Water and other tributaries of the River Isle and modifications to existing drainage outfalls. It has been noted that flood mapping obtained from the Environment Agency indicates that some of the existing watercourse crossings appear to act as a throttle, increasing the extents of existing upstream flood plains. Requirements for these culverts with regards to alleviating existing flooding problems will need to be considered as design progresses.

Design

Edge of pavement detailing will follow the conventions set out in the Design Manual for Roads and Bridges and Highway Construction Details. Concrete channels will be used for the collection of surface runoff, and these channels will outfall to adjacent watercourses via sustainable treatment systems. The treatment measures will vary from site to site depending upon aspects such as available space and sensitivity of the receiving watercourses, although ponds and basins are expected to be the appropriate method along the majority of route Option 2A/2B. The exception to this will be the tie in works at the M5 motorway which are likely to be constrained by the need to minimise impact on adjacent property. In this area flood and pollution control measures are likely to comprise more heavily engineered facilities such as enlarged pipes, tanks and valves.

Earthworks drainage and pavement foundation drainage will be provided as required in accordance with the Design Manual for Roads and Bridges and where necessitated by geotechnical design.

5.3.7. Summary of benefits

- This option would use a significant amount of the existing road corridor and thus minimise new or increased environmental impact to properties that are remote from the existing road.
- It would include the potential to re-use the existing carriageway construction, subject to condition surveys and geometric design development.
- This option offers an alternative route to Option 2A/2B that passes further to the south of Henlade, thus increasing any noise and air quality benefits at Henlade.

5.3.8. Summary of issues

- This option is not as direct as Option 1/1B + NFS with regards to strategic traffic to the SWP.
- This option would require the adoption of departures from standards to reuse the alignment of two bends around the existing Hatch Beauchamp Bypass. This would obviously represent a reduction in the quality of the route, although part of the basis of the departures would be that potential safety implications are avoided or adequately mitigated.
- As this option follows a significant length of existing A358 there are likely to be challenges associated with the management of traffic during construction.

5.4. Option 8 +NFS

5.4.1. Introduction

The online section of this option is almost identical to that proposed for Option 2A/2B. The offline section takes a similar route to Option 8/8B + Jct25, although the link to Junction 25 is omitted in favour of a new all-movements junction with the M5, approximately 3.5km south of Junction 25. This option provides an additional north facing connection to the M5 that is not available with Option 8/8B + Jct25, hence the “NFS” (North Facing Slips) suffix.

5.4.2. Description of route

Option 8/8B + NFS commences at the M5 approximately 3.5km south of Junction 25 at a new two-bridge roundabout which forms a new all-movements junction with the motorway. The proposed road initially takes a north-easterly course past Shoreditch, crossing the B3170 and Stoke Road before arcing around the north of Stoke Hill. In contrast to Option 8/8B + Jct25, there is no link to Junction 25 from this location, and therefore no junction at Stoke Hill.

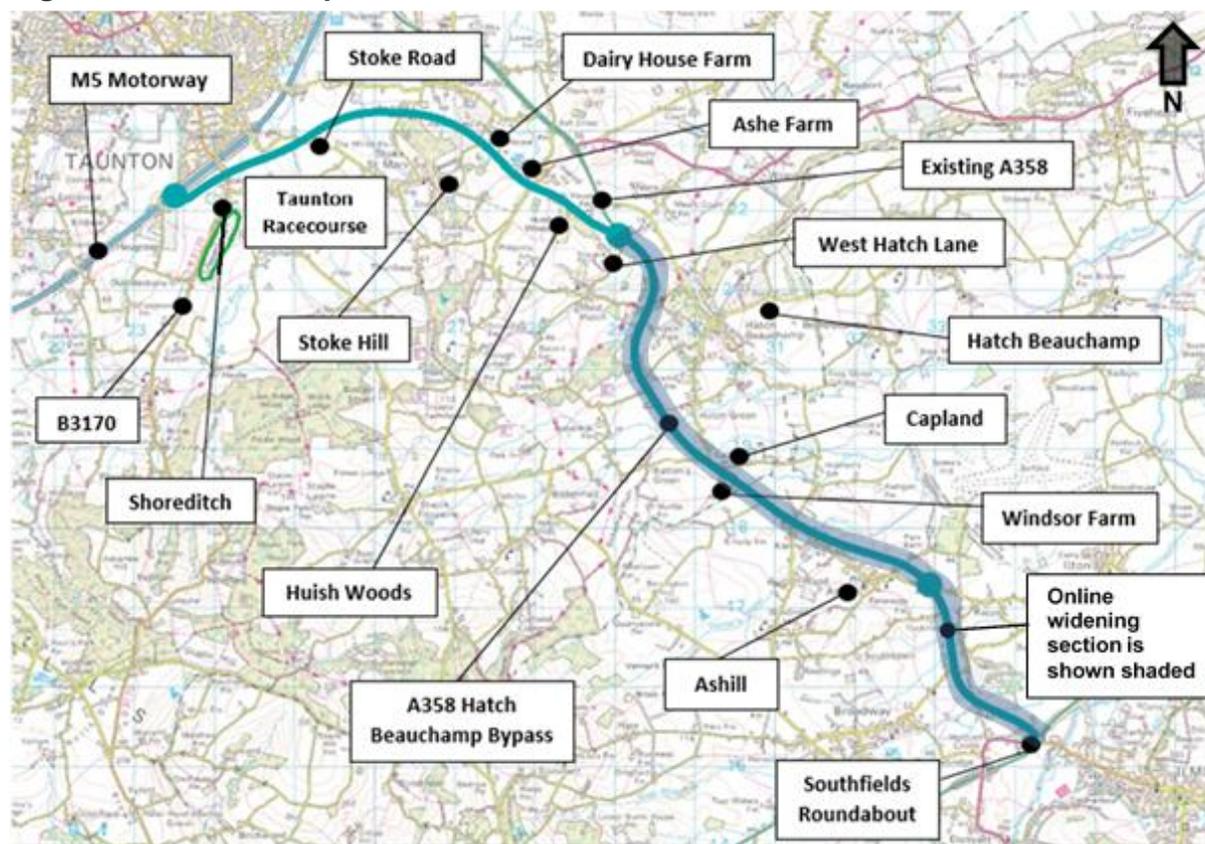
This option is identical to Option 8/8B + Jct25 from this point onwards.

From Stoke Hill the proposed road continues in a south easterly direction for 2.5km passing to the south of Dairy House Farm, Ashe Farm, skirting the northern boundary of Huish Woods and then joining up with the existing A358 corridor at West Hatch Lane.

The proposed road then follows the existing A358 Hatch Beauchamp Bypass for 3.5km using asymmetrical widening, the southbound carriageway being formed from the existing road and the northbound carriageway being formed from new construction. Between Capland and Ashill, approximately 1km, the proposed road takes an offline route just to the north of the existing road. This enables the existing road to be retained as a local route between Ashill and Hatch Beauchamp, and to provide access to existing properties along the route such as Windsor Farm.

Once at Ashill, the proposal involves the application of asymmetrical widening once more through to Southfields Roundabout. Around the north of Ashill, the existing carriageway will become the westbound carriageway and so the eastbound carriageway will comprise new construction to the north, minimising impact on residential properties in the village. Between Ashill and Southfields this 'asymmetrical' widening is reversed to minimise impact on land associated with Jordans Park Local Wildlife Site.

Figure 5.4: Route Option 8/8B + NFS



5.4.3. Possible junctions

An all movements grade separated junction will be provided at the connection to the M5 motorway. This will be located approximately 2.5km south of Junction 25, and will essentially form a new junction on the M5 for strategic traffic.

An all movements grade separated junction would be provided at West Hatch Lane to enable interchange with the existing A358 and A378. This junction could also serve adjacent communities such as West Hatch and Hatch Beauchamp. A grade separated junction would be provided at Ashill to provide access to communities near Ashill and Ilton. An at-grade connection would be provided to the Southfields Roundabout with the A303, although local improvements may be required at that junction.

The proposed size and layout of these junctions would be determined during further design development and would be based upon predicted traffic volumes and relevant design standards. Junction locations may also vary to avoid constraints and optimise service to local traffic and non-motorised users.

5.4.4. Structures

Structures, primarily overbridges, will be required at each of the interchanges and junctions highlighted in Section 5.5.3. Structures, again primarily overbridges, will also be required to carry side roads across the proposed new road and maintain local road connectivity.

Culverts will be required to convey existing watercourses under the proposed road and side roads. In some instances these culverts will comprise simple piped cross sections, although for more significant watercourses these structures may need to have rectangular cross sections or be simple integral bridges. It is noted that watercourses such as Broughton Brook, Venners Water and Fivehead River, all of which are crossed by the route of Option 8/8B + NFS, have flood plains. Depending upon the flood risk assessment the structures associated with these watercourses may be significant.

Retaining walls may be required to minimise impact on adjacent property. For Option 8/8B + NFS it is not anticipated that these structures will be significant in quantity or size.

5.4.5. Compliance with standards

An objective of the design development of this option will be to maximise retention of the existing A358 alignment, particularly the Ashill and Hatch Beauchamp Bypasses which were constructed in the 1980s and 1990s and as such are relatively high standard single carriageway construction. However the pair of sweeping bends that carry the A358 around the western periphery of Hatch Beauchamp have been assessed to have substandard horizontal and vertical alignment based on relevant geometric standards for the proposed dual carriageway. These elements are also likely to contribute to sub-standard visibility. It is considered that there is sufficient justification for the retention of this alignment on the basis that it would minimise construction

disruption, waste and visual intrusion. There is also precedent in the proposal to incorporate this alignment in the proposed scheme as this was the intention in the previous Announced scheme. It is therefore the intention that technical approval will be obtained for this aspect early in Stage 2.

The layout of junctions is generally anticipated to be compliant with the geometric standards for each junction type. However as design development progresses and constraints become clear, it may be necessary to relax the standard of provision in which case the appropriate technical approval would be obtained prior to incorporating any reduced elements into the design.

5.4.6. Drainage

Hydrology

From the proposed junction with the M5, the first 5km of this route passes through the Black Brook and Broughton Brook catchments. These watercourses eventually drain to the River Tone just downstream of Taunton. As this section comprises a new offline route and there are flood plains associated with most the watercourses it is expected that the drainage scheme through this section will need to meet stringent performance requirements, particularly regarding the control of flooding.

The following 3.5km will drain into the Widness Rhyne which, via West Sedgemoor, is a tributary of the River Parrett. A significant flood plain is associated with West Sedgemoor, and this is likely to be a factor in the design of drainage for these sections.

Between Hatch Beauchamp and Southfields, drainage outfalls will be to the Fivehead River, Venners Water and other tributaries of the River Isle. Works will essentially involve the extension of existing watercourse crossings, including those that currently already have flood plains. It has been noted that flood mapping obtained from the Environment Agency indicates that some of these existing watercourse crossings appear to act as a throttle, increasing the extents of existing upstream flood plains. Requirements for these culverts and any associated outfalls from the upgraded road with regards to alleviating existing flooding problems will need to be considered as design progresses.

Design

Edge of pavement detailing will follow the conventions set out in the Design Manual for Roads and Bridges and Highway Construction Details. Concrete channels will be used for the collection of surface runoff, and these channels will outfall to adjacent watercourses via sustainable treatment systems. The treatment measures will vary from site to site depending upon aspects such as available space and sensitivity of the receiving watercourses, although ponds and basins are expected to be the appropriate method along the majority of route Option 8/8B + NFS. The exception to this will be the tie in works at the M5 motorway which are likely to be constrained by the need to minimise impact on adjacent property. In this area flood and pollution control measures

are likely to comprise more heavily engineered facilities such as enlarged pipes, tanks and valves.

Earthworks drainage and pavement foundation drainage will be provided as required in accordance with the Design Manual for Roads and Bridges and where necessitated by geotechnical design.

5.4.7. Summary of benefits

- This option would use a significant amount of the existing road corridor and thus minimise new or increased environmental impact to properties that are remote from the existing road.
- It would include the potential to re-use the existing carriageway construction, subject to condition surveys and geometric design development.
- This option offers an alternative route to Option 2A/2B that passes further to the south of Henlade, thus increasing any noise and air quality benefits.
- This option is likely to improve network resilience as it involves an additional route and new junction with the M5, enabling separation of strategic traffic to the SWP from other traffic, including local traffic at Henlade.

5.4.8. Summary of issues

- This option is not as direct as Option 1/1B + NFS with regards to strategic traffic to the SWP.
- This option would require the adoption of departures from standards in order to reuse the alignment of two bends around the existing Hatch Beauchamp Bypass. This would obviously represent a reduction in the quality of the route, although part of the basis of the departures would be that potential safety implications are avoided or adequately mitigated.
- This option does not include a link to Junction 25. As such Taunton bound traffic will either have to briefly join the M5 motorway via the new junction and then leave the motorway at Junction 25, or leave the proposed route at the West Hatch Junction and travel through Henlade.

6. Traffic analysis

6.1. Traffic data

To assist with the creation of a strategic model for the scheme a large amount of data has been obtained from local authority datasets.

From Devon County Council (DCC) the following types of data were obtained:

- Automatic Traffic Count (ATC)
- Manual Classified Count (MCC)
- Roadside Interview Data (RSI)

From Somerset County Council (SCC) the following types of data were obtained:

- ATC
- MCC
- Roadside Interview Data (RSI)
- Journey Time Data

The above data included considerable amounts of ATC and MCC data for both the A358 and the A303/A30 between Honiton and Ilminster.

Additionally, manual classified turning count data for Junction 25 of the M5 at Taunton was obtained from JMP, while classified count data was obtained from Highways England Area 2 for sections of Junction 29 of the M5 at Exeter

ATC and journey time data was obtained directly from Highways England and DfT. For data up until the end of March 2015 this was from the HATRIS database (TRADS traffic flows, JTDB journey times). Data for the remainder of 2015 is obtained from the new Highways England Open Source online.

Origin-destination (OD) data is important for building transport models. Some OD data (in the form of road side interview data) was available from local authority sources, however the majority of this data was not collected within the immediate study area for this scheme. To complement the existing data Nationwide Data Collection (NDC) was commissioned in 2015 to carry out road side interview surveys (RSIs) and associated manual classified counts (MCC) and automatic traffic counts (ATC). NDC was also commissioned to carry out manual classified turning counts (MCTC) at two locations to supplement the data.

6.2. Traffic analysis methodology

The purpose of developing the new local traffic model was to forecast the traffic impacts of options for dualling the existing single carriageway A358 and to provide the evidence base for scheme appraisal. The following sections describe how the base model was built and used to produce future year forecasts for the scheme options.

6.2.1. Base year model

The local highway traffic model has been developed in the SATURN⁴ suite of traffic modelling software, in accordance with the Department for Transport's Transport Analysis Guidance (WebTAG), to represent three weekday time periods that are consistent with the SWRTM model time periods. These are an average AM peak period hour (07:00-10:00), an average hour in the inter-peak (10:00-16:00) and an average PM peak period hour (16:00-19:00) for an average Monday to Thursday weekday in October 2015 (excluding school holidays). A weekday off peak period (19:00-07:00) model has also been derived from the inter-peak model to assist with data provided for appraisal purposes. It should be noted that higher traffic flows occur at weekends and during holiday periods but, at this stage, these have not been modelled. Seasonal traffic will be addressed in PCF Stage 2.

The development of the highway model relied on new surveys described in chapter 6.1 of this report.

The zoning system within the model has been largely based upon the zoning system within the South West Regional Model. The SWRTM is based upon the Census Medium Level Super Output Area (MSOA). Within the Fully Modelled Area (FMA) and in close proximity to the proposed scheme and key areas of the A358 and A303/A30 it has been necessary to split SWRTM zones further with the lowest level of census area being used - Output Areas (OA). To represent development sites in the vicinity of the M5 Junction 25 new zones have been created within OA's. The network comprises of 248 different zones split amongst three distinct model areas:

- Fully Modelled Area (FMA) – this is the area over which the proposed scheme will have a significant influence. This network focuses on the M5, A358 and A303/A30 and is bounded by three key junctions: M5 Junction 25 that connects the M5 with A358 at Taunton; Southfields roundabout at the junction of the A358/A303 at Ilminster; and M5 Junction 29 that connects M5 with A30 at Exeter. The links included within the FMA are fully simulated within the SATURN model with junction delays included.
- Intermediate Area – developed in order to ensure the correct movement of trips between the external network and the FMA. Modelled as buffer network with a relatively fine zoning system and road network. The relevant Speed Flow Curves have been applied to each link within the intermediate area, with no junction delay included.
- A network external to the FMA and intermediate areas which provides the robust loading and routing of longer distance strategic trips. Modelling characterised by a great deal of zonal aggregation and a minimal road network. The relevant Speed

⁴ SATURN: Simulation and Assignment of Traffic to Urban Road Networks

Flow Curves have been applied to each link included within the external area, with no junction delay included.

Trip matrices have been prepared based on both observed and synthetic data. Checks were undertaken at key stages in the development of the matrices to ensure that the provenance of the matrices is maintained. Checks include analysis of the observed and synthetic matrices prior to merging and, after merging, comparisons with counts before applying matrix estimation. Analyses of the effects of matrix estimation are also in line with current WebTAG guidance.

The SATURN model convergence meets WebTAG criteria in all time periods. The model achieves a good level of traffic flow calibration with results indicating a close match to observations on the calibration screenlines and for individual link counts, with the TAG unit M3.1 criteria for GEH and flow proximity being met in all time periods for both all vehicles and cars

Traffic flow validation has been undertaken against independent count data and assessment of the validation process shows that the model also achieves a good level of flow validation in each of the modelled time periods. This meets many of the validation criteria and is close to meeting the criteria in TAG unit M3.1 in other cases.

The journey time validation is considered to be good with the model recreating all journey times that are representative on key routes in the modelled area, although the westbound delays on the A358 are difficult to accurately replicate in the model.

In conclusion it is considered that the base year highway assignment models developed for the October 2015 weekday average (Monday to Thursday) A358 Taunton to Southfields traffic model demonstrate a good representation of traffic behaviour in the study area and form a robust basis from which future year forecasts for the A358 scheme can be developed.

6.2.2 Traffic Forecasting

Forecasts have been prepared for two forecast years, the scheme opening year 2023 and a design year 15 years later, 2038. The forecasting method that was developed in line with this model took account of the spatial allocation of local development as well as using the Department for Transport's National Trip End Model 7.0 (NTEM7.0) released in July 2016 and the latest 2015 Road Transport Forecast databases. Since the release NTEM 7.0, some localised issues have been identified with the dataset with a revised NTEM7.0 dataset expected to be available at the end of February 2017. Nevertheless in the meantime for the purposes of this stage of the assessment the original NTEM7.0 has been used.

First the growth factors for the networks different zones were derived from NTEM and the matrices were factored to account for projected forecasted growth. Next the different developments identified by local councils were assessed in an uncertainty log to identify

those likely to be built by the opening or design years. The additional trips that these sites were projected to attract were incorporated into the matrix finessing stage.

The traffic forecasts have been prepared assuming a fixed matrix on an origin-destination basis using the local SATURN traffic model. Variable demand modelling has not been implemented at this stage but wider area reassignments have been assessed using the SWARMMS model that will be updated with the SWRTM in Stage 2. In the absence of variable demand modelling fuel and income factors have been applied to the trip end growth to represent the effect of changing costs over time, in accordance with WebTAG guidance.

Future year Most Likely networks have been based on the 2015 validated model. The schemes included in the Most Likely scenario were identified following an assessment of the likelihood of each scheme going ahead. These developments that would create a different highway structure have been coded as a difference between the 2023 and 2038 Do Minimum and the 2015 base networks.

Results indicate that the numbers of trips are forecast to increase for future forecast years of 2023 and 2038 above base year 2015 values across the study area. As the model has been run with a fixed trip matrix this means the initial future year trip matrices loaded on the Do Minimum and the Do Something networks are the same.

Currently the four route options defined in Chapter 5 of this report have been assessed. Analysis of Annual Average Daily Traffic (AADT) information shows relatively small flow differences on the new A358 to the east of the M5 between the Option 1 + NFS (31,700 2 way flow in 2038), Option 8/8B + Junction 25 (45,900 2 way flow in 2038) and Option 8/8B + NFS (26,000 2 way flow in 2038). The Option 2A/2B scheme attracts the most traffic to the new A358 (54,600 2 way flow in 2038), with the majority of this traffic (73%) accessing the M5 and Taunton via the new link to Junction 25, the remainder (27%) using the new free flow slip roads with the M5 to travel south on the M5.

Analysis of highway journey times demonstrates that each of the four scheme options would improve access times along the A358 corridor between the A303 at Ilminster and the M5 at Taunton.

