M5 Junction 10 Improvements Scheme

JCS Transport Strategy Evidence Base

TR010063 - APP 9.48

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JCS Transport Strategy Evidence Base

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JCS Transport Strategy Evidence Base

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JCS – Transport Evidence Base

This transport evidence base has informed the development of the Joint Core Strategy (Gloucester City, Cheltenham Borough and Tewkesbury Borough councils).

The production of the evidence base has been managed by the JCS Transport Evidence Working Group which consists of officers and their appointed consultants from Gloucestershire County Council, Highways England and the Joint Core Strategy authorities.

Contents Amendment Record

This report has been issued and amended as follows:

Issue	Revision	Description	Date	Signed
0.1		Final Draft circulated for discussion	22/07/16	BW
1.0		Transport Strategy supporting Pre-Submission Joint Core Strategy	06/10/16	BW
2.0		Transport Strategy supporting JCS Proposed Main Modifications	25/05/17	BW

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JCS Transport Strategy

The JCS Transport Strategy has identified a six point plan to enable the delivery of the JCS development proposals. This will strengthen local and regional connectivity and improve the desirability of the JCS area as a destination.

The six point plan emphasises the importance of minimising the impact of development to ensure an efficient, safe and resilient transport network. It recognises the role of 'place' and the need to remove strategic or 'through' traffic from local environments. It also strongly supports walking, cycling and public transport use, with the long-term aim of reducing reliance on the car for short and longer distance trips.

The improvements summarised in this strategy will be instrumental in creating high quality, vibrant and successful communities. Planned highway capacity improvements will separate local and through traffic to ensure it can move with fewer journey delays and without undermining high quality passenger transport networks. In addition, attractive pedestrian and cycle infrastructure will be integral to highway networks to enable sustainable travel choice. A key focus of the JCS Transport strategy is to create the opportunity and environment to enable real change in travel behaviours and modal shift.

JCS Transport Strategy - Six point plan

1. Provide an efficient, safe and resilient transport network which enables the delivery of residential and employment growth by minimising its impacts on the transport network.
2. Deliver new, and enhance existing, sections of highway where required across the whole of the JCS area, to improve the quality of place; reduce community severance; facilitate the principle of orbital vehicle movements by separating local and 'through' traffic; and enable economic growth.
3. Remove pinch points on the local highway network, prioritising those on radial routes served by key bus corridors including the 10, 41/42, 94, 97/98 bus services.
4. Encourage public transport providers (bus and rail) to increase service frequencies along strategic corridors and review service coverage where there are gaps serving development sites
5. Provide coherent cycle and pedestrian linkages which connect development sites to adjacent land uses through permeable site layouts and the provision of new infrastructure;
6. Optimise the smart operation and management of the transport network through increased use of technology and travel information to provide multi-modal travel information

The strategy includes a number of large infrastructure schemes including:

- M5 Junction 10 - conversion to a full-movements junction and providing access to the West of Cheltenham strategic allocation
- Grade separated junction improvement at Cole Avenue to ensure Gloucester's South West Bypass functions to its maximum capacity
- A46 offline improvement which will bring about significant upgrade to the existing A46 route, encouraging walking, cycling and public transport use

- New junction on the A40 Gloucester Northern Bypass and new link road with the A38 Tewkesbury Road. This improvement will enable changes to be made to the existing A40 Longford Roundabout junction including and downgrading of the existing A38 Tewkesbury Road link north of the junction in Longford to encourage walking, cycling and public transport use

The outcomes of this strategy include:

- Minimising the increase in travel demand derived from the scale of growth outlined in the JCS. The highway network will be busier, but it will continue to operate in a safe and efficient manner. The network will also be more resilient as pinch points within the existing network are removed improving radial route options.

- Delivering the large infrastructure schemes listed above enables the separation of local and strategic or 'through' traffic. This removal of non-local traffic will significantly improve the quality of place and reduce community severance.

- Providing additional bus priority measures, including both new highway capacity and signal optimisation on existing high frequency routes will aid the bus operation within the JCS area. If delays do persist then, as part of the traffic signal optimisation, further bus priority measures could be further incorporated to reduce journey time uncertainty.

- Providing increased journey time reliability on the highway network will encourage public transport operators to continue to provide high frequency services. This will ensure a high quality customer experience and help increase the attractiveness of public transport for more people for more of their trips.