For traffic travelling between the A303 east of the Southfields junction to the north of Taunton via the A358, journey time savings of 11%-15% during the AM period and 14%-20% during the PM period are forecast across the four options in 2038. For traffic travelling between the A303 east of the Southfields junction to the M5 north of Taunton via the A358, journey time savings of 17%-18% during the AM period and 19%-21% during the PM period are forecast across the three options in 2038. These results are for an average neutral weekday, which are likely to be greater during the higher flows experienced particularly during busy summer weekends.

For traffic travelling between the A303 east of the Southfields junction to the M5 at Junction 29 (Wincanton-Exeter) along the A303 and A30 there is a slight increase in forecast journey times, with an increase in journey time of 3%-4% during the AM period and 1%-3% during the PM period being forecast across the four options in 2038. This slight increase in journey times is a result of the increased levels of congestion at the Southfields roundabout and again would likely be greater during busy summer weekends.

The forecast traffic for each of the options contains the Most Likely scenario only, and does not include forecasts for Low or High sensitivity test forecasts at this stage. These sensitivity tests will need to be undertaken in the next stage.

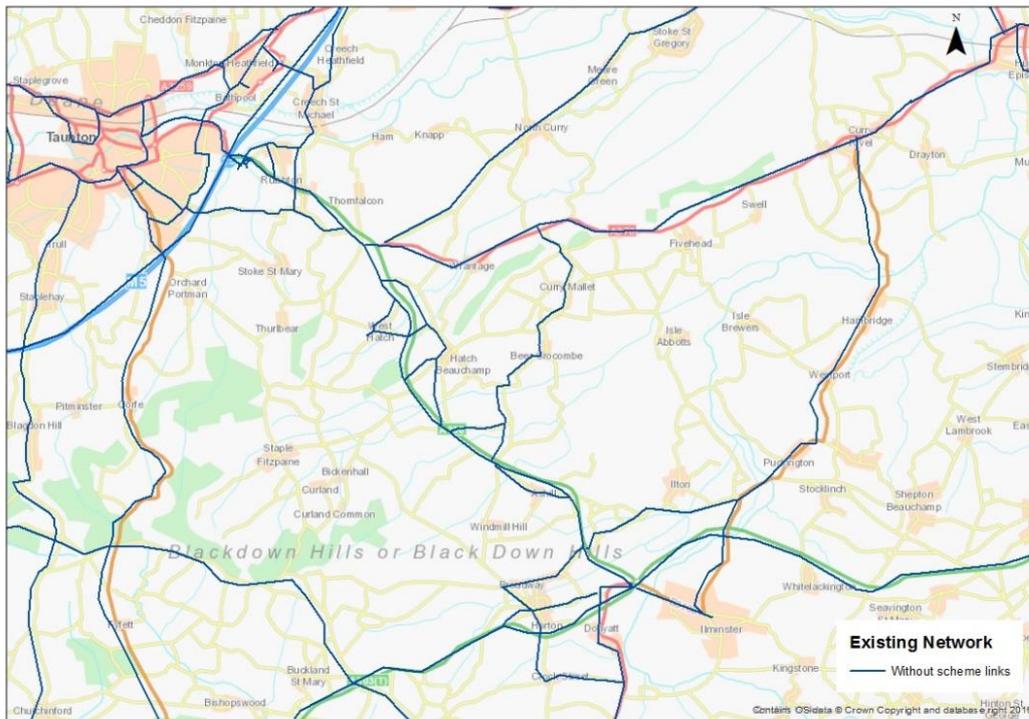
Operational assessment of Junction 25 has been carried out for the options both without a Junction 25 link (Option 8/8B+NFS) and with (Option 2A/2B and Option 8/8B+Jn25). The analysis was undertaken with LINSIG for the linked signal junction improvement proposed by Somerset County Council with forecast peak period traffic flows for the design year 2038. This showed that with the junction improvement the degree of saturation would be around 85% in both the AM and PM peak periods either with or without the Jn25 link. All options will remove traffic to M5 South from Jn 25 whilst for options without the link road the majority of traffic to Taunton and M5 North will still pass through Jn 25 via the old A358. This explains why there is not much difference in the operation of Jn 25 between the options. It should be noted that values for degree of saturation up to 90% are usually considered to be acceptable though the analyses show that further detailed analysis would be required to reduce queuing issues on the circulation internal links.

For Option 8/8B+NFS an ARCADY analysis of the operational performance of the proposed new all movements junction with M5 was assessed. This showed that for peak period design year 2038 traffic forecasts that the ratio of flow to capacity would be 0.46 for both peak periods. The acceptable limiting value is usually taken as 0.85 for roundabouts so there would be considerable spare capacity that could be used.

6.3. Networks and printouts

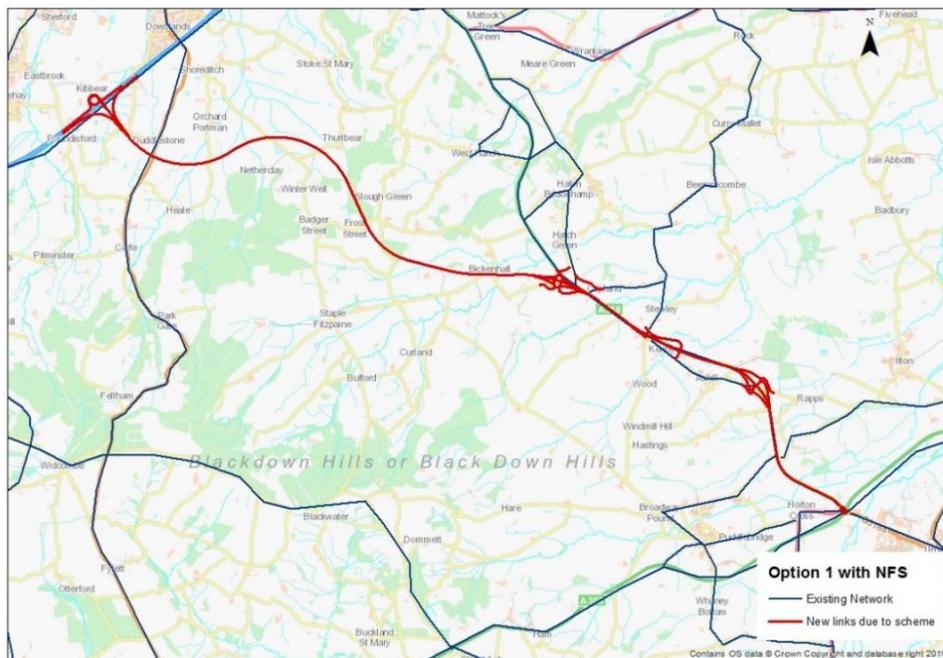
Figure 6.1 shows the without-scheme scenario, the local traffic model network is overlaying a map base of the local area. Figure 6.2 to Figure 6.5 show the graphical representations of the future forecast networks as they appear in with-scheme networks; the pink links show the new model links added to represent each of the four scheme options that have been tested.

Figure 6.1: A358 Taunton to Iminster network – without scheme



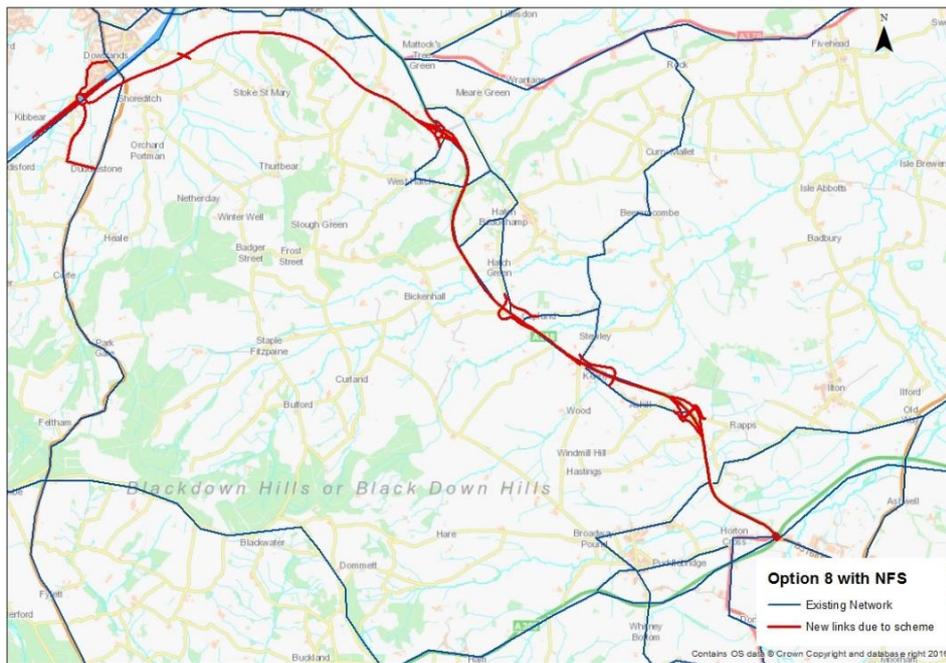
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Figure 6.2: A358 Taunton to Iminster network – with option 1 with NFS



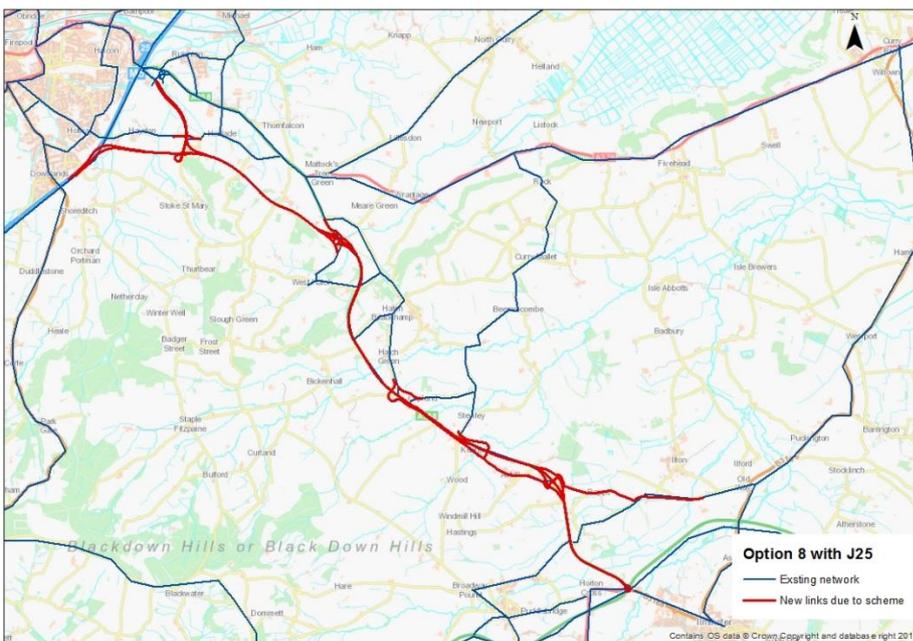
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Figure 6.3: A358 Taunton to Iminster network – with option 8 with NFS

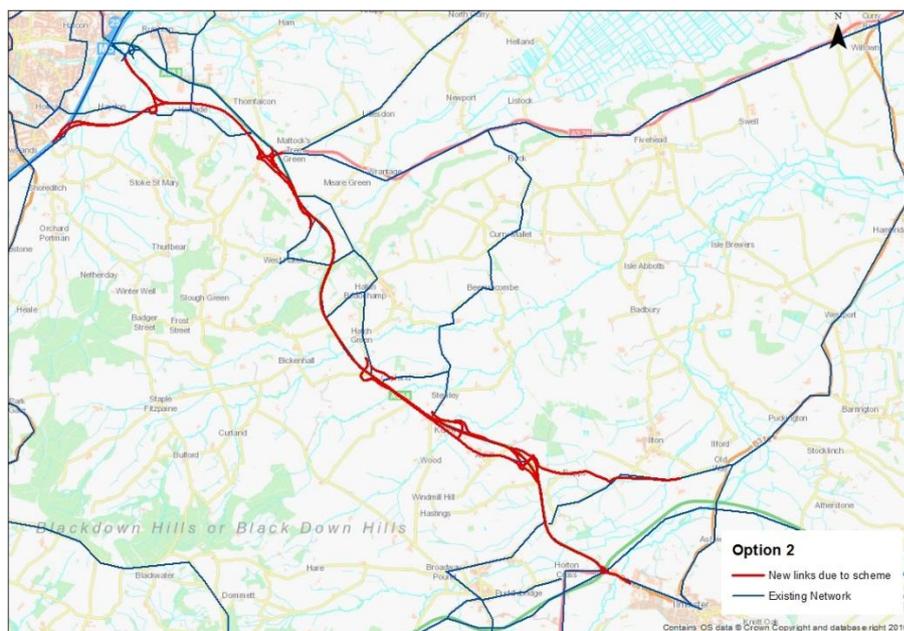


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Figure 6.4: A358 Taunton to Iminster network – with option 8 with J25



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Figure 6.5: A358 Taunton to Ilminster network – with option 2A/2B

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6.4. Road layout and standards

6.4.1. Road geometry

A high quality layout has been developed in order to understand the range of possible constraints that may be factors in the development of the route options. The option layouts are therefore fully compliant with geometric standards, although permitted relaxations have been employed where this has been deemed to be appropriate.

The whole A303/A358 route is to be classified as an Expressway in accordance with the Department for Transport's *Road Investment Strategy*. Design standards for expressways have yet to be published although Highways England have provided provisional guidance in the form of a Technical Note.

The design speed for each link has been selected in accordance with the references in Table 6.1.

Table 6.1: Link design speeds

Link Type	Design Speed (kph)	Reference
Mainline (Expressway)	120A	Expressway Technical Note
Interchange Links	85	TD22/06 Table 4/1
Slip Roads	70	TD22/06 Table 4/1
Dumb-bell Link Roads	70	TD22/06 Table 4/1
Single Carriageways	-	To be selected on a case by case basis, depending on location and adopting authority requirements
Compact Connectors	30	TD40/94 Paragraph 6.5

Objectives will be assessed and, if appropriate, alignments will be optimised through the application of further relaxations and departures from standard to derive a balanced solution.

The cross sections of the proposed route and side roads will be designed in accordance with TD27/05 “Cross Sections and Headroom”. Headroom clearances are also determined from this standard. It is expected that the road improvement will become a high load route and headroom clearances for overbridges have been designed accordingly.

It may be more appropriate to provide reduced cross sections for some minor side roads to be consistent with the character of the road and this approach will be applied in consultation with the local highway authority.

6.4.2. Junction strategy: location and layout

Typically the junction strategy would be determined following an assessment of accident, delay, capital and maintenance costs for various options. Much of this information was not readily available at the commencement of this stage of work, and so the junction strategy that is presented at this stage is provisional, the intention being that this can be refined during subsequent stages.

The provisional locations of the provisional junctions are provided in Table 6.2.

Table 6.2: Junction locations

Option	Junction	For interchange between the Expressway and . . .
Option 1	Kibbear Farm Interchange	M5 South and North
	Cad Road	A303 South, Ilminster, Ilton Taunton, Hatch Beauchamp, A378 and Ashill via retained A358 carriageway
Option 2/2D	M5 Black Brook Interchange	M5 South
	Forest Drove	Hatch Beauchamp and surrounding communities Taunton and A378 via retained A358 carriageway
	Park Barn Lane	Ashill, Ilton

Option	Junction	For interchange between the Expressway and . . .
		A303 South, Ilminster via retained A358 carriageway
Option 8A/8B	M5 Black Brook Interchange	M5 South
	Henlade	Taunton
	West Hatch Lane	Hatch Beauchamp A378 via retained A358 carriageway
	Park Barn Lane	Ashill, Ilton A303 South, Ilminster via retained A358 carriageway
Option 13	M5 Black Brook Interchange	M5 South
	Henlade	Taunton
	Forest Drove	Hatch Beauchamp and surrounding communities Taunton and A378 via retained A358 carriageway
	Southfields	A303 South, Ilminster Ashill, Ilton via new link

An early assessment has been made to determine whether full grade separation standards (in accordance with TD22/06) or compact grade separation (in accordance with TD40/94) would be most appropriate. In view of the likely high mainline flows that are expected all junctions are currently designed to full grade separation standards. This approach will be reviewed in PCF Stage 2.

7. Economic assessment

7.1. Application of TUBACOBA

The Department for Transport's Transport Analysis Guidance (WebTAG) provide a detailed methodology for quantifying a wide range of potential impacts of a transport scheme and monetising them wherever possible. According to the WebTAG guidelines, the potential impacts of the improvements are categorised under the main objectives as Economy, Environment, Society and Public Accounts. These objectives are further subdivided into sub-objectives. The economic assessment of the A358 Taunton to Ilminster scheme assesses impacts according to the guidelines and the results are summarised in an Appraisal Summary Table (AST) as prescribed in the WebTAG guidelines.

An assessment of the wider economic impacts has also been undertaken using the consultant's own approach. This approach has been carried out using TEAM (Mott MacDonald's Transparent Economic Assessment Model). This indicates that the wider economic impacts are positive and likely to be significant, providing further justification for the scheme.

The transport users' economic appraisal has been undertaken using the computer program TUBA (Transport Users Benefit Appraisal) Version 1.9.6, with an updated economics file to take on board changes in the November 2016 WebTAG guidance. Using trip and cost matrices from the traffic model, TUBA calculates user benefits and produces results for various degrees of disaggregation and summarises the outputs. For calculating accident benefits COBALT (Cost and Benefit of Accidents – Light Touch) version 13_02 was used. For calculating benefits caused by queues and delays as a result of scheme construction, the QUADRO version 14 (QUEues And Delays at ROadworks) program was used. With both programs the latest 2016 economics files were used to comply with the November 2016 WebTAG guidance. Journey time reliability has been assessed using the method set out in TAG A1.3 Appendix C.5.

The economic analysis is based on matrices from the application of a fixed trip matrix on an origin-destination basis using the local SATURN (Simulation and Assignment of Traffic to Urban Road Networks) traffic model. The economic appraisal has been carried out for a scenario that uses National Trip End Model (NTEM) 7.0 growth rates with attraction of planned local developments also taken into account.

Other impacts such as noise, air quality and greenhouse gases have also been monetised. These impacts are described in chapter 9 of this report and summarised in the Appraisal Summary Tables (Appendix C).

7.1.1. TUBA assumptions

The appraisal is based on matrices of trips and costs extracted from the transport model. From these, TUBA calculates the user benefits in time, fuel vehicle operating costs (VOC), non-fuel VOC and charges. Scheme costs are input and both benefits and

costs are discounted to the present value year (2010) in accordance with WebTAG unit A1.1 paragraph 2.7.6.

TUBA has been used to appraise four scheme options. The scheme will be opened in 2023. Forecasts have been produced for the opening year and 15 years later, 2038. The appraisal period is 60 years from scheme opening. Assumptions for the economic appraisal including economic parameters and annualisation factors that form inputs to the TUBA economic appraisal process include:

- After the year of 2038, user benefits are assumed not to grow and are subject to normal discounting to 2010 present value year and changes to other economic parameters.
- The economic analysis is based on a fixed origin-destination basis using the local SATURN traffic model.
- Any economic benefits are based on differences between the 'with' and 'without' scheme scenarios.
- Economic benefits are estimated for all hours and days of a full calendar year and have been derived from the weekday traffic models with off peak and weekend benefits derived by a process of factoring.
- The final appraisal has been carried out on scenarios that have been grown by the NTEM 7.0 growth rates along with local developments having been accounted for to address the trip attraction of future sites in the region. There have been data issues found with the initial release of NTEM 7.0 which are being addressed with an updated version due for release in 2017.
- scheme option costs have been assessed by Highway England's cost consultants Benchmark based on design information provided.

7.1.2. Accident assumptions in COBALT

COBALT (Cost and Benefits of Accidents – Light Touch) is the industry standard software provided by the Department for Transport which is used to derive the accident (or collision) impacts of a scheme. Accidents for the most recent five-year period were entered into the COBALT network along with the existing and future annual average daily traffic flows from the traffic model. Somerset and Devon County Council provided accident data between 2010 and 2014.

COBALT calculates existing accident rates based upon the Somerset County Council records and uses these to estimate future accident numbers in the Do-Minimum scenario, whilst rates for new carriageways in the scheme options are based upon default accident rates. COBALT then compares the predicted numbers of accidents with and without the scheme and converts them into monetary values by multiplying the numbers of accidents by their monetised costs.

COBALT outputs the accident benefits for the scheme over the 60-year appraisal period in 2010 prices and discounted to 2010.