- Removing traffic from the A38 in Longford and A46 in Ashchurch, along with new walking and cycling infrastructure between Bishops Cleeve and Cheltenham and Arle Court Park and Ride, will increase the ease and desirability of walking and cycling within the JCS area.

- Using smart technology; traffic signal replacement, travel information and Smart Motorway running will to further maximise network efficiencies and support the delivery of the JCS Transport Strategy's Six Point Plan.

Conclusion

The schemes identified as part of the JCS Transport Strategy represent an effective and viable transport mitigation package which successfully supports the delivery of the JCS growth proposals and complies with the JCS Transport Strategy.

Despite the many benefits provided by the transport strategy there remain several unresolved issues which would require further mitigation. These are not viewed as being fundamental to the operation of the transport network. These issues are likely to be resolved through further detailed junction modelling and iterative design resulting in increased efficiencies being achieved.

It should be noted that the schemes identified as part of the JCS Transport Strategy represent one of many possible methods to manage the impact on the transport network of the growth proposals included in the JCS.

1.0 JCS Transport Evidence Base

1.1 Introduction

1.1.1 Gloucestershire County Council in partnership with Highways England (as highway authorities) and Amey as the appointed consultants, has supported the Joint Core Strategy Authorities (Gloucester City, Cheltenham Borough and Tewkesbury Borough councils) with the production of a transport evidence base and transport strategy, to support the adoption of the Joint Core Strategy (JCS).

1.1.2 Transport Evidence has been provided to support the JCS throughout the plan making process. The transport schemes outlined within the mitigation scenarios have been identified on the basis of compliance with the JCS Transport Strategy and the delivery of the development proposals outlined in the JCS. This ensures the cumulative impacts of the growth proposals could be assessed, understood and mitigated.

1.1.3 The evidence base is compliant with guidance in the National Planning Policy Framework (NPPF) and Planning Practice Guidance (PPG) 'Transport evidence bases in plan making and decision taking' and Circular 02/2013.

1.1.4 The production of the evidence base has been managed by the JCS Transport Evidence Working Group. This consists of officers and their appointed consultants from GCC, Highways England and the JCS authorities. The Working Group, in various forms, has met for several years. In September 2015 these arrangements were formalised, and regular meetings were held to progress and agree parts of the evidence base as completed. Notes of the meetings (progress and decisions) were circulated to all members for formal agreement at the subsequent meeting.

1.1.5 The mitigation package identified within this document (**Section 6**) represent an effective and viable transport mitigation package which successfully supports the delivery of the JCS growth proposals and complies with the JCS Transport Strategy. However, it should be noted that it is one of many possible methods to manage the impact on the transport network of the growth proposals included in the JCS.

1.2 Roles and responsibilities

1.2.1 The production of the JCS transport evidence base is a JCS-directed process supported by GCC as the local transport authority, and Highways England as the strategic road authority. It has been used to inform the JCS transport strategy, which will require endorsement by the District Authorities (as the local planning authority) as part of the local plan making process.

1.2.2 GCC and Highways England have been fully consulted and have provided input throughout the process via the JCS Transport Evidence Working Group. GCC has commissioned Amey, on behalf of JCS authorities, to manage the production of the evidence base and inform the transport strategy.

1.2.3 Two separate GCC teams which have advised on the process. Officers within the Transport Planning Team have led on commissioning Amey and have assisted in presenting outputs

from the model within this document. Officers within the Highways Development Team have assessed the outputs provided at each stage of the process, and provided feedback on the impacts on the local highways network. Officers from Highways England have a similar role, providing feedback based on the impacts on the strategic highway network.

1.2.4 Despite input throughout the process, the JCS Evidence Base and the JCS Transport Strategy is not formally endorsed by GCC or Highways England at this stage. Once the JCS is formally adopted the JCS Transport Strategy will need to be considered through the Gloucestershire Local Transport Plan (LTP) process for adoption. Any formal changes to the LTP will be made following GCC Lead Cabinet Member and/or County Council approval as appropriate.

1.2.5 Where the JCS Transport Strategy is considered to be significantly different from GCC's current LTP any updates to the LTP will require a targeted consultation with the local community.

1.3 The assessment process

1.3.1 The 2013 GCC and Highways England-owned Central Severn Vale (CSV) SATURN traffic model was finalised in March 2017. A 'Three Stage' assessment process has been agreed to inform the production of the JCS Transport Strategy. This approach comprises of:

- **Stage 1: The JCS 'Do nothing' scenario** – constructed using the following assumptions:
    - Constructed using the 2013 base
    - Committed approved JCS growth, including Strategic Allocations with planning permissions
    - TEMPRO growth for those areas outside the JCS area
    - Committed / delivered transport schemes
- **Stage 2: The JCS 'Do minimum' scenario** – constructed using the following assumptions:
    - Using the 'Do nothing' scenario
    - The JCS proposed Strategic Allocations
    - All unallocated Objectively Assessed Need JCS growth
    - 'Do minimum' transport package (where funding has been allocated but not committed)
- **Stage 3: The JCS 'Do something' scenarios** – constructed using the following assumptions:
    - Using the 'Do minimum' scenario
    - Transport mitigation scenarios

1.3.2 Copies of the 2013 Central Severn Vale (CSV) SATURN traffic model Local Modal Validation Report (LMVR) for the CSV SATURN model can be provided upon request.

1.4 The purpose of the evidence base

1.4.1 The purpose of the JCS Transport Evidence Base assessment is to demonstrate that the process used to inform the JCS Transport Strategy is fully compliant with national guidance. The following objectives have been identified to guide this work:

- To provide a robust transport evidence to facilitate the approval of the Joint Core Strategy;
- To facilitate the promotion and use of sustainable modes of transport from development proposals outlined in the Joint Core Strategy;
- To assess the quality and capacity of existing transport infrastructure to meet forecasted travel demands (derived from development proposals outlined in the Joint Core Strategy);
- To identify a cost-effective transport strategy which seeks to reduce the cumulative impact of increased travel demand resulting from the development proposals outlined within the Joint Core Strategy.

1.4.2 No definition of 'severe' shall be provided within this assessment. Its application depends on context. For example, an additional 15 vehicles added to a highway link already experiencing delay may be undesirable, but unlikely to be classed as 'severe'. Whereas a new queue of 15 vehicles at a junction with light traffic flows, or where emerging drivers may take risks as a consequence of the change, might be considered 'severe'.

1.4.3 Eleven strategic travel corridors were identified to assess the strategic impacts of the land use scenario outlined within the JCS. These corridors were identified on the basis of their importance to support national and local economic growth.

1.4.4 The routes were informed by the 'Link and Place' Spectrum outlined within Gloucestershire's Local Transport Plan (2015-2031). The routes typically experience high volumes of traffic and interact with the strategic bus corridors. The performance of the corridors in relation to junction performance provides a good proxy to the impact of journey time delays.

2.0 Policy context

2.1 National Planning Policy Framework

2.1.1 The National Planning Policy Framework (NPPF) sets out how it expects the government's planning policies for England to be applied. It outlines the role of planning to achieve sustainable development. Within this context *sustainable* means ensuring that better lives for ourselves do not mean worse lives for future generations and *development* means growth.

2.1.2 Achieving this balance is the primary challenge of the JCS Transport Strategy. The scale of growth outlined within the JCS will result in a significant increase in travel demand. How these additional trips can be accommodated by the transport network, whilst still enabling it to function, requires a balancing act between affordability, new infrastructure and the promotion of travel choice.

2.1.3 Access to transport networks is a key determinant of the quality of place for people to live and work. Gloucestershire is at a cross roads both in terms of transport pressures, and in terms of its location. It connects with strategic rail and road networks and is a hinge point between Birmingham, Bristol, Cardiff and London.

2.1.4 The NPPF states that the transport system needs to be balanced in favour of sustainable transport (walking, cycling, bus and rail) modes, giving people a real choice about how they travel. The successful outcome of this approach will be the reduced need for major transport infrastructure in the long-term, reduced transport derived emissions impacting air quality and less congestion, leading to better social, economic and environmental conditions. However it also recognises that opportunities for travel choice vary between urban and rural areas.

2.1.5 The urban nature of much of the JCS area is reflected by its highly accessible transport network which provides the greatest choice of travel options within Gloucestershire. High quality, high frequency bus services support access across the area. For longer distance trips there are two railway stations located in Cheltenham and Gloucester which provide regular services to London, Bristol, Cardiff, Birmingham and Swindon. A third station is also located in Ashchurch, but this station is served by an infrequent rail service.

2.1.6 Despite the availability of travel choice, car use continues to dominate in the JCS area. The combination of already heavily trafficked routes and historic street patterns has resulted in Air Quality Management Areas (AQMAs) being declared at several location. Mitigating the transport impact of the JCS development in these areas will be vital to demonstrating a sustainable transport strategy.