7.1.3. Construction delay in QUADRO and maintenance delay

Some delays to the local road network will be caused during the construction of the A358 dualling. Consequently, a QUADRO-based economic assessment was performed to analyse the potential construction and maintenance impact due to the implementation of the improvements.

This assessment assesses the dis-benefits caused by construction of each of the options taking account of the traffic management proposals during construction and the time periods for which they are expected to be in place. The dis-benefits occur as a result of roadworks causing delays to traffic (both due to physical presence of the works and any delays caused by breakdowns or accidents occurring within the works), leading to impacts on travel times, vehicle operating costs, carbon emissions and accident costs.

It has been agreed with Highways England that delays due to maintenance will not need to be assessed in the options identification stage of the scheme and can be presented in the next stage. It should be noted that delays due to maintenance are likely to decrease due to the increase in network capacity with the scheme.

7.1.4. Journey time reliability benefits using WebTAG A1.3 Appendix C.5

'Reliable journeys' is one of the sub-objectives within the 'Economy' section of scheme appraisal and the estimate provided in this section is aimed at addressing this sub-objective for the A358 Taunton to Ilchester scheme. The term 'reliability' is often used interchangeably with 'travel time variability' or 'journey time variability'. The stress-based approach set out in TAG A1.3 Appendix C.5 has been used to assess journey time reliability benefits.

The predicted reliability benefits that have been calculated for the four modelled schemes are shown in Table 7.1.

Table 7.1: Predicted Reliability Benefits (£000s) – all DS options

	Option 1 NFS	Option 8 NFS	Option 8 Core + J25	Option 2A/2B
Travel Time Benefits (60 years' appraisal period)	522,694	477,376	536,206	625,449
Reliability Impact	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial
Reliability Percentage	10%	10%	10%	10%
Reliability benefits	52,269	47,738	53,621	62,545

Notes: All monetary values are expressed in 2010 prices discounted to 2010

7.1.5. Noise

The noise appraisal has been undertaken in accordance with TAG unit A3 chapter 2. Net present values (NPV) have been calculated for changes in noise, amenity and several specific health issues. To derive the NPVs, calculated values for each house within the respective option study areas required independent entries in the WebTAG Noise Worksheets for 'with' and 'without' scheme in both opening and design years. The study areas used in the calculations were consistent with the DMRB approach, which in broad terms has been determined by minimum changes of 1dB in a comparison between 'with' and 'without' scheme scenarios in the year of Opening, or the equivalent in the Design Year of 3dB. Thus the study areas for each option were different due to variations in traffic models.

Night-time noise has been calculated based on conversion from daytime to night-time using the relationship between daytime and night-time traffic flows identified within a Transport Research Laboratory report as discussed in DMRB. Owing to the preliminary stage of design, mitigation in the form of additional bunds or barriers has not been incorporated into the appraisal, and this has provided a more realistic reflection of overall benefits and dis-benefits.

As only a local traffic model has been produced at this stage which does not capture the changes that occur remote from the local area, for example reassignments from the M4 motorway, then a fixed matrix approach has been applied that excludes the wider area reassignment from the 'with scheme' case. This issue will be fully addressed in PCF Stage 2 with the application of the SWRTM whereby benefits from the traffic reductions remote from the study area can be accounted for in a regional assessment alongside the local impacts of wider area reassignment. The use of SWRTM will also account for variable demand modelling.

7.1.6. Air quality

The air quality appraisal has been undertaken in accordance with Transport Appraisal Guidance (TAG) unit A3 chapter 3. Net present values (NPV) have been calculated for both local and regional changes in air quality. To derive the NPV, calculations have only been undertaken in the air quality worksheets for any roads within 200m of the scheme options that meet the DMRB local air quality screening criteria in the traffic model. Such roads comprise: road alignment changes by 5m or more, daily traffic flow change by 1000 Annual Average Daily Traffic (AADT) or more, Heavy duty vehicle (HDV) flows, which comprise HGVs and buses, change by 200 AADT or more, daily average speeds change by 10kmph or more or peak hour speed change by 20kmph or more.

A review of traffic data for the base year, opening year and design year 'with' and 'without scheme' scenarios has been undertaken with calculations taking into account AADT flows and average flows in the morning AM (07:00- 10:00), inter peak (10:00- 16:00), evening PM (16:00-1900) and off peak (19:00- 07:00) periods including percentage of HDVs and average speeds outputs for the preceding periods.

Changes in air quality have been appraised using the Department for Transport's Local Air Quality Workbook and Air Quality Valuation Workbook.

For the same reasons given above, the air quality assessment has used a fixed matrix approach that excludes the wider area reassignment estimate and variable demand modelling impacts which will be captured in the option selection stage with SWRTM.

7.1.7. Greenhouse gases

The greenhouse gases appraisal has been undertaken in accordance with TAG Unit A3 Chapter 4. To derive the NPV of change in carbon dioxide equivalent (CO₂e) emissions for each option, traffic data has been provided comprising AADT flows including percentage HGVs, average link speeds for the AADT period and link lengths for each scenario assessed. Traffic data was used to calculate vehicle emissions of greenhouse gases (as CO₂e) for the opening year and design year of the scheme using factors derived from the Department for Transport's WebTAG Databook v1.5. Linear interpolation was used to calculate vehicle emissions between 2023 and 2038; these values were input into the Department for Transport's Greenhouse Gases Workbook to calculate the NPV. In accordance with the economics appraisal, the greenhouse gas appraisal assumes no change in greenhouse gas emissions beyond 2037.

For the same reasons given above, the greenhouse gases assessment has used a fixed matrix approach that excludes the wider area reassignment estimate and variable demand modelling impacts which will be captured in PCF Stage 2 with SWRTM.

7.2. Accident savings

The accident savings for each option, which contribute to the analysis of monetised cost benefits are reproduced in Table 7.2. This shows a saving in accidents for the options over the 60-year appraisal period for Option 1 NFS and Option 8 + Jct25, while Option 8 NFS sees a slight increase in accidents over the Do Minimum scenario.

Table 7.2: Predicted accident savings based on local accident rates

Severity		Values over 60-year appraisal period			
		Option 1 NFS	Option 8 + Jct25	Option 8 NFS	Option 2A/2B
Number of Personal Injury Accidents savings					
Casualties	Fatal	-0.2	-1.3	-1.2	-0.9
	Serious	34.5	43.44	16.8	47.4
	Slight	137.2	255.0	-97.6	253.6
Value of accident savings (£000s in 2010 prices discounted to 2010)		£6,977	£9,666	-£314	£10,184

7.3. Results of the economic appraisal

The overall impacts are summarised in the Analysis of Monetised Costs and Benefits table, which includes all results from the TUBA, COBALT and QUADRO programs as

well as the WebTAG-based assessments for reliability, noise, air quality and greenhouse gases. These are shown in Table 7.3.

The Net Present Value (NPV) results indicate that all the options provide value for money. The options will result in Benefit Cost Ratios (BCR) between 1.44 and 1.86 with the initial BCR and between 1.64 and 2.08 with the adjusted BCR that includes reliability benefits. Under the Department for Transport's value for money criteria, these represent medium to high value for money with the BCR around the BCR threshold of 2.0 between medium and high value for money. However, it should also be noted that the assessment of wider economic benefits undertaken with TEAM shows that these benefits are likely to be significant, providing further justification for the scheme.

Table 7.3: Analysis of Monetised Cost Benefits (£000s)

Item	Opt 1 + NFS	Opt 8 + NFS	Opt 8 + J25	Opt 2A/2B
Accidents (not assessed by TUBA) ¹	6,977	-314	9,666	10,184
Roadworks (not assessed by TUBA) ²	-28,162	-54,916	-54,691	-58,676
Greenhouse Gases (not assessed by TUBA) ³	-22,330	-21,791	-16,589	-18,969
Noise (not assessed by TUBA) ⁴	315	-837	2204	493
Air Quality (not assessed by TUBA) ⁵	76	71	180	-136
<hr/>				
Economic Efficiency: Consumer Users (Commuting)	103,727	95,830	108,557	122,843
Economic Efficiency: Consumer Users (Other)	111,111	98,781	127,916	159,928
Economic Efficiency: Business Users and Providers	218,925	200,801	239,090	283,355
Wider Public Finances (Indirect Taxation Revenues)	36,496	33,533	28,412	30,474
Present Value of Benefits (PVB)	427,135	351,158	444,745	529,496
<hr/>				
Broad Transport Budget / Present Value of Costs (PVC)	256,945	243,851	266,270	284,094
<hr/>				
OVERALL IMPACTS				
Net Present Value (NPV)	170,190	107,307	178,475	245,401
Initial Benefit to Cost Ratio (BCR)	1.662	1.440	1.670	1.864
<hr/>				
Reliability Benefits	52,269	47,738	53,621	62,545
Adjusted BCR	1.866	1.636	1.872	2.084

Notes: All monetary values are expressed in 2010 prices discounted to 2010 1 - From COBALT, 2 - From QUADRO 4 - TAG Unit A3 Chapter 2,4 - TAG Unit A3 Chapter 3,5 - TAG Unit A3 Chapter 4

8. Safety assessment

8.1. Impact on road user – Strategic Safety Action Plan

8.1.1. Introduction

A high level safety review has been undertaken for the four alignment options for A358 Taunton to Southfields Route Improvement scheme. This technical note sets out the findings of that review.

8.1.2. Highways England Policy

Highways England is a Government-owned public sector company whose primary role is to operate and improve the strategic road network. A key measure of its performance involves making its network a safer place, both to use and to work. Highways England acknowledges that it cannot entirely eliminate risk on the road network but that it can recognise risk, assess it and implement any controls which are reasonably required. The early route option selection stage provides the greatest scope for eliminating hazards and risk reduction.

Highways England has been set a target by the Government to achieve a 40% reduction in the number of Killed or Seriously Injured (KSI) accidents by 2020, with a longer term aim being to get as close as possible to zero by 2040.

The Highways England document 'Health and Safety, Our Approach' (2015) identifies three at-risk populations that it is responsible for (excluding its employees working away from offices):

- Road users
- Customer operations staff (e.g. Traffic Officers)
- Road workers and other supply chain employees

The design process for this scheme should at all times consider the safety of these populations.

The scheme objectives are identified in the Client scheme Requirements. For safety this objective was:

- Improve safety along the A303/A358/A30 corridor.
- The selection of more prescriptive safety objectives for the scheme will be set out in more detail in the Safety Plan which will be prepared later in the scheme programme. The Plan is expected to include:
 - For road users, the safety objective is a reduction in Personal Injury Collisions and no increase in severity ratio
 - For road workers, risks will be managed to be 'tolerable' (see the Health and Safety Executive's 'Tolerability of Risk' model), with the aim to implement

reasonably practicable control measures to drive residual risk towards the 'broadly acceptable' region.

8.1.3. Road Safety Review of Stage 1 PCF Options

Scheme options

During PCF Stage 1 a number of alignment options have been developed. These have been rationalised to 4 options; Option 1 + NFS, Option 2A/2B, Option 8A+Jct25 and Option 8+NFS. All four options utilise significant sections of the existing A358 alignment and then route off-line in the vicinity of the M5.

A desk top safety assessment of the four alignment options has been carried out supplemented by a site visit during which the locations of the tie-ins between the existing and proposed road alignments were observed first hand.

Information on existing non-motorised user (NMU) amenities, such as footways and bridleways, in the study area was available for the review, as was the results of NMU surveys conducted in September 2016.

Road safety review comments on the four alignment options are summarised in the tables below.

Table 8.1: Route Option 1 +NFS Road Safety Review Comments

Location	Option design / existing feature	Route Option 1+NFS Road Safety Comments
Scheme wide	New highway alignment	Several footpaths and bridleways intersect the new highway alignment. It is unclear from the option design how these will be catered for in the new dual-carriageway design. At-grade NMU crossings on high speed roads are not advisable. All NMU crossings of the new A358 should be designed to be grade-separated.
Existing A358	Existing A358 highway retained north of Capland	The option drawing provided does not indicate any proposed alterations to the existing A358 north of Capland. With a new offline highway proposed the existing A358 will become an important route for local access - including for NMUs - particularly if certain vehicle types are banned from using the new highway. Reduced traffic levels on the existing A358 may encourage increased vehicle speeds. NMUs will not be adequately catered for as there is currently very limited infrastructure specifically for pedestrians, cyclists and equestrians. As a guide, cycle-specific infrastructure should be provided where 85th percentile vehicle speeds are above 20mph or traffic flows are above 2500pcu/day. Where infrastructure is provided for NMUs it should be designed such that pedestrians, cyclists and equestrians do not come into conflict and cyclists may make use of their potentially higher speed.
Existing A358	Existing A358 upgraded south of Capland	Upgrading an existing road will bring construction workers in closer proximity to live traffic, compared to the offline schemes. This has significant potential to create more hazards for workers and their supply chain.
Existing A358	Existing A358 upgraded south of Capland	Upgrading of a section of the existing A358 alignment to 'expressway', with no parallel local access road provision, limits opportunities for east-west movements by local traffic. This may encourage 'junction hopping' by local traffic between any proposed junctions with its associated adverse safety implications due to excessive merging/weaving on the mainline, or else use of inappropriate local roads, many of which are of relatively low standard. Consider providing a Local Access Road or an easily identifiable east-west route made up of existing links and suitable for local and prohibited traffic. It is noted that while this issue is common to all scheme options, Option 1 retains the longest section of existing A358.
Various locations	Tie-in of new highway alignment to local road network	The exact location of any junctions connecting the scheme with the local road network and of any overbridges/underbridges connecting local roads to be provided along the scheme length are unknown at this stage. However, the scheme is located in a rural area with many local roads barely 3 or 4m wide and bound by hedgerow. Care will therefore need to be taken to ensure that sudden changes in road character between existing and new highway is avoided. Sudden changes in character can lead to excessive acceleration/braking by drivers.

Location	Option design / existing feature	Route Option 1+NFS Road Safety Comments
M5 junction	New M5 / A358 junction	<p>The new A358 alignment will connect via a new junction to the M5 to the south of the existing Junction 25 (see image below). The form that the junction will take is unknown at this stage though it appears likely to be a grade separated gyratory given the angle at which the new highway meets the M5. This will be the first junction westbound drivers come to for some distance at which all vehicles will need to slow for a junction (assuming any other junctions provided along the scheme are grade-separated). Westbound traffic speeds will need to be reduced significantly before traffic enters the junction.</p> 

Location	Option design / existing feature	Route Option 1+NFS Road Safety Comments
<p>Capland</p>	<p>Provision of new junction connecting new highway with existing A358</p>	<p>A potential location for a new junction connecting the new highway with the existing A358 is identified on the scheme plan in the vicinity of Capland (see image below). A junction at this location would connect two roads carrying significant volumes of traffic at relatively high speeds. The design of this junction will need to be carefully considered to ensure that the various traffic flows (which are expected to be relatively high) and turning movements are managed in a safe way and that traffic speeds are reduced prior to traffic entering the junction.</p> 

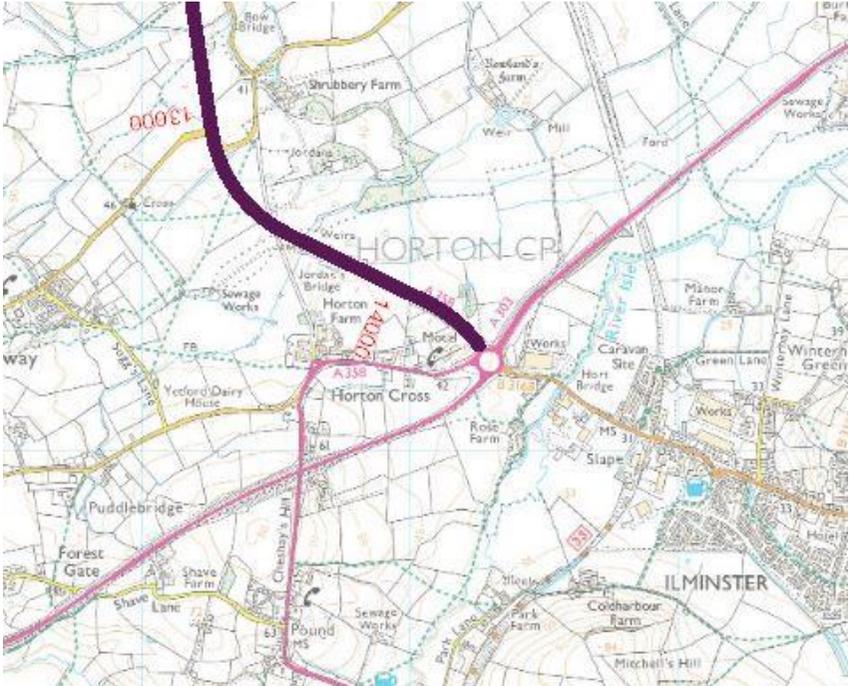
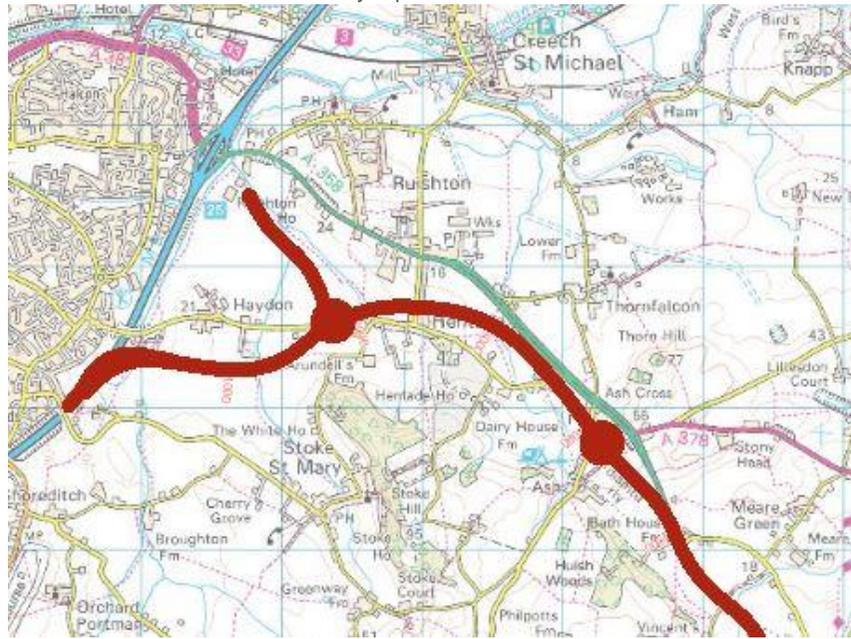
Location	Option design / existing feature	Route Option 1+NFS Road Safety Comments
<p>Southlands Roundabout</p>	<p>New highway connecting to existing roundabout</p>	<p>It appears from the scheme drawing that the new highway will terminate at its southern end at the existing Southlands roundabout (see image below). The existing roundabout has five entry arms and connects the A358 with the A303 trunk road, as well as the B3168. It appears that the roundabout will continue to be a five-arm roundabout with the upgrading of the A358.</p> <p>As a general rule the more arms on a roundabout the more risk of accidents. TD16/07 states that the number of accidents per year at roundabouts increases with the number of arms because of the corresponding increase in conflict points. It provides the following figures; 4-arm = 1.79 accidents/year, 5-arm = 3.66 accidents/year, 6-arm 5.95 accidents/year.</p> <p>The roundabout has a history of accidents with 21 accidents (17 slight; 4 serious) occurring between 2012 and 2016. Any alterations to this roundabout should take account of existing accident types and their potential causes.</p> <p>Additionally, this will become the first at-grade junction eastbound drivers come to for some distance. This may lead to an increase in accidents. Consider methods for warning drivers of the upcoming junction and ways of reducing vehicle speeds on the approach.</p> 

Table 8.2: Route Option 2A/2B Road Safety Review Comments

Location	Option design / existing feature	Route Option 2A/2B Road Safety Comments
Scheme wide	New highway alignment	Several footpaths and bridle ways intersect the new highway alignment. It is unclear from the option design how these will be catered for in the new dual-carriageway design. At-grade NMU crossings on high speed roads are not advisable. All NMU crossings of the new A358 should be designed to be grade-separated.
Existing A358	Existing A358 highway retained north of Ash	The option drawing provided does not indicate any proposed alterations to the existing A358 north of Ash. With a new offline highway proposed the existing A358 will become an important route for local access - including for NMUs - particularly if certain vehicle types are banned from using the new highway. Reduced traffic levels on the existing A358 may encourage increased vehicle speeds. NMUs will not be adequately catered for as there is currently very limited infrastructure specifically for pedestrians, cyclists and equestrians. As a guide, cycle-specific infrastructure should be provided where 85th percentile vehicle speeds are above 20mph or traffic flows are above 2500pcu/day. Where infrastructure is provided for NMUs it should be designed such that pedestrians, cyclists and equestrians do not come into conflict and cyclists may make use of their potentially higher speed.
Existing A358	Existing A358 upgraded south of Ash	Upgrading an existing road will bring construction workers in closer proximity to live traffic, compared to the offline schemes. This has significant potential to create more hazards for workers and their supply chain.
Existing A358	Existing A358 upgraded south of Ash	Upgrading of a section of the existing A358 alignment to 'expressway', with no parallel local access road provision, limits opportunities for east-west movements by local traffic. This may encourage 'junction hopping' by local traffic between any proposed junctions with its associated adverse safety implications due to excessive merging/weaving on the mainline, or else use of inappropriate local roads, many of which are of relatively low standard. Consider providing a Local Access Road or an easily identifiable east-west route made up of existing links and suitable for local and prohibited traffic. It is noted that while this issue is common to all scheme options, Option 2 upgrades the longest section of existing A358.
Various locations	Tie-in of new highway alignment to local road network	The exact location of any junctions connecting the scheme with the local road network and of any overbridges/underbridges connecting local roads to be provided along the scheme length are unknown at this stage. However, the scheme is located in a rural area with many local roads barely 3 or 4m wide and bound by hedgerow. Care will therefore need to be taken to ensure that sudden changes in road character between existing and new highway is avoided. Sudden changes in character can lead to excessive acceleration/braking by drivers.

Location	Option design / existing feature	Route Option 2A/2B Road Safety Comments
M5 junction	New M5 / A358 junction	<p>The new A358 alignment will connect via a new junction to the M5 to the south of the existing Junction 25 (see image below). The scheme drawing appears to suggest this will be a limited-movement junction offering routing to and from the south only. The location of the proposed junction is in close proximity to the existing Junction 25. Closely spaced junctions on motorways present safety issues in that they create situations of vehicles merging, diverging, and weaving in close proximity. The proposed spacing of junctions compared to recommended junction spacing should be checked and the safety implications considered further.</p> 
M5 Junction 25	New highway link between new A358 and M5 Junction 25	<p>A new highway link is proposed between the new A358 alignment and the existing M5 Junction 25 (see image above). The drawing provided does not make it clear how the new alignment will join Junction 25 although it is understood this will be via a local highway scheme proposed for the area.</p> <p>This new link will potentially draw a significant amount of traffic onto Junction 25, which is already a five-arm roundabout carrying substantial volumes of traffic and the safety implications of significantly altering the traffic flows and turning proportions at this junction should be considered.</p>

Location	Option design / existing feature	Route Option 2A/2B Road Safety Comments
M5 to Ash	New highway between M5 and Ash with new junctions	<p>A new highway alignment for the A358 is proposed north of Ash and the locations for two potential new junctions are shown on the option drawing (see image above). The proposed junctions are in close proximity to one another, as well as to the proposed junction with the M5. Additionally it is unclear how the section of A358 alignment to be retained will connect with the new highway, i.e. via the junction shown or via an additional junction.</p> <p>Closely spaced junctions on roads present safety issues in that they create situations of vehicles merging, diverging, and weaving in close proximity. TD 22/06 states a minimum weaving length between junctions on rural, all-purpose roads of 1km. The spacing, and number of, junctions in this location should be carefully considered and the safety implications of multiple junctions taken into consideration.</p>

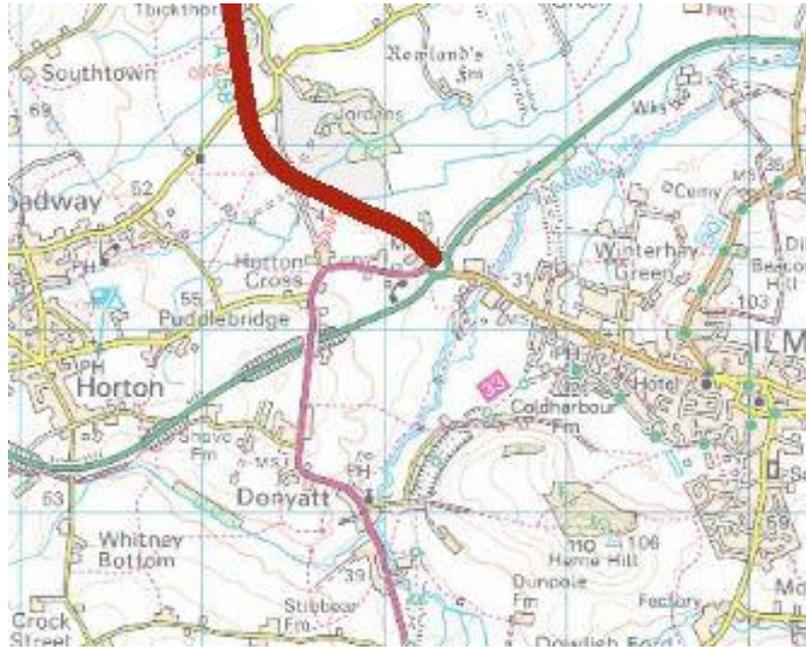
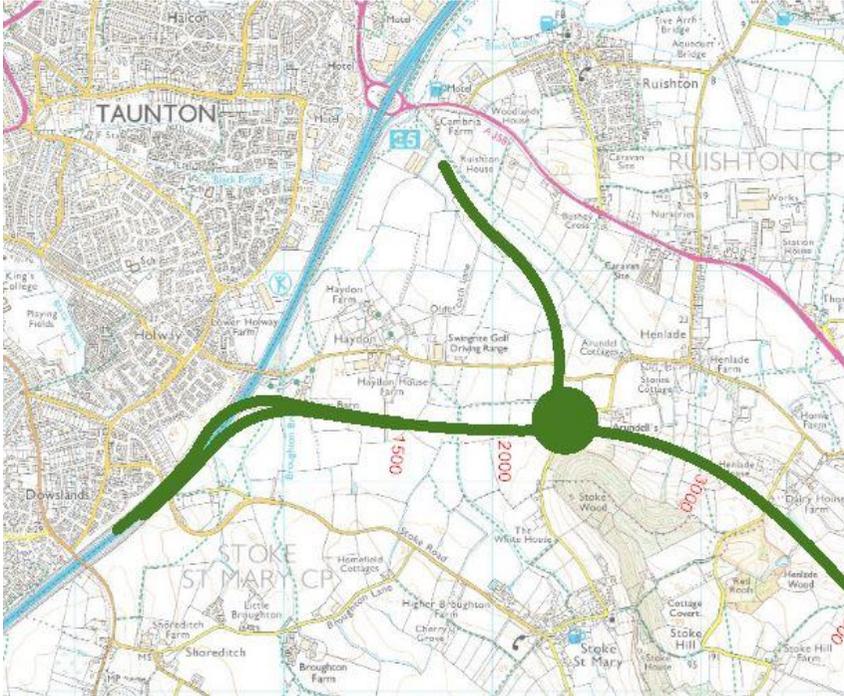
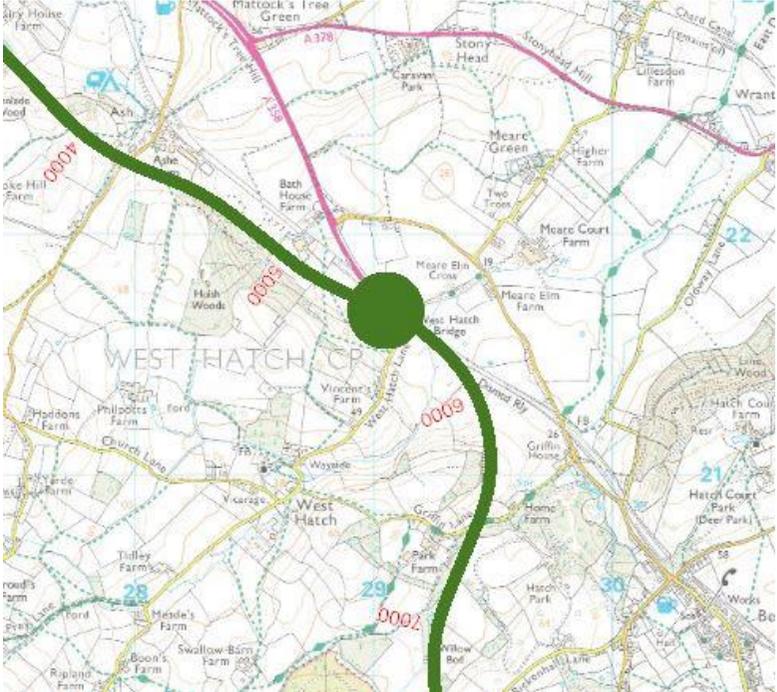
Location	Option design / existing feature	Route Option 2A/2B Road Safety Comments
<p>Southlands Roundabout</p>	<p>New highway connecting to existing roundabout</p>	<p>It appears from the scheme drawing that the new highway will terminate at its southern end at the existing Southlands roundabout (see image below). The existing roundabout has five entry arms and connects the A358 with the A303 trunk road, as well as the B3168. It appears that the roundabout will continue to be a five-arm roundabout with the upgrading of the A358.</p> <p>As a general rule the more arms on a roundabout the more risk of accidents. TD16/07 states that the number of accidents per year at roundabouts increases with the number of arms because of the corresponding increase in conflict points. It provides the following figures; 4-arm = 1.79 accidents/year, 5-arm = 3.66 accidents/year, 6-arm 5.95 accidents/year.</p> <p>The roundabout has a history of accidents with 21 accidents (17 slight; 4 serious) occurring between 2012 and 2016. Any alterations to this roundabout should take account of existing accident types and their potential causes.</p> <p>Additionally, this will become the first at-grade junction eastbound drivers come to for some distance. This may lead to an increase in accidents. Consider methods for warning drivers of the upcoming junction and ways of reducing vehicle speeds on the approach.</p> 

Table 8.3: Route Option 8/8B + J25 Road Safety Review Comments

Location	Option design / existing feature	Route Option 8/8B+J25 Road Safety Comments
Scheme wide	New highway alignment	Several footpaths and bridleways intersect the new highway alignment. It is unclear from the option design how these will be catered for in the new dual-carriageway design. At-grade NMU crossings on high speed roads are not advisable. All NMU crossings of the new A358 should be designed to be grade-separated.
Existing A358	Existing A358 highway retained north of Ash	The option drawing provided does not indicate any proposed alterations to the existing A358 north of Ash. With a new offline highway proposed the existing A358 will become an important route for local access - including for NMUs - particularly if certain vehicle types are banned from using the new highway. Reduced traffic levels on the existing A358 may encourage increased vehicle speeds. NMUs will not be adequately catered for as there is currently very limited infrastructure specifically for pedestrians, cyclists and equestrians. As a guide, cycle-specific infrastructure should be provided where 85th percentile vehicle speeds are above 20mph or traffic flows are above 2500pcu/day. Where infrastructure is provided for NMUs it should be designed such that pedestrians, cyclists and equestrians do not come into conflict and cyclists may make use of their potentially higher speed.
Existing A358	Existing A358 upgraded south of Ash	Upgrading an existing road will bring construction workers in closer proximity to live traffic, compared to the offline schemes. This has significant potential to create more hazards for workers and their supply chain.
Existing A358	Existing A358 upgraded south of Ash	Upgrading of a section of the existing A358 alignment to 'expressway', with no parallel local access road provision, limits opportunities for east-west movements by local traffic. This may encourage 'junction hopping' by local traffic between any proposed junctions with its associated adverse safety implications due to excessive merging/weaving on the mainline, or else use of inappropriate local roads, many of which are of relatively low standard. Consider providing a Local Access Road or an easily identifiable east-west route made up of existing links and suitable for local and prohibited traffic. It is noted that while this issue is common to all scheme options, Option 2 upgrades the longest section of existing A358.
Various locations	Tie-in of new highway alignment to local road network	The exact location of any junctions connecting the scheme with the local road network and of any overbridges/underbridges connecting local roads to be provided along the scheme length are unknown at this stage. However, the scheme is located in a rural area with many local roads barely 3 or 4m wide and bound by hedgerow. Care will therefore need to be taken to ensure that sudden changes in road character between existing and new highway is avoided. Sudden changes in character can lead to excessive acceleration/braking by drivers.

Location	Option design / existing feature	Route Option 8/8B+J25 Road Safety Comments
M5 junction	New M5 / A358 junction	<p>The new A358 alignment will connect via a new junction to the M5 to the south of the existing Junction 25 (see image below). The scheme drawing appears to suggest this will be a limited-movement junction offering routing to and from the south only. The location of the proposed junction is in close proximity to the existing Junction 25. Closely spaced junctions on motorways present safety issues in that they create situations of vehicles merging, diverging, and weaving in close proximity. TD22/06 states a minimum of 2km weaving distance between junctions on motorways. The proposed spacing of junctions compared to recommended junction spacing should be checked and the safety implications considered further.</p> 
M5 Junction 25	New highway link between new A358 and M5 Junction 25	<p>A new highway link is proposed between the new A358 alignment and the existing M5 Junction 25 (see image above). The drawing provided does not make it clear how the new alignment will join Junction 25 although it is understood this will be via a local highway scheme proposed for the area. This new link will potentially draw a significant amount of traffic onto Junction 25, which is already a five-arm roundabout carrying substantial volumes of traffic and the safety implications of significantly altering the traffic flows and turning proportions at this junction should be considered.</p>

Location	Option design / existing feature	Route Option 8/8B+J25 Road Safety Comments
M5 to Ash	New highway between M5 and Ash with new junctions	<p>A new highway alignment for the A358 is proposed north of Ash and the locations for a potential new junction are shown on the option drawing (see image above). The proposed junction is in close proximity to the proposed new junction with the M5 and the connection to the M5 Junction 25.</p> <p>Closely spaced junctions on roads present safety issues in that they create situations of vehicles merging, diverging, and weaving in close proximity. TD 22/06 states a minimum weaving length between junctions on rural, all-purpose roads of 1km. The spacing, and number of, junctions in this location should be carefully considered and the safety implications of multiple junctions taken into consideration.</p>
West Hatch	Provision of new junction connecting new highway with existing A358	<p>A potential location for a new junction connecting the new highway with the existing A358 is identified on the scheme plan in the vicinity of West Hatch (see image below). A junction at this location would connect two roads carrying significant volumes of traffic at relatively high speeds. The design of this junction will need to be carefully considered to ensure that the various traffic flows (which are expected to be relatively high) and turning movements are managed in a safe way and that traffic speeds are reduced prior to traffic entering the junction.</p> 

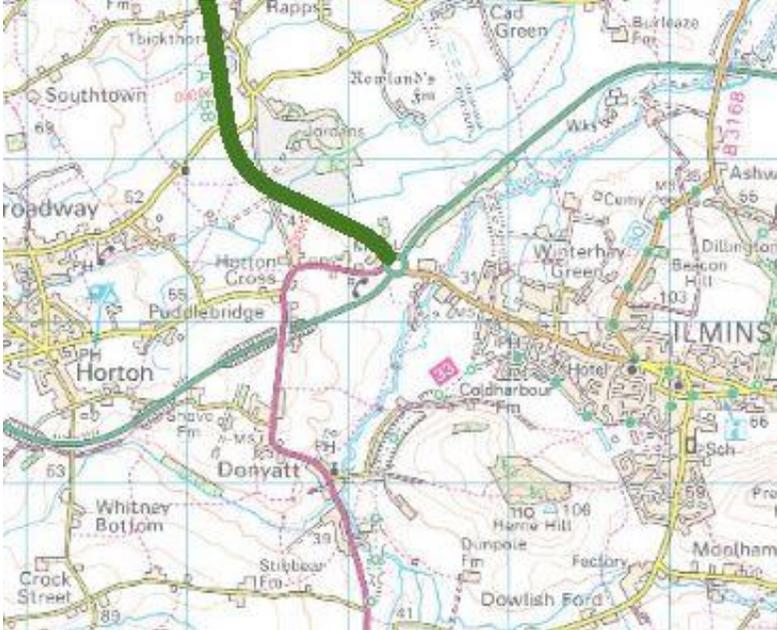
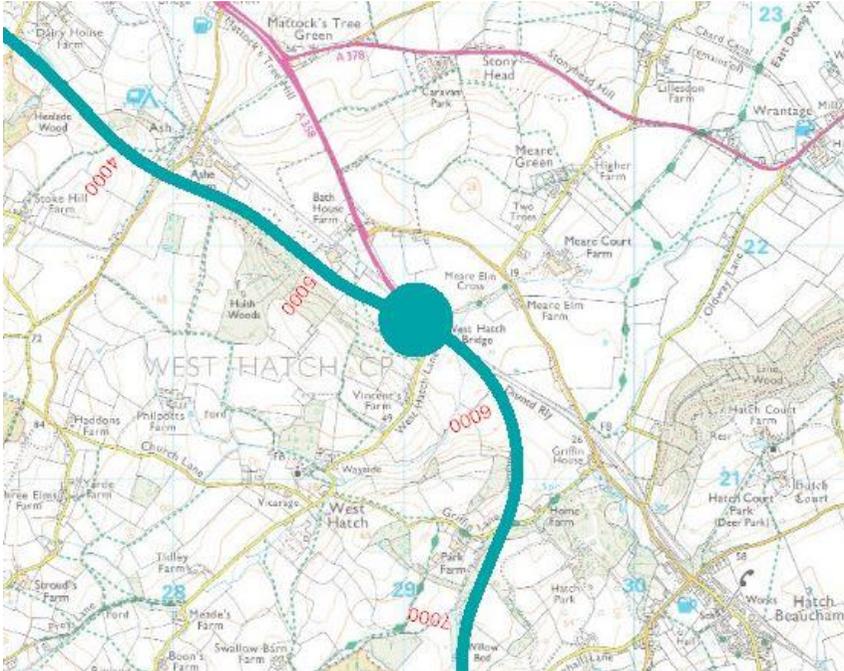
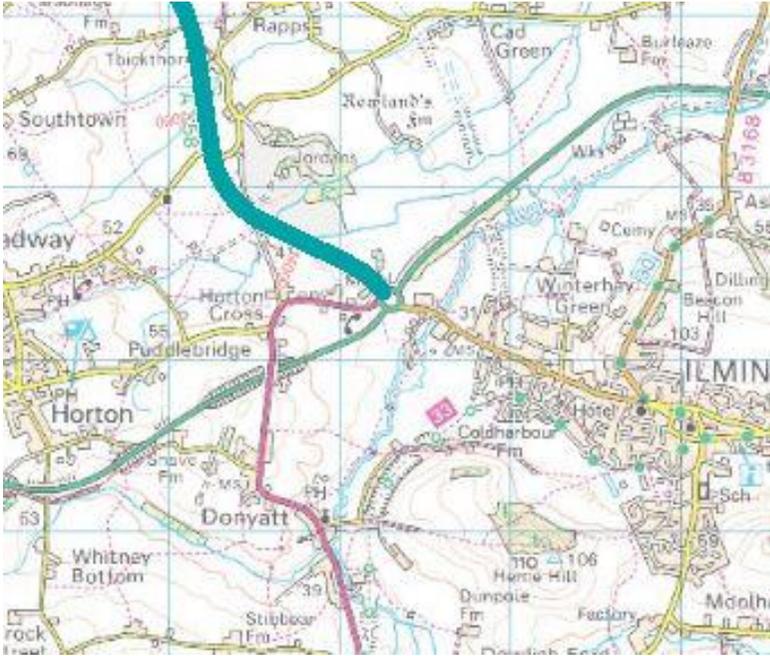
Location	Option design / existing feature	Route Option 8/8B+J25 Road Safety Comments
<p>Southlands Roundabout</p>	<p>New highway connecting to existing roundabout</p>	<p>It appears from the scheme drawing that the new highway will terminate at its southern end at the existing Southlands roundabout (see image below). The existing roundabout has five entry arms and connects the A358 with the A303 trunk road, as well as the B3168. It appears that the roundabout will continue to be a five-arm roundabout with the upgrading of the A358.</p> <p>As a general rule the more arms on a roundabout the more risk of accidents. TD16/07 states that the number of accidents per year at roundabouts increases with the number of arms because of the corresponding increase in conflict points. It provides the following figures; 4-arm = 1.79 accidents/year, 5-arm = 3.66 accidents/year, 6-arm 5.95 accidents/year.</p> <p>The roundabout has a history of accidents with 21 accidents (17 slight; 4 serious) occurring between 2012 and 2016. Any alterations to this roundabout should take account of existing accident types and their potential causes.</p> <p>Additionally, this will become the first at-grade junction eastbound drivers come to for some distance. This may lead to an increase in accidents. Consider methods for warning drivers of the upcoming junction and ways of reducing vehicle speeds on the approach.</p> 

Table 8.4: Route Option 8/8B + NFS Road Safety Review Comments

Location	Option design / existing feature	Route Option 8/8B+NFS Road Safety Comments
Scheme wide	New highway alignment	Several footpaths and bridleways intersect the new highway alignment. It is unclear from the option design how these will be catered for in the new dual-carriageway design. At-grade NMU crossings on high speed roads are not advisable. All NMU crossings of the new A358 should be designed to be grade-separated.
Existing A358	Existing A358 highway retained north of Capland	The option drawing provided does not indicate any proposed alterations to the existing A358 north of Capland. With a new offline highway proposed the existing A358 will become an important route for local access - including for NMUs - particularly if certain vehicle types are banned from using the new highway. Reduced traffic levels on the existing A358 may encourage increased vehicle speeds. NMUs will not be adequately catered for as there is currently very limited infrastructure specifically for pedestrians, cyclists and equestrians. As a guide, cycle-specific infrastructure should be provided where 85th percentile vehicle speeds are above 20mph or traffic flows are above 2500pcu/day. Where infrastructure is provided for NMUs it should be designed such that pedestrians, cyclists and equestrians do not come into conflict and cyclists may make use of their potentially higher speed.
Existing A358	Existing A358 upgraded south of Capland	Upgrading an existing road will bring construction workers in closer proximity to live traffic, compared to the offline schemes. This has significant potential to create more hazards for workers and their supply chain.
Existing A358	Existing A358 upgraded south of Capland	Upgrading of a section of the existing A358 alignment to 'expressway', with no parallel local access road provision, limits opportunities for east-west movements by local traffic. This may encourage 'junction hopping' by local traffic between any proposed junctions with its associated adverse safety implications due to excessive merging/weaving on the mainline, or else use of inappropriate local roads, many of which are of relatively low standard. Consider providing a Local Access Road or an easily identifiable east-west route made up of existing links and suitable for local and prohibited traffic. It is noted that while this issue is common to all scheme options, Option 1 retains the longest section of existing A358.
Various locations	Tie-in of new highway alignment to local road network	The exact location of any junctions connecting the scheme with the local road network and of any overbridges/underbridges connecting local roads to be provided along the scheme length are unknown at this stage. However, the scheme is located in a rural area with many local roads barely 3 or 4m wide and bound by hedgerow. Care will therefore need to be taken to ensure that sudden changes in road character between existing and new highway is avoided. Sudden changes in character can lead to excessive acceleration/braking by drivers.