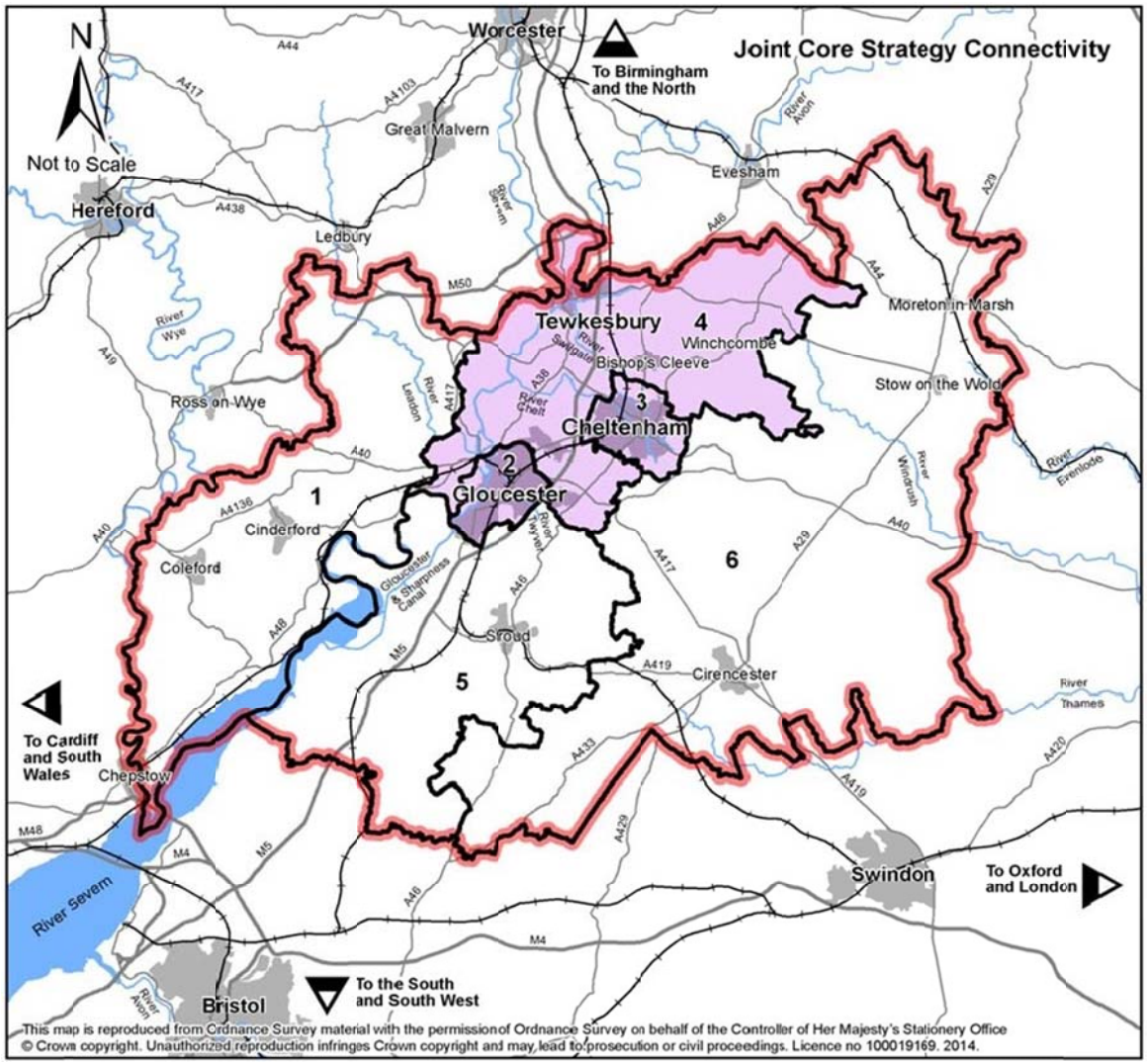
2.1.7 The NPPF confirms that development should only be prevented or refused on transport grounds where the residual cumulative impacts of development will be severe.

2.2 Joint Core Strategy

2.2.1 The JCS is an important part of the development plan for Gloucester, Cheltenham and Tewkesbury and covers the area shown in **Figure 1**. It has been prepared within the context of national policy, and having regard to the diverse aspirations and local characteristics that make up the area.