Location	Option design / existing feature	Route Option 8/8B+NFS Road Safety Comments
M5 junction	New M5 / A358 junction	<p>The new A358 alignment will connect via a new junction to the M5 to the south of the existing Junction 25 (see image below). The form that the junction will take is unknown at this stage though the scheme drawing appears to suggest a grade separated gyratory. This will be the first junction westbound drivers come to for some distance at which all vehicles will need to slow for a junction (assuming any other junctions provided along the scheme are grade-separated). Westbound traffic speeds will need to be reduced significantly before traffic enters the junction.</p> 

Location	Option design / existing feature	Route Option 8/8B+NFS Road Safety Comments
West Hatch	Provision of new junction connecting new highway with existing A358	<p>A potential location for a new junction connecting the new highway with the existing A358 is identified on the scheme plan in the vicinity of West Hatch (see image below). A junction at this location would connect two roads carrying significant volumes of traffic at relatively high speeds. The design of this junction will need to be carefully considered to ensure that the various traffic flows (which are expected to be relatively high) and turning movements are managed in a safe way and that traffic speeds are reduced prior to traffic entering the junction.</p> 

Location	Option design / existing feature	Route Option 8/8B+NFS Road Safety Comments
<p>Southlands Roundabout</p>	<p>New highway connecting to existing roundabout</p>	<p>It appears from the scheme drawing that the new highway will terminate at its southern end at the existing Southlands roundabout (see image below). The existing roundabout has five entry arms and connects the A358 with the A303 trunk road, as well as the B3168. It appears that the roundabout will continue to be a five-arm roundabout with the upgrading of the A358.</p> <p>As a general rule the more arms on a roundabout the more risk of accidents. TD16/07 states that the number of accidents per year at roundabouts increases with the number of arms because of the corresponding increase in conflict points. It provides the following figures; 4-arm = 1.79 accidents/year, 5-arm = 3.66 accidents/year, 6-arm 5.95 accidents/year.</p> <p>The roundabout has a history of accidents with 21 accidents (17 slight; 4 serious) occurring between 2012 and 2016. Any alterations to this roundabout should take account of existing accident types and their potential causes.</p> <p>Additionally, this will become the first at-grade junction eastbound drivers come to for some distance. This may lead to an increase in accidents. Consider methods for warning drivers of the upcoming junction and ways of reducing vehicle speeds on the approach.</p> 

8.2. Buildability including CDM

8.2.1. Introduction

In response to the *Road Investment Strategy: for the 2015/16 – 2019/20 Road Period* (Department for Transport, December 2014, updated March 2015), Highways England issued the *Highways England Delivery Plan 2015-2020* (Highways England, March 2015). In chapter 4 of the *Delivery Plan*, Highways England establishes a holistic approach to managing health and safety by working with suppliers and stakeholders with the goal being that no one should be harmed when travelling or working on the strategic road network. Specifically, by the end of 2020 Highways England's aim is to reach a target of a 40% reduction in the number of killed or seriously injured (KSI) accidents, with the longer-term aim being to get as close as possible to zero by 2040. Four at-risk populations have been identified whose health and safety needs must be addressed as part of this approach. They are:

- Road users
- Customer operations staff, which largely consists of the Traffic Officer service
- Road workers and other supply chain employees
- Highways England employees who work in and away from our offices

The A358 Taunton to Southfields scheme has a contribution to make to the achievement of Highways England's goal for the first three of these groups.

Potential health, safety and wellbeing factors were considered during the initial sifting process. Ongoing design developments will continue to address health, safety and wellbeing goals through a structured approach in accordance with the following publications:

- *Construction (Design and Management) Regulations 2015*. These regulations require that hazards and risks are identified and eliminated or reduced as part of the design process and, if elimination is not possible, for information to be provided regarding the nature of the residual risks.
- *Interim Advice Note 69/15 Design for Maintenance (Highways England, April 2015)*. This document provides guidance on the risk assessment and liaison process regarding the development of designs that are safe to maintain. It also introduces the concept of 'Maintenance Strategy and Repair Statements' in which designers record assumptions and requirements regarding maintenance activities. The intent is to identify the key features relating to maintenance activities which:
 - Must be undertaken in a particular manner
 - Do not have an obvious approach
 - Are hazardous to those undertaking the work or others who may be affected by it
 - Require a disciplined approach

During the design process reference was made to feedback regarding lessons learnt from latest working and operating practices from forums such as the Road Worker Safety Forum (RoWSaF), Safe Use of Roadside Verges in Vehicular Emergencies (SURVIVE) as well as circulars such as Highways England Safety Alerts and Monthly Health Safety and Wellbeing Briefings to ensure developing designs take account of the current experience.

8.2.2. Traffic Management

Highways England obtained initial advice from contractors specialising in constructing highway works to understand how traffic on the A358, A303 and M5 may be managed during the works.

It was determined that the width of the lanes on the existing A358 would be reduced to 3.25m and that a temporary speed limit of 40mph would be applied throughout the online widening sections. Depending upon the nature of improvement works at Southfields Roundabout it may be necessary to reduce the width of the A303 Ilminster Bypass to one lane in each direction, and to enforce a temporary speed limit of 40mph through the works.

Through the M5 interchange works motorway lanes would also be reduced in width, the hardshoulder temporarily taken out of service, and a temporary 50mph speed limit enforced.

Closures & diversion routes

Overnight motorway closures are likely to be required for the installation of overbridge beams and some temporary works at the new M5 interchange. In this event the existing signed diversion route between Junction 25 and Junction 26 (via Taunton town centre and the A38) could be used subject to consultation with Somerset County Council. A mitigation of the effects of this diversion on the local road network should be that only one motorway carriageway will be closed at any one time.

Should a closure of the A303 Ilminster Bypass be required the existing signed diversion route along the B3168 between South Petherton and Southfields, via Ilminster, could be used. This would require the temporary suspension of an environmental weight limit, subject to consultation with SCC.

Full closure of the existing A358 carriageway at any point during the works is not anticipated, although if closures are required this would require diversion routes of significant distance, particularly to and from the south.

8.2.3. Cost effectiveness

The approach to ensuring cost effective construction and maintenance will centre on maximising standardisation of components such as structures, drainage and road restraint systems, and enabling the use of familiar and conventional construction and

maintenance techniques. This approach should also help maximise the health and safety performance of the project during construction and operation.

This process is at an early stage, but ultimately liaison will be undertaken with Highways England's construction and maintenance supply chain partners to ensure opportunities to improve cost effectiveness are identified and implemented.

One particular area of focus will be on the treatment of the existing A358 carriageway along sections of online widening. Options in these locations range between retaining the existing carriageway as a local road and constructing an entirely new dual carriageway alongside to integrating the existing carriageway as one side of the new dual carriageway. The latter approach clearly offers significant efficiencies subject to resolution of complications such as traffic management during construction and the risk of the existing asset being in a poor condition.

9. Environmental assessment

9.1. Introduction

This section presents a summary of the assessment of potential environmental and social effects at both the construction and operation stages of the A358 Taunton to Southfields scheme. The environmental assessments have been completed in accordance with WebTag Unit A3 Environmental Impact Appraisal (Department for Transport, December 2015) and WebTAG UNIT A4-1 Social Impact Appraisal (Department for Transport, November 2014).

Environmental and social assessments have also been completed to a Scoping Level in accordance with Volume 11, Section 3, parts 1-2 and parts 4-11 of the Design Manual for Roads and Bridges (Highways England, dates of issue as appropriate to each part).

9.2. Consultation with statutory bodies

Consultations with Statutory Environmental Bodies (SEB) have been undertaken with members of Historic England, Natural England and the Environmental Agency. Key stakeholder workshops have also been held to introduce the scheme to representatives from Somerset County Council, Taunton Deane Borough Council, Natural England and South West Heritage.

9.3. Noise

The quantitative appraisal for Noise impacts has predicted an overall benefit for Option 1/1B + NFS as a result of traffic decrease at residential areas on the A358, between the diversion and the Junction 25 of the M5. For Option 8/8B+Jct25 the changes in traffic flow occur in similar situations to those expected for Option 1/1B + NFS, however a greater proportion of A358 traffic is predicted to take the diversion route preferentially since this option would also connect to Junction 25 of the M5.

Given that the population density is greater within 600m of the A358 than it is adjacent to the diverted route, the noise appraisal for Option 8/8B + Jct25 results in an overall benefit.

For Option 2A/2B, the changes in flow are analogous to those expected for Option 8/8B + Jct25. However, the diversion passes through areas of higher population density for Option 2A/2B, and therefore the positive impact of the diversion on traffic is sufficient such that the overall noise appraisal indicates an overall benefit.

For Option 8/8B+NFS, the changes in flow are like those expected for Option 1/1B + NFS, however as the diversion passes through areas of higher density population and the positive impact of the diversion on the traffic flow are lower than the other options, the overall noise appraisal score would indicate net dis-benefit.

The changes in Noise Net Present Value (NPV) for each of the proposed options are presented below. Positive values indicate benefits and negative values are considered to be dis-benefits.

- Option 1/1B + NFS: £315,352;
- Option 2A/2B: £493,647;
- Option 8/8B + NFS: -£837,041; and,
- Option 8/8B + Jct25: £2,204,368.

9.4. Air quality

The quantitative assessment for Air Quality has concluded that there would be an overall improvement of local ambient air quality within the study area with respect to nitrogen dioxide (NO₂) and Particulate Matter (PM₁₀) for all the options. The proposed options are predicted to increase regional emissions of mono-nitrogen oxides (NO_x) and PM₁₀. However, Option 2A/2B is the only option with a negative NPV, due to the increase in regional NO_x emissions outweighing the air quality benefits provided at a local level. Therefore, Option 2A/2B is predicted to have overall dis-benefits.

Across all four scheme Options, the Affected Road Networks (ARNs) cover the M5, A303, A30 and A358 between Taunton, Southfields and Exeter as well as minor B roads near the scheme, such as the B3170 and B3187. Under Option 8/8B + Jct25 and Option 2A/2B, the ARN extends into Taunton. The largest ARN is associated with Option 2/2B, which in addition to covering the roads mentioned above, also includes the main roads through North Curry and Mare Green.

The total value of change in air quality Net Present Value (NPV) for each of the proposed options is as follows:

- Option 1/1B + NFS: £75,782;
- Option 2A/2B: -£135,996;
- Option 8/8B + NFS: £70.803; and,
- Option 8/8B + Jct25: £179,513.

9.5. Greenhouse gases

The Greenhouse Gas appraisal has indicated that the four options are predicted to increase greenhouse gas emissions. The net present value of the change in CO₂e emissions over the 60-year appraisal period from the scheme for each of the options is presented below, with a detrimental impacts expected for all options.

- Option 1/1B + NFS: -£22,329,961;
- Option 2A/2B: -£18,969,025;
- Option 8/8B + NFS: -£21,790,787; and,

- Option 8/8B + Jct25: -£16,589,054.

9.6. Landscape and townscape

All four proposed route options would traverse the agricultural landscape between Taunton in the west and Ilminster in the east. Option 1/1B+NFS, which is the furthest away from the existing A358 corridor and therefore its placement in an otherwise agricultural and tranquil environment would lead to a more notable change than those near the existing A358 corridor. This option would be set at the base of the Blackdown Hills Area of Outstanding Natural Beauty (AONB) which rise to the south. Existing far reaching views would be disrupted by the presence of the new route which would be visible from this elevated ground.

Although on the lowland plain, the visibility of the Options 8/8B + NFS and Option 8/8B + Jct25 amongst the local landscape may be limited by intervening vegetation, the scheme would be visible from the upper slopes of the adjacent Blackdown Hills AONB, set within the context of panoramic views and the town of Taunton just west of the new alignment. Also, the provision of junctions at West Hatch and Ashill would increase the level of disturbance, as well as the new link connecting to Junction 25. Overall, a Large Adverse effect is anticipated as a result of Option 1/1B + NFS, Option 8/8B + NFS and Option 8/8B + Jct25.

Option 2A/2B would be in the most part either passing in close proximity to the existing A358, or online, which can reduce the impacts upon landscape character and visual receptors since it would be contained within the existing road corridor. However, Option 2A/2B would be visible from local visual receptors such as residential properties and Public Rights of Way (PRoWs), including those within villages to the south at Ilminster which is a conservation area. Large junctions at Thornfalcon and Ashill would be particularly notable given their scale and extension away from the online section. Therefore, a Moderate Adverse significance of effect would be anticipated as a result of Option 2A/2B.

9.7. Heritage and historic resources

All options present the potential for Large Adverse effects on unknown archaeological buried remains. Option 1/1B+NFS, Option 8/8B + NFS and Option 8/8B + Jct25 has a majority offline alignment, in which proposed construction would extend through current rural areas with known archaeological assets, and areas of high archaeological potential. Option 2A/2B has a majority online alignment, with only the most northern extent as a proposed additional offline route, already located within an urbanised area. However, the online section would still require significant land take for widening and junctions and as such there is still the potential for significant effects upon buried archaeology, within the 250m study area.

It is predicted that the construction of all the options would have a Slight Adverse effect on the medium value Grade II Listed Buildings located within 250m. The same effect is also identified for Option 2A/2B, Option 8/8B + NFS and Option 8/8B + Jct25 on the

Grade II* Listed Buildings, although considered of high value. There is not considered to be any potential impacts to the form, survival, condition, complexity or period of the assets, although impacts on the setting and character of context of the Grade II and Grade II* Listed Buildings as a result of construction activities is anticipated. However, if these impacts remain of minor magnitude, as all buildings are already within the vicinity of roads. This would result in a Slight Adverse effect.

9.8. Biodiversity

With regards to the effects on designated sites, Option 1/1B + NFS is anticipated to have a Large Adverse effect on Thurlbear Wood and Quarrylands Site of Special Scientific Interest (SSSI) and designated ancient woodland located 100m east and downstream of the option centreline. Option 8/8B + NFS is anticipated to have a Moderated Adverse effect on South Taunton Streams Local Nature Reserve (LNR).

These impacts may include, but are not limited to habitat removal and fragmentation, disturbance, air pollution, noise and vibration which will adversely reduce the integrity of these sites environmental resources for which they are protected. Additionally, all the proposed Options have the potential to disturb and remove habitats within Local Wildlife Sites (LWS) and ancient woodland, and affect the connectivity between other designated sites within the scheme study area.

The proposed works for all options would potentially result in permanent loss of habitats of high to medium conservation value. All options are anticipated to have Moderate Adverse effect upon ancient woodland, hedgerows, standing water, and watercourses. These habitats are all listed within the Somerset LBAP and Taunton Deane LBAP, whilst hedgerows are further protected against the Hedgerow Regulations 1997.

In the absence of mitigation, a Moderate Adverse effect would be anticipated to UK protected species including badgers, nesting birds, water voles, otters, WCC and reptiles, and a Large Adverse effect would be predicted to European Protected Species which includes, but is not limited to GCN, bats, dormice and schedule 1 listed birds, for all the proposed options.

As such, and without mitigation, there would be an overall Large Adverse effect anticipated for Option 1/1B + NFS, and a Moderate Adverse effect anticipated as a result of Options 2A/2B, 8/8B + NFS and 8/8B + Jct25.

9.9. Water environment

All options are unlikely to affect waterbodies with the potential incorporation of standard mitigation measures within the CEMP and the inclusion of Sustainable Drainage Systems (SuDS) in the drainage design. These would prevent adverse effects from pollutants or increased surface water run-off particularly in Flood Zone 3 and 2 (Taunton) and downstream waterbodies Isle - Cad Brook to Fivehead River, Isle, North Moor Main Drain and Tone Drains. Discharge of dewatering during construction would cause a Slight Adverse Impact on drains and ditches. The west area of the options

would cause a localised Slight Adverse Impact on Tone and North Somerset Stream groundwater body without compromise the entire waterbody or affect the overall summary assessment score. Due to the stage in development of the scheme and current absence of a drainage design, an overall Slight Adverse score has been assigned without consideration for mitigation at this stage.

9.10. Physical fitness

There are a number of non-motorised user (NMU) amenities that exist within the study area for all the proposed options, consisting of cycle routes, footpaths, footways and two long distance trails, namely the East Deane Way and Staple Fitzpaine Herepath. One footbridge is located within 250m of Option 1/1B+NFS only, which crosses the M5 at Poundisford, one signalised crossing located within 250m of the other options.

All the proposed options would require the severance of several of these PRow. These severed PRow would likely be replaced in the form of footbridges or underpasses, if deemed necessary following the completion of NMU surveys. As such, all the proposed options have the potential to result in changes to journey distances, although at this stage, it is unknown whether journey distances will increase or decrease.

Effects associated with physical activity are anticipated to be Neutral for all options. It is important to note that effects could potentially change following completion of NMU surveys, and following confirmation of the preferred locations for footbridges and underpasses.

9.11. Journey ambience

All four of the proposed options would result in an improvement to journey quality. Alternative access arrangements for all the options are still to be considered, however based on the current design there is potential for adverse effects to the services at Southfield roundabout with traffic potentially removed from this location which has the potential to result in impacts on businesses situated there.

In terms of traveller stress, all four options have the potential to reduce traveller stress along the A358. All options would overall, be likely to minimise the frustration felt by drivers through improved journey times and reliability, with an increased network capacity and provision of new local access roads and strategically placed junctions.

Current proposals for NMU would comprise the stopping up of uncontrolled routes over the A358, which would improve safety and the subsequent fear of potential accidents, resulting in a beneficial impact for travellers. Furthermore, NMU crossings will be diverted across bridges or through underpasses to ensure that pedestrians do not encroach on the A358, and further reducing driver stress, although the exact locations of these will not be known until early in Stage 2 or 3.

10. Appraisal summary

10.1. Appraisal summary tables (ASTs)

Appraisal summary tables with corresponding worksheets have been produced in accordance with the Department for Transport's Transport Analysis Guidance (WebTAG) (last updated in July 2016). The summary tables are reproduced in Appendix C of this report.

10.2. Summary of consultation with public bodies

10.2.1. Identifying and engaging with stakeholders

Identifying and engaging with stakeholders has been an integral element of the options generation and development process as specified in Highways England PCF stage 1 guidelines.