2.2.2 There are strong linkages between the three local authority areas, with Cheltenham Borough and Gloucester City being the main economic drivers for Gloucestershire. The majority of people live and work in the JCS area, and have a choice of access to leisure and health facilities, amenities and countryside from a variety of locations.

Figure1– Geographic extent of the JCS area



2.2.3 Transport has a key role in enabling the delivery of the JCS vision by supporting the development of the area as a highly attractive and accessible location. The JCS vision quantifies this role by stating that all residents and businesses (existing and new) will benefit from improved infrastructure including roads and public transport.

2.2.4 All development influences travel patterns either through new trips on the network or the re-routing of existing trips. This may occur on a micro-level by providing a single access point onto the highway network, or the macro-level where a range of infrastructure improvements are required to extend travel choices.

2.2.5 For Gloucester the JCS vision, in terms of transport, will aim to provide a well-connected and resilient city centre, along with accessible high-quality business parks. It also identifies the A40 corridor as being essential to attract visitors.

2.2.6 For Cheltenham the JCS vision, in terms of transport, will aim to continue to support the town's vibrancy and role as a sub-regional focal point for economic and cultural activity. As with Gloucester, accessible high-quality business parks will be dependant on transport connections. Two trip types were also identified in terms of promoting Cheltenham's retail and tourism offer.

2.2.7 For Tewkesbury the JCS vision, in terms of transport, will aim to strengthen the town's role as a desirable place to visit, supporting a thriving day and night-time economy. As a rural authority the bus is identified as an important enabler for rural communities to benefit from connectivity between Tewkesbury, Cheltenham and Gloucester.

2.2.8 A key challenge identified by the JCS is in relation to the area's disproportionately aging population, due to the migration of retired people from other parts of the country. This is an important consideration in relation to the transport strategy as it will need to consider day time public transport activity along with peak travel impacts associated with work based trips. The importance of walking and cycle links for health is also a consideration.

2.2.9 **Figure 2** identifies the JCS ambitions and strategic objectives that the transport strategy will support. Transport's role in supporting these objectives will be in terms of connectivity from the strategic allocations to the existing transport network. This is to enable travel choice opportunities and awareness of the local environmental impacts to be identified. It allows suitable mitigation measures to be determined in terms transport externalities (including visual impact, noise and air pollution).

Figure 2 – The JCS Transport Strategy will help support the following JCS objectives

Ambition	Strategic Objective
A thriving economy	1) Building a strong and competitive urban economy 2) Ensuring vitality of town centres
A sustainable natural and built environment	4) Conserving and enhancing the environment 5) Delivering excellent design in new developments 6) Meeting the challenges of climate change
A healthy, safe and inclusive community	7) Promoting sustainable transport 9) Promoting healthy communities

2.2.10 The JCS states that successful and sustainable communities depend upon physical, green, and social and community infrastructure to meet the needs of residents and businesses. Strategic Objective 7 states the JCS objective to promote sustainable transport use and

reduce reliance on the car. The wording of this objective is outlined in **Figure 3**. This objective underpins the JCS transport strategy.

Figure 3 – JCS Strategic Objective 7 – Promoting sustainable transport

Strategic Objective 7 – Promoting sustainable transport

Reduce the need to travel and the reliance on the car by:

- Improving opportunities for public transport, walking and cycling by making routes more convenient, safe and attractive.
- Improving existing, and providing new, frequent public transport links and safe walking and cycling routes in all new developments.
- Improving access to services in rural and urban areas through new development, improved integrated transport links and supporting local and community led transport initiatives in the Local Transport Plan throughout the JCS area
- Promoting bus priority on key public transport corridors identified in the Local Transport Plan throughout the JCS area.

2.2.11 The planning authority cannot allow development to take place that will have an unacceptable impact on the existing transport network. The JCS recognises this and the limitations of what a developer can reasonably be expected to financially contribute towards without jeopardising the economic viability of the development proposal.

2.2.12 For this reason, the JCS transport strategy will consider infrastructure provision 'in the round' and not look at items in isolation. It will also consider the use of funding from government and other public sources as the strategy will not be affordable if it is reliant on developer contributions alone. This approach is consistent with the NPPF.

2.3 Gloucestershire's Local Transport Plan (2015 -2031)

2.3.1 Gloucestershire's Local Transport Plan (LTP) sets out the transport issues and priorities for the county for the period 2015 – 2031. It outlines the county council's approach to managing the increased transport demand, which will go hand in hand with projected housing development and accelerated economic growth.

2.3.2 The car will always have a vital role to play in Gloucestershire – especially within more rural areas. However, the marketing and provision of attractive and viable alternatives, 'smarter choices', will be instrumental in ensuring genuine travel choice, which in the long-term will reduce actual and perceived reliance on the car.

2.3.3 The aim of the LTP is to influence how and when individuals choose to travel so that individual travel decisions do not cumulatively result in the failure of the transport network. Failure in the context of the LTP signifies dangerous travel conditions, prolonged travel delay (congestion) and ultimately network gridlock.

2.3.4 It is a statutory requirement under the Local Transport Act 2008 for Local Authorities to have a LTP. However, the plans role has changed. It no longer provides the basis of a financial

allocation from the Department for Transport. Instead, it sets out the long term policy structure for local transport delivery, including a set of scheme priorities

2.3.5 The transport priorities identified in the LTP have been included on the basis of compliance with the overarching LTP objectives. They do not represent a commitment by the county council for funding, but they reflect the county's transport priorities.

2.3.6 The LTP's role is to set out the long-term strategy for transport within the county, agreed by the county council as Local Highway and Transport Authority. The county council then actively seeks funding to deliver transport schemes identified within the LTP.

2.3.9 In recent years, a large proportion of the capital funding for transport improvements in Gloucestershire have come through the Local Growth Deal. Thorough Local Growth Deals, Government provides funds to Local Enterprise Partnerships or LEPs for projects that benefit the local area and economy. The Local Enterprise Partnership for Gloucestershire is the G-first LEP.

2.3.10 Ad-hoc bidding opportunities may also arise. The county council will exploit all opportunities for additional funding where the criteria of the fund support the delivery of the LTP objectives. An example of such bidding opportunities includes the Department for Transport's National Productivity Investment Fund which is intended to improve roads, cut congestion and improve journey times.

2.3.11 Funding for schemes to mitigate the impact of development are provided through individual planning obligation agreements inline with the policies outlined in the NPPF.

2.3.12 Central Government also allocates funding to the Strategic Road Network (SRN), which is the network of Motorways and Trunk Roads within the county. This network is managed by Highways England, on behalf of the Government. Highways England bids for capital funding to improve these roads as part of the Road Investment Strategy (RIS) process. RIS 1 has been allocated for the period up to March 2021. The RIS 2 bidding process is underway and Highways England will be allocating capital for the period April 2021 to March 2026.

2.3.13 To identify transport priorities in the county the LTP considers transport in separate travel corridors, defined within the LTP as "Connecting Places Strategies" (CPS). Each CPS characterises the distinctive transport issues affecting that area of Gloucestershire. They identify the challenges faced over the next 15 years and propose transport priorities for that area to support the delivery of LTP objectives.

2.3.14 Two CPS documents cover the JCS area; the Central Severn Vale CPS and Tewkesbury CPS. The LTP delivery priorities will be updated to reflect the JCS Transport Strategy (where compliant with LTP policy) during the lifetime of the LTP as new evidence emerges. The schemes outlined in the two CPS documents will provide the basis of the JCS Transport Strategy.

2.4 Enhancing Connectivity

2.4.1 An underpinning reason for allocating the bulk of the county's projected development needs in association with existing towns within the Severn Vale is the potential for enhanced

transport connectivity. Not only are these sites closer to strategic and public transport networks, they also offer greater opportunities for people to make more trips – particularly local trips – on foot or by cycle.

2.4.2 The transference of more of these local trips to walking and cycling (active travel modes) will be instrumental in creating high quality, vibrant and successful communities, and in ensuring the whole transport network operates efficiently and optimally.

2.4.3 An 'active travel' network' may be defined and reinforced through development within the JCS area if it is considered early in the master planning process and at a strategic level. The network should connect within and between new developments and existing settlements. It may reflect opportunities to 'shorten' travel distances and serve new desire lines.

2.4.4 However, the JCS development sites are on the edges of existing settlements. This means they may be further away from the centres of the towns that they are juxtaposed to than is much of the existing fabric of those towns, and more proximal to other settlements and/ or JCS sites.