The approach taken during the option identification stage of the appraisal process has been to ensure that all three main components of the engagement – consultation, participation and information – are considered and undertaken on an on-going basis with key stakeholders.

A stakeholder mapping exercise was undertaken during July and August 2015. Identified stakeholders were categorised, following Highways England's guidelines, according to the role and the level of involvement they would have throughout the project lifecycle.

Following this process, the first of a series of workshops with key statutory stakeholders took place in December 2015. The workshop was attended by representatives from:

- Local authorities: Somerset County Council, South Somerset District Council, Taunton Deane Borough Council
- Statutory environmental bodies: Environment Agency, Natural England, and Historic England
- A non-statutory consultee, the National Trust, was invited due to key interests in this area

The purpose of the workshops was to keep the key statutory stakeholders up to date with the project's progress, seek views to ensure the project was aligned with local plans and receive input into the ongoing stakeholder engagement programme.

During the initial meeting, the attendees identified a number of additional stakeholders that possessed additional technical knowledge and local area expertise that would be beneficial during the options development stage. The additional stakeholders were subsequently included in the stakeholder engagement programme.

In addition to the stakeholder workshops, a group was formed to assist with the development of the Statement of Community Consultation (SoCC). The SoCC development group comprised local authority communications, planning and community engagement officers. Many of the group's suggestions and local information knowledge was incorporated into a draft SoCC, which included recommendations about identifying and engaging with different sectors of the community, including hard to reach groups.

A period of key stakeholder engagement commenced during the summer of 2016 with a series of meetings with key and statutory stakeholders. The information and views captured during the meetings was considered during the planning of the public consultation processes.

Early consultation has been held with local parishes along the route. Parish Council Area Group (PCAG) Meetings were held in November 2016 with all of the parish councils within the vicinity of the proposed scheme extents and provided a forum for local parish councils to discuss their priorities, perceptions and concerns about the proposed route options.

10.2.2. Information provision – stakeholder workshops

The main role of the stakeholder workshops is to ensure key stakeholders' views are captured and considered during the options development process and to introduce, explain and discuss the inclusive engagement processes involved with a Development Consent Order (DCO) application.

A number of workshops were carried out during the options development stage to ensure that comments and views from the host local authorities, statutory and key stakeholders were collected and input back into the options development process.

Details of the workshops held, the topics discussed and the location are summarised in Table 10.1

Table 10.1: Stakeholder workshops

Meeting agenda	Date	Location
Introduction to the A358 project and Highways England/MMSJV team	4 December 2015	Taunton Deane Borough Council offices
scheme progress and DCO process	22 March 2016	Taunton Deane Borough Council offices
scheme progress and options development	13 July 2016	Taunton Deane Borough Council offices
scheme progress, parish council engagement and the public consultation	11 November 2016	Taunton Deane Borough Council offices

10.2.3. Local authority communications and community engagement meeting

A meeting was held with the local authority communications and community engagement officers to introduce and explain the scheme and to discuss the communications strategy.

In addition to this, the discussion involved the role that the local authorities' communications and community engagement teams would have assisting with the preparation of a Statement of Community Consultation (SoCC).

This group met once, before transforming into the SoCC development group, with the addition of local authority planning officers. A summary of the topics discussed during the meeting is detailed in Table 10.2.

Table 10.2: Community engagement meetings

Meeting agenda	Date	Location
Introduction to Highways England/MMSJV communications team and outline of communications strategy	14 January 2016	Taunton Visitor Centre

10.2.4. SoCC development group meetings

The SoCC development group comprises representatives from the local authorities' communications, community engagement and planning officers. The purpose of the meetings is to seek input and advice to create a SoCC that takes into consideration all sections of the local community and the methods used to communicate to them.

Much of the feedback gained during the group's first meeting was included in a non-statutory SoCC, which will be used as a guide to producing the statutory SoCC once the scheme reaches the statutory pre-application consultation stage under the DCO planning regime.

Feedback from the meetings included suggestions for public exhibition venues and public viewing areas during the non-statutory consultation period, discussion of consultation zones and consultation channels, and consideration of hard to reach community groups.

Feedback was collated and included in a proposed final SoCC, which was circulated with explanatory guidance to host and adjoining local authorities for a formal 30-day review and comment period.

Details of the meetings held, the topics discussed and the location are summarised in Table 10.3.

Table 10.3: SoCC development group meetings

Meeting agenda	Date	Location
Non-statutory SoCC development and community engagement	22 March 2016	Taunton Deane Borough Council offices
Non-statutory SoCC review	26 May 2016	Taunton Deane Borough Council offices

10.3. Comparison of options

Economics

In the economic assessment summarised in chapter 7 of this report, option 2A/2B has the highest present value benefits (£529.495 million) and Option 8/8B + NFS has the lowest (£351.157 million), whilst the present value costs are highest for option 2A/2B (£284.094 million) and lowest for Option 8/8B + NFS (£243.851 million).

Option 2A/2B has the highest benefit to cost ratio (BCR) of 2.08 when adjusted to include reliability benefits, whilst option 8/8B + NFS has the lowest at 1.64. Options 1 + NFS and Option 8/8B + J25 both have BCR values of 1.87.

Under the Department for Transport's value for money criteria, these represent medium or high value for money (medium value for money is in the range 1.5-2.0 and high value for money in the range of 2.0-4.0). However, it should also be noted that the assessment of wider economic benefits undertaken with TEAM (Mott MacDonald's Transparent Economic Assessment Model) shows that these benefits are likely to be significant providing further justification of the scheme.

Overall, in terms of value for money, the best option is 2A/2B followed by Options 8+J25, 1 NFS and 8 NFS.

Safety – Accident Savings

The COBALT (Cost and Benefit of Accidents – Light Touch) results used in the economic assessment give the cost of accidents in monetary form for the 60-year appraisal period. The COBALT results show that there would be a benefit when compared with no improvements to the existing route for Options 1/1B + NFS, 2A/2B and 8/8B+J25. This is because, for these options, there would be a reduction in accidents compared with the Do Minimum option i.e. with no improvement scheme. For Option 8/8B + NFS, there would be a slight increase in accidents resulting in a slight disbenefit. This is mainly because Option 8/8B + NFS would remove the least amount of traffic from the A358 at Henlade resulting in a lower level of junction accident benefit than the other options.

The economic benefits of accident savings would be greatest for option 2A/2B which showed, over the 60-year appraisal period, an increase of 0.9 fatal accidents, and savings of 47.4 serious injury accidents and 253.6 slight injury accidents with a consequent economic benefit of £10.183 million. Option 8/8B + J25 showed an increase

of 1.3 fatal accidents, and savings of 43.4 serious injury accidents and 255 slight injury accidents with an economic benefit of £9.666 million. Option 1/1B + NFS showed an increase of 0.2 fatal accidents, and savings of 34.5 serious injury accidents and 137.2 slight injury accidents with an economic benefit of £6.977 million. Option 8/8B + NFS showed an increase of 1.2 fatal accidents, a saving of 16.8 serious injury accidents and an increase of 97.6 slight injury accidents with an economic disbenefit of £314 million. The small increase in predicted fatal accidents is mainly due to the higher speeds on the proposed dual carriageway.

Overall, Option 2A/2B demonstrates the highest economic benefit of accident savings, followed by Options 8/8B+J25 and 1/1B + NFS with Option 8/8B + NFS showing a slight disbenefit.

Safety – Strategic Safety Action Plan

The Strategic Safety Action Plan presented in Chapter 8 of this report highlighted several issues common to all the options that will require further consideration at the next stage of design. The design will be compliant with all relevant design standards except where there appears to be sufficient justification to depart from standards in which case technical approval will be sought.

The following option-specific issues were highlighted:

- Proximity of junctions on the M5: this is specific to Options 2A/2B and 8/8B+NFS. Closely spaced junctions on motorways present safety issues in that they create situations of vehicles merging, diverging, and weaving in close proximity. The proposed spacing of junctions compared to recommended junction spacing would need to be checked and the safety implications considered.
- New highway link between the A358 and M25 J25: this is specific to Options 2A/2B and 8/8B + J25. M5 Junction 25 is already a five-arm roundabout carrying substantial volumes of traffic and the safety implications of significantly altering the traffic flows and turning proportions at this junction would need to be considered.

Buildability and maintenance

In the qualitative assessment presented in Chapter 8.2 of this report, none of the options would be more or less favourable in terms of buildability than any other. All four options would be similar in terms of maintenance.

In the QUADRO analysis of the cost of roadworks, all four options are predicted to have an economic disbenefit. Option 2A/2B would have the greatest disbenefit at

-£58,676,000; Option 8/8B + NFS would have disbenefit of -£54,917,000; Option 8/8B + NFS would have a dis-benefit of -£54,691,000 and Option 1/1B + NFS would have a disbenefit of -£28,162,000.

Environment

Options 1/1B + NFS, 2A/2B and 8/8B + J25 have the potential to decrease noise in local residential areas, whilst Option 8/8B + NFS has the potential to increase noise in local residential areas. Option 8/8B + J25 would have the highest positive benefit of £2,204,368 primarily due to traffic decreases at residential areas on the A358 whilst the greatest proportion of A358 traffic are also predicted to take the diversion route connecting to Junction 25 of the M5. Option 2A/2B would have a positive benefit of £493,647 with similar changes in flow to Option 8/8B + J25, but the diversion for this option would pass through an area of higher population density than Option 8/8B + J25. Option 1/1B + NFS would have a positive benefit of £315,352 due to traffic decreases at residential areas. Option 8/8B + NFS would have a dis-benefit of -£837,041, with similar changes in flow to Option 1/1B + NFS, but the diversion passes through areas of higher population density than Option 1/1B + NFS whilst the positive impacts of the diversion are also lower than the other scheme options.

Air Quality

Options 1/1B + NFS, 8/8B + NFS and 8/8B + J25 are predicted to result in an overall air quality benefit primarily as a result of improvements in local ambient air quality of nitrogen dioxide (NO₂) and particulate matter (PM₁₀). This is due to reduced congestion on the affected road network. At a regional level, all options are predicted to increase emissions of mono-nitrogen oxides (NO_x) and PM₁₀, but it is only for Option 2A/2B that these dis-benefits would exceed the benefits gained from local improvements. For Option 2A/2B, this leads to an overall air quality dis-benefit. Option 8/8B + J25 would have the greatest benefit of £179,513; option 1 NFS would have a benefit of £75,782; whilst Option 8/8B + NFS would have a benefit of £70,803. Option 2A/2B would have a dis-benefit of -£135,996.

Greenhouse Gases

The greenhouse gas appraisal indicates that all the options would lead to an increase in greenhouse gas emissions. Option 8/8B + J25 is predicted to have the smallest dis-benefit at -£16,589,054; Option 2A/2B would have a dis-benefit of -£18,969,025; option 8 NFS would have a dis-benefit of -£21,7910,787; whilst Option 1/1B + NFS would have the greatest dis-benefit of -£22,329,961. The range of disbenefits that have been predicted for the scheme options would primarily be due to a change in vehicle-kms relative to the Do Minimum scenarios in the opening year and design years.

Other environmental issues have been subject to a qualitative appraisal.

Options 1/1B + NFS, 8/8B + NFS and 8/8B + J25 have been assessed as having a Large Adverse effect on landscape without mitigation, with Option 1/1B + NFS having

the maximum impact due to its proximity to the Blackdown Hills AONB, and introduction of a new road corridor within a tranquil area. Option 2A/2B has been appraised as having a Moderate effect on landscape without mitigation, since this option sits closer to the existing road corridor. In relation to heritage and historic resources, all options present the potential for Large Adverse effects on unknown archaeological buried remains. All options however would have a Slight Adverse effect on medium value Grade II listed buildings located within 250m.

In the area of biodiversity, option 1 NFS is anticipated to have a Large Adverse effect on Thurlbear Wood and Quarrylands Site of Special Scientific Interest (SSSI) with the other options being anticipated to have a Moderate Adverse impact on designated sites. All four options have been given a score of Slight Adverse at this stage in relation to the water environment. All four options are anticipated to have Neutral effects associated with physical activity and an improvement to journey quality.

11. Programme

A scheme programme has been developed and the latest version at the time of issue of this report is contained in Appendix D of this report. The programme may vary depending on scheme development following the outcome of consultation responses. The construction period may vary depending on the route option selected at the next stage of the scheme development.

Key programme dates are:

- | | |
|--|---------------|
| • Commence public consultation | March 2017 |
| • Preferred Route Announcement | October 2017 |
| • Application for Development Consent Order | June 2018 |
| • Publish Development Consent Order | November 2019 |
| • Secretary of State decision | November 2019 |
| • End of legal challenge period | January 2020 |
| • Start of construction (entry by negotiation) | March 2020 |
| • scheme open to traffic | March 2023 |

12. Conclusions and recommendations

12.1. Options for public consultation

12.1.1. Conclusions

Of the four options for which a technical appraisal has been carried out, Option 2A/2B represents the best benefit cost ratio (BCR) being just above the threshold of 2.0 providing high value for money, however it is the most expensive. The other three options represent medium value for money.

In environmental qualitative assessments, all options perform similarly in the categories assessed except in the areas of landscape and biodiversity. Option 2A/2B, whilst having an adverse effect on landscape, would have a lesser impact than the other options. Option 1/1B + NFS would have a highly significant impact on the landscape without mitigation due to its proximity to the Blackdown Hills AONB. It would be more visible from the higher ground than the other options and would introduce a new road corridor in a tranquil area.

Option 1/1B + NFS would also have a greater impact on biodiversity than the other options as it would have a Large Adverse effect on Thurlbear Wood and Quarrylands Site of Special Scientific Interest. Overall, Option 1/1B + NFS would have the greatest impact on the environment in terms of the qualitative assessments. Due to these environmental impacts, it is recommended that Option 1 + NFS should not be taken forward to public consultation.

Option 2A/2B, Option 8/8B + J25 and Option 8/8B + NFS provide the following benefits, at varying degrees, over the Do Minimum Scenario:

- Provision of a modern dual carriageway for A358 traffic travelling to and from the M5 motorway
- Removal of traffic from the existing A358 between West Hatch and M5 Junction 25 helping to reduce periods of congestion and support economic growth
- Reduced traffic congestion in residential areas such as Henlade along the existing A358
- Safer crossing points for pedestrians, cyclists and equestrians
- Improved safety by removal of access to the dual carriageway at new and upgraded junctions
- Retention of the A358 between West Hatch Lane and M5 Junction 25 for local traffic and as an alternative route.

It is recognised that the appraisal of these options shows that those with a link to Junction 25 perform better in a number of respects, however Option 8/8B+NFS has additional benefits related to economic growth and resilience:

- The all-directions traffic connection between the M5 motorway and proposed A358 dual carriageway located on the southern side of Taunton will provide increased connectivity and thus improve route resilience
- The new M5 junction provides more flexibility in planning for future economic growth in the Taunton area, and opens up an opportunity for a new access junction for development
- The scheme releases road capacity on the existing A358 and at Junction 25 to support economic growth at the Junction 25 employment development zone

Unlocking the potential for economic growth in the area has been a key objective in developing route option proposals. The new junction at the M5 motorway will provide a significant capacity enhancement to the network. It is likely that increases in traffic demand could be accommodated at the new junction, supporting major development opportunities in the area south of Taunton.

Improving the performance of the A358 between Taunton and Southfields with more reliable journey times will help support the growth of existing businesses and support the establishment of new businesses. This will also provide a boost to the already healthy tourism sector in the area and for tourists travelling to and from the south west peninsula.

12.1.2. Recommendations

Option 8/8B + NFS is recommended to be taken forward to public consultation as it would provide improved opportunities for future growth in housing and employment leading to increased prosperity. The provision of an additional junction on the south side of Taunton would help relieve pressure on Junction 25, reduce journey times and queue lengths. Route resilience would be improved by providing alternative route opportunities between the A378 and the M5. Reduced traffic through Henlade will improve air quality,

12.2. Alignment with Objective

It has been decided that Option 8/8B+NFS is taken to public consultation as a single option. It aligns with the objectives by:

- Making the network safer
 - Provision of a high standard dual carriageway
 - No central reserve gaps
 - Safer crossing points for pedestrians, cyclists and equestrians
- Improving user satisfaction
 - Provision of a high standard dual carriageway

-
- Reduction of congestion
 - Improved journey resilience
 - Supporting the smooth flow of traffic
 - Grade separated junctions
 - Provision of a high standard dual carriageway
 - Reduced congestion
 - Encouraging economic growth
 - Improved capacity at J25
 - New all movements junction south side of Taunton
 - Improved connectivity between SW and SE
 - Delivering better environmental outcomes
 - Improved air quality at Henlade
 - Helping cyclists, walkers and other vulnerable users of the network
 - Safer crossing points for pedestrians, cyclists and equestrians
 - Maintains integrity of Henlade/Lower Henlade area
 - Keeping the network in good condition
 - Designed for maintenance
 - New road

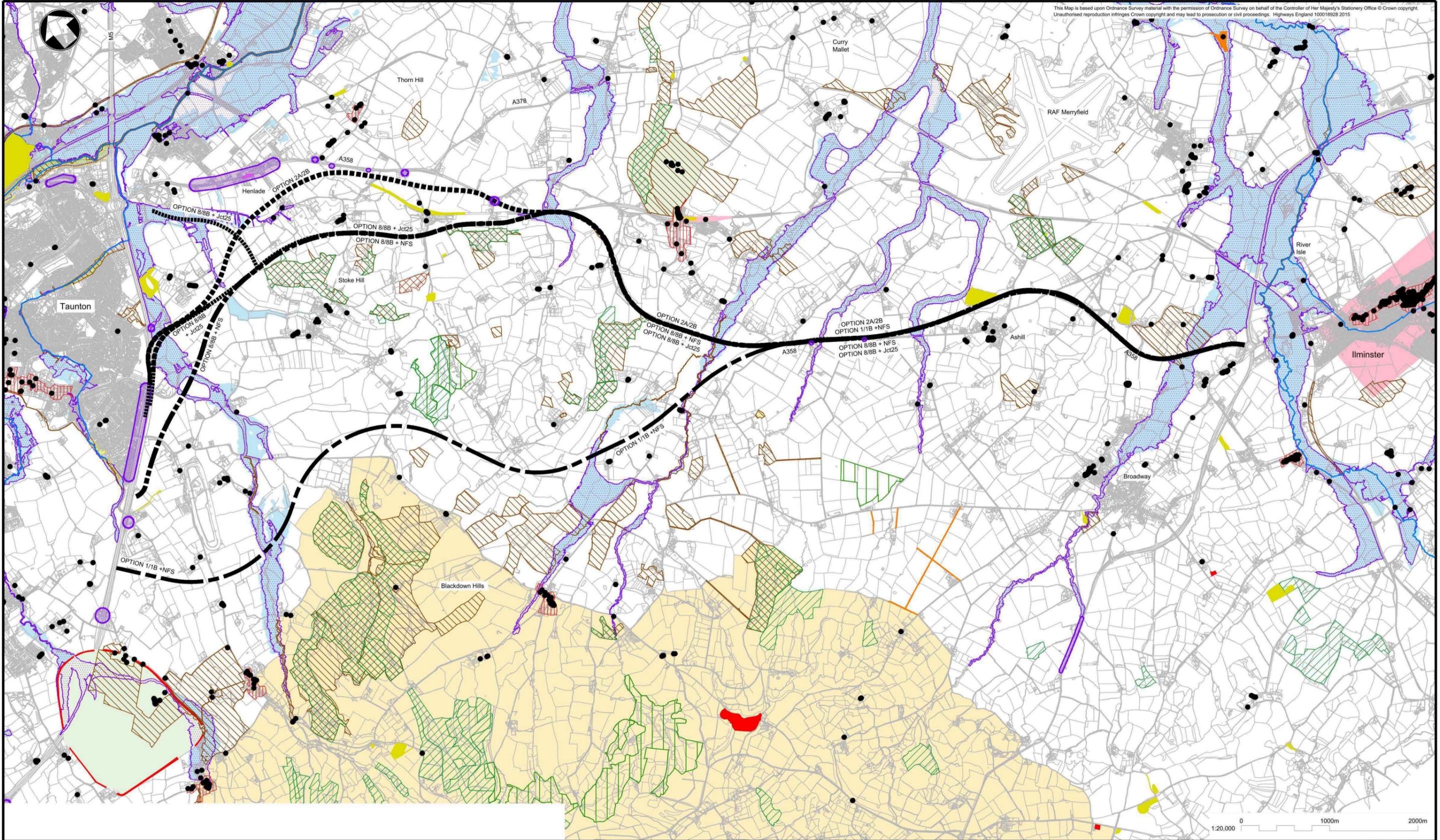
Appendices

Appendix A Glossary

- AADT Analysis of Annual Average Daily Traffic
- AOD Above ordnance datum
- AONB Area of Outstanding Natural Beauty
- AQMA Air Quality Management Area
- ATC Automatic Traffic Count
- BCR Benefit Cost Ratio
- BGS British Geological Survey
- COBALT Cost and Benefits of Accidents – Light Touch
- dB Decibel
- DCO Development Consent Order
- DfT Department for Transport
- FMA Fully Modelled Area
- HADDMS Highways Agency Drainage Data Management System
- HDV Heavy duty vehicle
- KSI Killed or seriously injured
- LWS Local Wildlife Site
- NIA Noise Important Area
- NMU Non-motorised user(s)
- NPPF National Planning Policy Framework
- NPPG National Planning Practice Guidance
- NPSNN National Policy Statement for National Networks
- NPV Net Present Value
- NSIP Nationally Significant Infrastructure Project
- NTEM National Trip End Model
- MOD Ministry of Defence
- MMSJV Mott MacDonald Sweco Joint Venture
- PCU Passenger car unit
- PRoW Public Rights of Way
- QUADRO Queues and Delays at Roadworks
- RSPB Royal Society for the Protection of Birds
- SAC Special Area of Conservation
- SATURN Simulation and Assignment of Traffic to Urban Road Networks
- SCC Somerset County Council
- SOBC Strategic Outline Business Case
- SoCC Statement of Community Consultation
- SSSDC South Somerset District Council
- SSSI Site of Special Scientific Interest
- SuDS Sustainable drainage systems
- SWARMMS South West Area Multi Modal Study

- SWRTM South West Regional Traffic Model
- TAG Transport Analysis Guidance
- TEAM Transparent Economic Assessment Model
- VOC Vehicle operating costs
- VfM Value for Money
- WebTAG Transport Analysis Guidance
- WFD Water Framework Directive

Appendix B Route Options and Environmental Constraints Plan



-  Option 1/1B + NFS
-  Option 2A/2B
-  Option 8/8B + NFS
-  Option 8/8B + Jct25
-  Footpath
-  Cycle Route
-  Bridleway
-  Restricted Byway

-  Registered Common Land
-  Local Wildlife Sites
-  Sites of Special Scientific Interest
-  Conservation Area
-  Scheduled Monuments
-  Authorised Landfill
-  Historic Landfill

-  Registered Parks and Gardens
-  Area of Outstanding Natural Beauty
-  Local Nature Reserve
-  National Nature Reserve
-  Ancient Woodlands
-  Air Quality Management Areas
-  Rivers

-  Noise Important Areas
-  Local Geological Site
-  Flood Zone 2
-  Flood Zone 3
-  Listed Buildings

PROVs: The precise line of a right of way can only be determined by reference to the Definitive Map (1:10560 scale). Somerset County Council can accept no responsibility for any error or inaccuracy which may arise from the transposition of the Definitive Map to a different scale.

Flood Mapping: © Environment Agency copyright and/or database right 2015. All rights reserved. Some features of this map are based on digital spatial data from the Centre for Ecology & Hydrology. © NERC (CEH). © Crown copyright and database rights 2004 Ordnance Survey 100024198

Sites of special scientific interest, Ancient woodland, registered common land: © Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right [2017]

Historic Landfills: © Environment Agency copyright and/or database right 2015. All rights reserved. Contains information © Local Authorities

NiAs, Phase 1 drawings, waterbodies - no restrictions.

Scheduled Monuments, Listed Buildings, Registered Parks and Gardens: © Historic England [year]. Contains Ordnance Survey data © Crown copyright and database right [2017]. The Historic England GIS Data contained in this material was obtained on [date]. The most publicly available up to date Historic England GIS Data can be obtained from <http://www.HistoricEngland.org.uk>

Watercourses: Contains Ordnance Survey data © Crown copyright and database right 2016

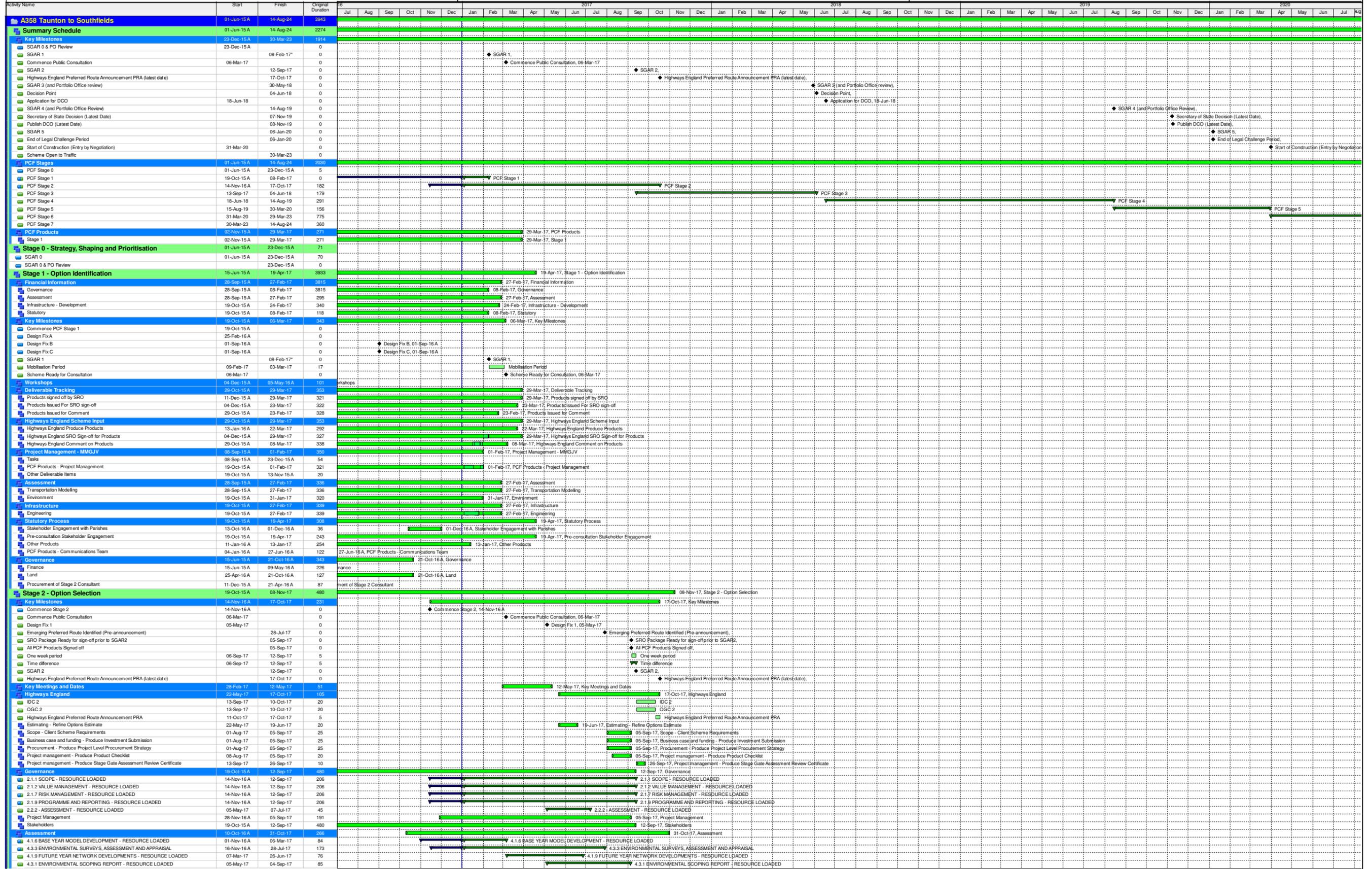
Appendix C Appraisal Summary Tables

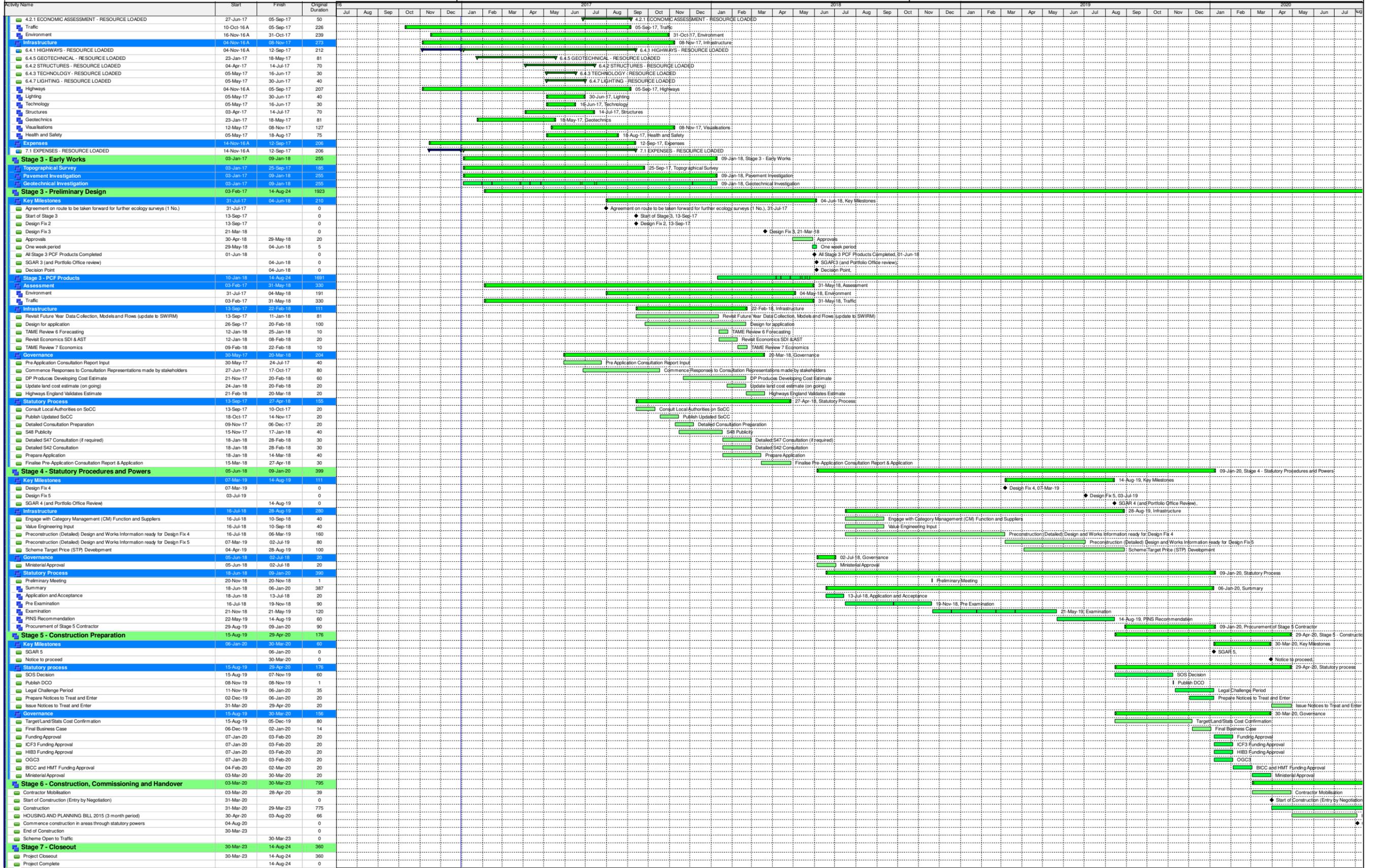
Appraisal Summary Table				Date produced:	Jan-17	Contact:			
Name of scheme:		A358 Taunton to Southfields - Option 2A2B				Name	David Stock		
Description of scheme:		The Scheme intends to provide a dual carriageway on the A358 between Taunton and Southfields roundabout in Somerset. The Scheme links the A303 at Ilminster with the M5 at Taunton and is likely to include grade separated interchanges and the removal of at grade junctions and direct accesses. Option 2A2B commences at the M5 approximately 2km south of Junction 25. The route initially passes south of Haydon and north of Stock Wood, and then along Stoke Road before running parallel to the south of existing A358, for approximately 100-200m. The proposed road then meets up with the route of the existing A358 at West Hatch Lane. The route passes close to the A378 junction at Mattocks Tree Hill which would enable direct interchange between the proposed road and the A378. This option involves the re-use of a greater amount of the existing A358.				Organisation	Highways England		
		Role	Promoter/Official						
Impacts		Summary of key impacts			Assessment				
					Quantitative		Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
					Value of journey time changes(£)				
					£308.6m				
					Net journey time changes (£)				
					0 to 2min	2 to 5min	> 5min		
					£7.1m	£68.5m	£233m		Yes
Economy	Business users & transport providers	Journey Time Benefits by converting a single carriageway section to modern dual carriageway with associated junction improvements. Net journey time changes is the net of positives and negatives in a given time band. Monetary (NPV) includes both journey times and vehicle operating cost impacts.			N/A		N/A	£283.4m	
	Reliability impact on Business users	Reliability benefits by converting a single carriageway section to modern dual carriageway with associated junction improvements.			N/A		N/A	£30.9m	
	Regeneration	N/A			N/A		N/A	N/A	
	Wider Impacts	Positive impact on jobs and GVA growth has been identified using a bespoke approach aligned to the emerging WebTAG units on Wider Impacts - full description provided in the A358 Taunton to Southfields Land Use and Economic Development Report, July 2016.			Growth of approx. 630 jobs and £37.7 million annual GVA.		N/A	N/A	
Environmental	Noise	For Option 2A/2B, the changes in flow are analogous to those expected for Option 1/1B + Option 8/8B + Jct.25, however as the diversion passes through areas of higher density population the overall disbenefits will be greater. However, the positive impact of the diversion is sufficient such that the overall appraisal with respect to noise would indicate net benefit.			Households experiencing increased daytime noise in forecast year: 342. Households experiencing reduced daytime noise in forecast year: 252. Households experiencing increased night time noise in forecast year: 229. Households experiencing reduced night time noise in forecast year: 204		n/a	NPV= £493,647 (Positive value indicates net benefit)	Yes
	Air Quality	The WebTAG local air quality assessment results show there is a net improvement in local air quality within the study area. The Scheme does not result in an exceedance of the NO2 or PM10 air quality objectives or limit values. The regional assessment predicts an increase in emissions of NOx and PM10 primarily as a result of the rerouting of vehicles on to the M5 away from surrounding A and B roads between Exeter and Taunton, resulting in a longer route for vehicles when approaching via the A303. Reduced vehicle numbers on roads such as the A30 and A373 where there are high numbers of receptors has the effect of improving local air quality in these areas. Overall, the total change in NPV is negative indicating a net deterioration in air quality when considering both local and regional effects.			Local Air quality effects at properties (Improvements / No effect / Deterioration) NO2 2023 (10468/ 212 / 5850) PM10 2023 (4831 / 6633 / 5066) Overall Assessment Score (negative score reflect benefit) NO2: (2023): minus -1023.1 PM10: (2023): minus -195.7 Change in Regional Emissions NOx (2023): 28.6 t/year PM10 (2023): 1.9 t/year		N/A (Guidance states that this column should not be used for AQ)	Value of change in PM concentrations: NPV: £685,170 Value of change in NOx emissions: NPV: minus £821,166 Total value of change in air quality NPV: minus -£135,996 (Negative value reflects net disbenefit)	Yes
	Greenhouse gases	Increase in GHG emissions are due to increased fuel consumption, which is related to slightly longer distances travelled by vehicles.			Change in non-traded carbon over 60y (CO2e) 415,857 tonnes Change in traded carbon over 60y (CO2e) 393 tonnes		N/A (Guidance states that this column should not be used for GHG)	-£18,969,025	
	Landscape	This option, would in the most part either run in close proximity to the existing A358 or online. Whilst the scheme would be a short distance from designated assets, like Listed Buildings and Registered Parks and Gardens, there would be no direct impact upon these features. This scheme option would be visible from local visual receptors such as residential properties and Public Rights of Way, including those within villages to the south at Ilminster which is a designated Conservation Area. Large junctions at Thornfalcon and Ashill would be particularly notable given their scale and extension away from the online scheme. Mitigation Planting would help to reduce the impacts upon visual amenity and landscape character over time.			N/A		Moderate Adverse	N/A	
	Townscape	N/A			N/A		N/A	N/A	
	Historic Environment	Option 2A/2B has a scale of impact on the historic environment: large adverse on the buried archaeology, slight adverse on Grade II listed buildings and slight adverse on Grade II* listed buildings. This results in an overall Large Adverse impact. The primary concern is the removal/destruction of any buried archaeology located within the route option.			N/A		Large Adverse	N/A	
	Biodiversity	There would be an overall Moderate Adverse effect on biodiversity as a result of Option 2A/2B. The option presents a Moderate Adverse effect to the five LWS within the footprint of the Option and a Slight Adverse Effect to the four SAC designated for bat conservation. The loss of habitats is considered to represent a Intermediate Negative magnitude of impact with a Moderate Adverse overall assessment score for those habitats listed on the Somerset Biodiversity Action Plan. The proposed works have the potential to affect bats, otters, water voles, kingfisher, dormice, reptiles, badgers, barn owls, white clawed crayfish, great crested newts, fish, invertebrates and nesting birds through the loss, fragmentation and isolation of habitats.			N/A		Moderate Adverse	N/A	
Water Environment	Careful consideration is required for the multiple new crossings of Option 2A/2B over the various watercourses, potential alteration of groundwater level and the work in flood zone 3 and 2 (Taunton). The potential incorporation of SuDS and pollution control measures within the drainage design would prevent any adverse effects. A precautionary Slight Adverse score has been assigned without mitigation.			N/A		Slight Adverse	N/A		
Social	Commuting and Other users	Journey Time Benefits by converting a single carriageway section to modern dual carriageway with associated junction improvements. Net journey time changes is the net of positives and negatives in a given time bend. Monetary (NPV) includes both journey times and vehicle operating cost impacts.			Value of journey time changes(£) £316.8m				Yes
					Net journey time changes (£)				
					0 to 2min	2 to 5min	> 5min		
					£20.8m	£80.2m	£215.7m		
	Reliability impact on Commuting and Other users	Reliability benefits by converting a single carriageway section to modern dual carriageway with associated junction improvements.			N/A		N/A	£31.7m	
	Physical activity	Option 2A/2B would require the severance of several PRoW. However, it is considered likely that most of the severed routes will be replaced in the form of a crossing footbridge or underpass if deemed necessary following the NMU survey results. Given that the majority of severed NMU routes are likely to be replaced, Option 2A/2B has the potential to result in changes to journey distances. At this stage, it is unknown whether journey distances will increase or decrease, and as such effects are considered to be Neutral.			N/A		Neutral	N/A	
	Journey quality	Option 2A/2B is anticipated to improve traveller care through the provision of new signage, gantries and lighting. New views would be provided to the surrounding area for travellers, although mitigation planting and sections of road in cutting would reduce views to the wider area. Traveller stress is predicted to reduce for Option 2A/2B, with the provision of new safety related infrastructure including new lane markings, a reinforced concrete barrier in the central reserve, cat's eyes and road studs, as well as NMU provisions reducing the likelihood of NMUs encroaching onto the A358.			N/A		Moderate Beneficial	N/A	
	Accidents	Reduction in the number of PIAs and casualties by converting the single carriageway sections to modern dual carriageway standard with associated junction improvements. (Negative values indicate an increase in casualties).			Reduction in casualties: Fatal=-1, Serious=47, Slight=254		N/A	£10m	Yes
	Security	Effects to security as a result of Option 2A/2B are anticipated to be Neutral as there are not anticipated to be any changes to security indicators as a result of the proposed option.			N/A		Neutral	N/A	No
	Access to services	Option 2A/2B is unlikely to alter access to services within the area, with side roads and junctions appropriately positioned to minimise impacts. Therefore Option 2A/2B is considered to have a Neutral impact.			N/A		Neutral	N/A	Yes
Affordability	Changes to vehicle operating costs and therefore changes to affordability as a result of Option 2A/2B are not anticipated and Option 2A/2B is considered to have a Neutral effect on affordability.			N/A		Neutral	N/A	Yes	
Severance	Option 2A/2B has the potential to result in severance to pedestrian journeys to and from community facilities. There is the potential for severance impacts to key community facilities within 250m of this option which makes journeys less attractive and longer. There is also potential for pedestrian journeys to facilities further than 250m from this option to be affected. Pedestrians could subsequently be dissuaded from making journeys to facilities on foot. NMU facilities would be installed at appropriate locations as determined by the NMU surveys, which would minimise impacts to pedestrian journeys. The Scheme could also result in relief from existing severance with provision of new NMU facilities and traffic flows potentially reduced on the existing A358.			N/A		Moderate Adverse	N/A	Yes	
Option and non-use values	The scheme is expected to have little or no impact on option and non-use values			N/A		Neutral	N/A		
Public Accounts	Cost to Broad Transport Budget	The scheme would be funded through Central Government Funds. All values are 2010 prices, discounted to 2010.			Central Government Funding £284.1m		N/A	£284.1m	
	Indirect Tax Revenues	There would be some increase in tax being paid to the Exchequer			Central Government Funding Wider Public Finances = £30.5m		N/A	£30.5m	

Appraisal Summary Table				Date produced:	Jan-17	Contact:						
Name of Scheme:		A358 Taunton to Southfields - Option 8-8B+NFS				Name		David Stock				
Description of scheme:		The Scheme intends to provide a dual carriageway on the A358 between Taunton and Southfields roundabout in Somerset. The Scheme links the A303 at Ilminster with the M5 at Taunton and is likely to include grade separated interchanges and the removal of at grade junctions and direct accesses. Option 8/8B + NFS commences at the M5 approximately 3.5km south of Junction 25, the route initially takes a north-easterly course, before arching around the north of Stoke Hill. The route then continues in a south easterly direction for 2.5km and joins up with the existing A358 corridor at West Hatch Lane. Between Capland and Ashill, approximately 1km, the road takes an offline route to the north of the existing road.				Organisation		Highways England				
						Role		Promoter/Official				
Impacts		Summary of key impacts			Assessment							
					Quantitative		Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp			
Economy	Business users & transport providers	Journey Time Benefits by converting a single carriageway section to modern dual carriageway with associated junction improvements. Net journey time changes is the net of positives and negatives in a given time band. Monetary (NPV) includes both journey times and vehicle operating cost impacts.			Value of journey time changes(£)		£228.6m		N/A	£200.8m	Yes	
					Net journey time changes (£)							
					0 to 2min	2 to 5min	> 5min					
					£20.9m	£68.7m	£139m					
	Reliability impact on Business users	Reliability benefits by converting a single carriageway section to modern dual carriageway with associated junction improvements.			N/A		N/A	£22.9m				
	Regeneration	N/A			N/A		N/A	N/A				
	Wider Impacts	Positive impact on jobs and GVA growth has been identified using a bespoke approach aligned to the emerging WebTAG units on Wider Impacts - full description provided in the A358 Taunton to Southfields Land Use and Economic Development Report, July 2016.			Growth of approx. 630 jobs and £37.7 million annual GVA.		N/A	N/A				
Environmental	Noise	For Option 8/8B + NFS, the changes in flow are analogous to those expected for Option 1/1B + NFS, however as the diversion passes through areas of higher density population the overall disbenefits will be greater. Thus, although the level of impact is relatively low, the overall appraisal with respect to noise would indicate net disbenefit.			Households experiencing increased daytime noise in forecast year: 397 Households experiencing reduced daytime noise in forecast year: 74. Households experiencing increased night time noise in forecast year: 187. Households experiencing reduced night time noise in forecast year: 93		n/a	NPV= -£837,041 (Negative value indicates net disbenefit)	Yes			
	Air Quality	The WebTAG local air quality assessment results show there is a net improvement in local air quality within the study area. The Scheme does not result in an exceedance of the NO2 or PM10 air quality objectives or limit values. The regional assessment predicts an increase in emissions of NOx and PM10 primarily as a result of the rerouting of vehicles on to the M5 away from surrounding A and B roads between Exeter and Taunton, resulting in a longer route for vehicles when approaching via the A303. Reduced vehicle numbers on roads such as the A30 and A373 where there are high numbers of receptors has the effect of improving local air quality in these areas. Overall, the total change in NPV is positive indicating a net benefit in air quality when considering both local and regional effects.			Local Air quality effects at properties (Improvements / No effect / Deterioration) NO2 2023 (5652/ 1359 / 3166) PM10 2023 (2965 / 4495 / 2717) Overall Assessment Score (negative score reflect benefit) NO2: (2023): minus -649.8 PM10: (2023): minus -123.7 Change in Regional Emissions NOx (2023): 20.9 t/year PM10 (2023): 1.1 t/year		N/A (Guidance states that this column should not be used for AQ)	Value of change in PM concentrations: NPV: £734,021 Value of change in NOx emissions: NPV: minus £663,218 Total value of change in air quality NPV: £70,803 (Positive value reflects net benefit)	Yes			
	Greenhouse gases	Increase in GHG emissions are due to increased fuel consumption, which is related to slightly longer distances travelled by vehicles.			Change in non-traded carbon over 60y (CO2e) 477,542 tonnes Change in traded carbon over 60y (CO2e) 808 tonnes		N/A (Guidance states that this column should not be used for GHG)	-£21,790,787				
	Landscape	This option, would run online with the existing A358 for over half of its length. The scheme would then diverge through open countryside across agricultural fields and vegetated boundaries. The scheme would be in close proximity to designated assets such as Listed Buildings and Registered Parks and Gardens. Hatch Beauchamp Conservation Area and Hatch Court Park, a registered park and garden, are key features located within 500m of the scheme. This scheme option would be visible from local visual receptors such as residential properties and Public Rights of Way, including those within villages to the south at Ilminster which is a designated Conservation Area. Also, the new junction with the M5, as well as new junctions at West Hatch and Ashill would form more notable features in the landscape due to their scale and in some instances elevation.			N/A		Large Adverse	N/A				
	Townscape	N/A			N/A		N/A	N/A				
	Historic Environment	Option 8/8B+ NFS has a scale of impact on the historic environment: large adverse on the buried archaeology, slight adverse on Grade II listed buildings and slight adverse on Grade II* listed buildings. This results in an overall Large Adverse impact. The primary concern is the removal/destruction of any buried archaeology located within the route option.			N/A		Large Adverse	N/A				
	Biodiversity	There would be an overall Moderate Adverse effect on biodiversity as a result of Option 8/8B + NFS. The option presents a Moderate Adverse effect to South Taunton Streams LNR and the six LWS within the footprint of the Option and a Slight Adverse effect is anticipated to the four SAC designated for bat conservation. The loss of habitats is considered to represent a Intermediate Negative magnitude of impact with a Moderate Adverse overall assessment score for those habitats listed on the Somerset Biodiversity Action Plan. The proposed works have the potential to affect bats, otters, water voles, kingfisher, dormice, reptiles, badgers, barn owls, white clawed crayfish, great crested newts, fish, invertebrates and nesting birds through the loss, fragmentation and isolation of habitats.			N/A		Moderate Adverse	N/A				
Water Environment	Careful consideration is required for the multiple new crossings of Option 8/8B + NFS over the various watercourses (particularly West Sedgemoor Main Drain and Black Brook), potential alteration of groundwater level and the work in flood zone 3 and 2. The potential incorporation of SuDS and pollution control measures within the drainage design would prevent any adverse effects. A precautionary Slight Adverse score has been assigned without mitigation.			N/A		Neutral	N/A					
Social	Commuting and Other users	Journey Time Benefits by converting a single carriageway section to modern dual carriageway with associated junction improvements. Net journey time changes is the net of positives and negatives in a given time bend. Monetary (NPV) includes both journey times and vehicle operating cost impacts.			Value of journey time changes(£)		£248.8m		N/A	£194.6m	Yes	
					Net journey time changes (£)							
					0 to 2min	2 to 5min	> 5min					
					£36m	£71.1m	£141.7m					
		Reliability impact on Commuting and Other users	Reliability benefits by converting a single carriageway section to modern dual carriageway with associated junction improvements.			N/A		N/A	£24.9m			
		Physical activity	Option 8/8B+NFS would require the severance of several PROW. However, it is considered likely that most of the severed routes will be replaced in the form of a crossing footbridge or underpass if deemed necessary following the NMU survey results. Given that the majority of severed NMU routes are likely to be replaced, Option 8/8B+NFS has the potential to result in changes to journey distances. At this stage, it is unknown whether journey distances will increase or decrease, and as such effects are considered to be Neutral.			N/A		Neutral	N/A			
		Journey quality	Option 8/8B+NFS is anticipated to improve traveller care through the provision of new signage, gantries and lighting. New views would be provided to the surrounding area for travellers, although mitigation planting and sections of road in cutting would reduce views to the wider area. Traveller stress is predicted to reduce for Option 8/8B+NFS, with the provision of new safety related infrastructure including new lane markings, a reinforced concrete barrier in the central reserve, cat's eyes and road studs, as well as NMU provisions reducing the likelihood of NMUs encroaching onto the A358.			N/A		Moderate Beneficial	N/A			
		Accidents	Reduction in the number of PIAs and casualties by converting the single carriageway sections to modern dual carriageway standard with associated junction improvements. (Negative values indicate an increase in casualties).			Reduction in casualties: Fatal=-1, Serious=17, Slight=-98		N/A	-£0.3m	Yes		
		Security	Effects to security as a result of Option 8/8B+NFS are anticipated to be Neutral as there are not anticipated to be any changes to security indicators as a result of the proposed option.			N/A		Neutral	N/A	Yes		
		Access to services	Option 8/8B+NFS is unlikely to alter access to services within the area, with side roads and junctions appropriately positioned to minimise impacts. Therefore Option 8/8B+NFS is considered to have a Neutral impact.			N/A		Neutral	N/A	Yes		
	Affordability	Changes to vehicle operating costs and therefore changes to affordability as a result of Option 8/8B + NFS are not anticipated and Option 8/8B + NFS is considered to have a Neutral effect on affordability.			N/A		Neutral	N/A	Yes			
	Severance	Option 8/8B+NFS has the potential to result in severance to pedestrian journeys to and from community facilities. There is the potential for severance impacts to key community facilities within 250m of this option which makes journeys less attractive and longer. There is also potential for pedestrian journeys to facilities further than 250m from this option to be affected. Pedestrians could subsequently be dissuaded from making journeys to facilities on foot. NMU facilities would be installed at appropriate locations as determined by the NMU surveys, which would minimise impacts to pedestrian journeys. The Scheme could also result in relief from existing severance with provision of new NMU facilities and traffic flows potentially reduced on the existing A358.			N/A		Moderate Adverse	N/A	Yes			
	Option and non-use values	The scheme is expected to have little or no impact on option and non-use values			N/A		Neutral	N/A				
Public Accounts	Cost to Broad Transport Budget	The scheme would be funded through Central Government Funds. All values are 2010 prices, discounted to 2010.			Central Government Funding £243.9m		N/A	£243.9m				
	Indirect Tax Revenues	There would be some increase in tax being paid to the Exchequer			Central Government Funding Wider Public Finances = £33.5m		N/A	£33.5m				

Appraisal Summary Table				Date produced:	Jan-17	Contact:		
Name of Scheme:		A358 Taunton to Southfields - Option 8-8B+Jct25				Name	David Stock	
Description of Scheme:		The Scheme intends to provide a dual carriageway on the A358 between Taunton and Southfields roundabout in Somerset. The Scheme links the A303 at Ilminster with the M5 at Taunton and is likely to include grade separated interchanges and the removal of at grade junctions and direct accesses. Option 8/8b + Jct25 commences at the M5 approximately 2km south of Junction 25. The route initially passes south of Hayden and north of Stoke Wood, and continues in a south easterly direction for 2.5km to join up with the existing A358 corridor at West Hatch Lane. Between Capland and Ashill, approximately 1km, the road takes an offline route just to the north of the existing road.				Organisation	Highways England	
						Role	Promoter/Official	
Impacts		Summary of key impacts		Assessment				
				Quantitative		Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
				Value of journey time changes(£)				
				Net journey time changes (£)				
				0 to 2min	2 to 5min	> 5min		
				£10.5m	£50.1m	£202.1m		
Economy	Business users & transport providers	Journey Time Benefits by converting a single carriageway section to modern dual carriageway with associated junction improvements. Net journey time changes is the net of positives and negatives in a given time band. Monetary (NPV) includes both journey times and vehicle operating cost impacts.		£262.7m				
	Reliability impact on Business users	Reliability benefits by converting a single carriageway section to modern dual carriageway with associated junction improvements.		N/A		N/A	£239.1m	Yes
	Regeneration	N/A		N/A		N/A	N/A	
	Wider Impacts	Positive impact on jobs and GVA growth has been identified using a bespoke approach aligned to the emerging WebTAG units on Wider Impacts - full description provided in the A358 Taunton to Southfields Land Use and Economic Development Report, July 2016.		Growth of approx. 630 jobs and £37.7 million annual GVA.		N/A	N/A	
Environmental	Noise	For Option 8/8B + Jct.25, the changes in flow are analogous to those expected for Option 1/1B + NFS, however a greater proportion of A358 traffic is predicted to take the diversion route preferentially, as this option also feeds into M5 junction 25. Given the population density is greater within 600m of the A358 than it is adjacent to the diverted route, the overall appraisal with respect to noise would indicate net benefit		Households experiencing increased daytime noise in forecast year: 251. Households experiencing reduced daytime noise in forecast year: 495. Households experiencing increased night time noise in forecast year: 79. Households experiencing reduced night time noise in forecast year: 385		n/a	NPV= £2,204,368 (Positive value indicates net benefit)	Yes
	Air Quality	The WebTAG local air quality assessment results show there is a net improvement in local air quality within the study area. The Scheme does not result in an exceedance of the NO2 or PM10 air quality objectives or limit values. The regional assessment predicts an increase in emissions of NOx and PM10 primarily as a result of the rerouting of vehicles on to the M5 away from surrounding A and B roads between Exeter and Taunton, resulting in a longer route for vehicles when approaching via the A303. Reduced vehicle numbers on roads such as the A30 and A373 where there are high numbers of receptors has the effect of improving local air quality in these areas. Overall, the total change in NPV is positive indicating a net benefit in air quality when considering both local and regional effects.		Local Air quality effects at properties (Improvements / No effect / Deterioration) NO2 2023 (9656/ 192 / 5316) PM10 2023 (4738 / 6585 / 3841) Overall Assessment Score (negative score reflect benefit) NO2: (2023): minus -1166.8 PM10: (2023): minus -197.6 Change in Regional Emissions NOx (2023): 26.1 t/year PM10 (2023): 1.5 t/year		N/A (Guidance states that this column should not be used for AQ)	Value of change in PM concentrations: NPV: £896,858 Value of change in NOx emissions: NPV: minus -£717,345 Total value of change in air quality NPV: £179,513 (Positive value reflects net benefit)	Yes
	Greenhouse gases	Increase in GHG emissions are due to increased fuel consumption, which is related to slightly longer distances travelled by vehicles.		Change in non-traded carbon over 60y (CO2e) 365,117 tonnes Change in traded carbon over 60y (CO2e) 344 tonnes		N/A (Guidance states that this column should not be used for GHG)	-£16,589,054	
	Landscape	This option, would in the most part either run in close proximity to the existing A358 or online as it does in most of the middle part. The scheme would be in close proximity to designated assets, such as Listed Buildings and Registered Parks and Gardens, although would only have an indirect impact. A small patch of ancient woodland would be directly affected as a result of the scheme alignment. This scheme option would be visible from local visual receptors such as residential properties and Public Rights of Way, including those within villages to the south at Ilminster which is a designated Conservation Area. The new junctions at West Hatch and Ashill would increase the level of disturbance, as well as, the new link connecting to Junction 25.		N/A		Large Adverse	N/A	
	Townscape	N/A		N/A		N/A	N/A	
	Historic Environment	Option 8/8B+J25 has a scale of impact on the historic environment: large adverse on the buried archaeology, slight adverse on Grade II listed buildings and slight adverse on Grade II* listed buildings. This results in an overall Large Adverse impact. The primary concern is the removal/destruction of any buried archaeology located within the route option.		N/A		Large Adverse	N/A	
	Biodiversity	There would be an overall Moderate Adverse effect on biodiversity as a result of Option 8/8B + Jct25. The Option presents a Moderate Adverse effect to the six LWS within the footprint of the Option and a Slight Adverse effect to the four SAC designated for bat conservation. The loss of habitats is considered to represent a Intermediate Negative magnitude of impact with a Moderate Adverse overall assessment score for those habitats listed on the Somerset Biodiversity Action Plan. The proposed works have the potential to affect bats, otters, water voles, kingfisher, dormice, reptiles, badgers, barn owls, white clawed crayfish, great crested newts, fish, invertebrates and nesting birds through the loss, fragmentation and isolation of habitats.		N/A		Moderate Adverse	N/A	
	Water Environment	Careful consideration is required for the multiple new crossings of Option 8/8B + Jct25 over the various watercourses (particularly West Sedgemoor Main Drain), potential alteration of groundwater level and the work in flood zone 3 and 2 (Taunton). The potential incorporation of SuDS and pollution control measures within the drainage design would prevent any adverse effects. A precautionary Slight Adverse score has been assigned without mitigation.		N/A		Slight Adverse	N/A	
Social	Commuting and Other users	Journey Time Benefits by converting a single carriageway section to modern dual carriageway with associated junction improvements. Net journey time changes is the net of positives and negatives in a given time band. Monetary (NPV) includes both journey times and vehicle operating cost impacts.		£273.5m				Yes
	Reliability impact on Commuting and Other users	Reliability benefits by converting a single carriageway section to modern dual carriageway with associated junction improvements.		N/A		N/A	£27.3m	
	Physical activity	Option 8/8B+Jct25 would require the severance of several PRoW. However, it is considered likely that most of the severed routes will be replaced in the form of a crossing footbridge or underpass if deemed necessary following the NMU survey results. Given that the majority of severed NMU routes are likely to be replaced, Option 8/8B+Jct25 has the potential to result in changes to journey distances. At this stage, it is unknown whether journey distances will increase or decrease, and as such effects are considered to be Neutral.		N/A		Neutral	N/A	
	Journey quality	Option 8/8B+Jct25 is anticipated to improve traveller care through the provision of new signage, gantries and lighting. New views would be provided to the surrounding area for travellers, although mitigation planting and sections of road in cutting would reduce views to the wider area. Traveller stress is predicted to reduce for Option 8/8B+Jct25, with the provision of new safety related infrastructure including new lane markings, a reinforced concrete barrier in the central reserve, cat's eyes and road studs, as well as NMU provisions reducing the likelihood of NMUs encroaching onto the A358.		N/A		Moderate Beneficial	N/A	
	Accidents	Reduction in the number of PIAs and casualties by converting the single carriageway sections to modern dual carriageway standard with associated junction improvements. (Negative values indicate an increase in casualties).		Reduction in casualties: Fatal=-1, Serious=43, Slight=255		N/A	£9.7m	Yes
	Security	Effects to security as a result of Option 8/8B+Jct25 are anticipated to be Neutral as there are not anticipated to be any changes to security indicators as a result of the proposed option.						No
	Access to services	Option 8/8B+Jct25 is unlikely to alter access to services within the area, with side roads and junctions appropriately positioned to minimise impacts. Therefore Option 8/8B+Jct25 is considered to have a Neutral impact.		N/A		Neutral	N/A	Yes
	Affordability	Changes to vehicle operating costs and therefore changes to affordability as a result of Option 8/8B + Jct25 are not anticipated and Option 8/8B + Jct25 is considered to have a Neutral effect on affordability.		N/A		Neutral	N/A	Yes
	Severance	Option 8/8B+Jct25 has the potential to result in severance to pedestrian journeys to and from community facilities. There is the potential for severance impacts to key community facilities within 250m of this option which makes journeys less attractive and longer. There is also potential for pedestrian journeys to facilities further than 250m from this option to be affected. Pedestrians could subsequently be dissuaded from making journeys to facilities on foot. NMU facilities would be installed at appropriate locations as determined by the NMU surveys, which would minimise impacts to pedestrian journeys. The Scheme could also result in relief from existing severance with provision of new NMU facilities and traffic flows potentially reduced on the existing A358.		N/A		Moderate Adverse	N/A	Yes
	Option and non-use values	The scheme is expected to have little or no impact on option and non-use values		N/A		Neutral	N/A	
Public Accounts	Cost to Broad Transport Budget	The scheme would be funded through Central Government Funds. All values are 2010 prices, discounted to 2010.		Central Government Funding £266.3m		N/A	£266.3m	
	Indirect Tax Revenues	There would be some increase in tax being paid to the Exchequer		Central Government Funding Wider Public Finances = £28.4m		N/A	£28.4m	

Appendix D Programme





▾ Remaining Level of Effort
 ▬ Actual Work
 ▬ Critical Remaining ...
▾ Actual Level of Effort
 ▬ Remaining Work
 ◆ Milestone

If you need help accessing this or any other Highways England information, please call **0300 123 5000** and we will help you.