2.4.5 Further compounding this, existing settlements may be ringed by heavily trafficked roads, closed development layouts or natural features which act as barriers to ease of movement between the new development site and existing settlements. In these instances walking and cycling conditions (the existence and attractiveness of routes) will be a greater factor in determining the potential for take up of these modes than simply spatial proximities and distances.

2.4.6 The need to facilitate walk and cycle trips will be in relation to a wide range of trip attractants, especially within a 1 – 5 km distance of the development site.

2.4.7 Some quietly trafficked lanes, public footpaths and bridleways could offer high quality intuitive pedestrian and cycle routes. Safeguarding them may enable active travel networks to be established at low cost and with less dedicated infrastructure provision than by imposing more rigid walk and cycle specific infrastructure.

2.4.8 Walk and cycle corridors across the JCS area will reflect not only an existing potential active travel network, but a new web of emerging movement desire lines that will embed as new development is implemented.

2.4.9 A challenge will be to safeguard the qualities of some of these links especially as motorised trip levels increase in association with the planned growth in JCS area.

2.4.10 There may be no need to build shared use foot and cycle ways within the new developments, although some may propose to incorporate core networks of traffic-free 'greenway' arrangements where these offer higher levels of permeability to pedestrians and cyclists than to motorised vehicles. Providing for active travel modes within the development will not be based on providing cycle-specific infrastructure as much as providing simple pedestrian and cycle-friendly environments around fine grain development layouts which limit speed through design.

2.4.11 As part of the JCS appraisal process or the Transport Assessments for the JCS sites, cycle and walking route barriers and improvements should be identified through clear audits.

2.5 JCS Transport Strategy Objectives and Outcomes

2.5.1 In line with the aims and objectives of the policy documents summarised in the previous section **Figure 4** outlines a set of transport objectives. **Figure 5** outlines the six fundamental points of the JCS Transport Strategy which will be used to inform the identification of the preferred mitigation strategy and **Figure 6** sets out the expected transport outcomes.

Figure 4 –JCS Transport Strategy Objectives

JCS Transport Strategy Objectives

- Require new developments to be supported by transport infrastructure measures which offset any unacceptable impacts.
- Prioritise investment in transport infrastructure to reduce the cumulative impact of new development where it affects the safe and expeditious movement of traffic on the local and strategic highway networks.
- Promote sustainable travel choice (walking, cycling, bus and rail) where it is realistic and safe to provide, ensuring new developments enjoy multi-modal connectivity with existing communities, employment, services and transport infrastructure.
- Identify, protect and enhance strategic and local quiet lanes, public rights of way and green corridors to reinforce walk and cycle desire lines within and between existing settlements, new development sites and key trip attractants
- Limit the negative externalities of the transport strategy on air quality and noise pollution
- Design transport schemes to minimise their visual impact on the environment

Figure 5 – JCS Transport Strategy's Six Point Plan

JCS Transport Strategy's Six Point Plan

1. Provide an efficient, safe and resilient transport network which enables the delivery of residential and employment growth by minimising its impacts on the transport network.
2. Deliver new, and enhance existing, sections of highway where required across the whole of the JCS area, to improve the quality of place; reduce community severance; facilitate the principle of orbital vehicle movements by separating local and 'through' traffic; and enable economic growth.
3. Remove pinch points on the local highway network, prioritising those on radial routes served by key bus corridors including the 10, 41/42, 94, 97/98 bus services.
4. Encourage public transport providers (bus and rail) to increase service frequencies along strategic corridors and review service coverage where there are gaps serving development sites
5. Provide coherent cycle and pedestrian linkages which connect development sites to adjacent land uses through permeable site layouts and the provision of new infrastructure;
6. Optimise the smart operation and management of the transport network through increased use of technology and travel information to provide multi-modal travel information

Figure 6 –JCS Transport Strategy Outcomes

Transport Strategy Outcomes

- Managed vehicle movements on strategic highway corridors to improve access and journey time reliability between Gloucester, Cheltenham and Tewkesbury
- Improved multi-modal travel access to Gloucester, Cheltenham and Tewkesbury urban centres and proposed development areas
- The move to a low carbon transport network where individuals are encouraged to walk or cycle for appropriate short distance trips or use passenger transport for some longer distance trips

3.0 Baseline site assessments of strategic allocations

3.1 Introduction

3.1.1 The Main Modifications to the Pre-Submission JCS Document (February 2017) states that during the plan period, provision will be made to meet the need for approximately 35,175 new homes and a minimum of 192 hectares of B-class employment land to support approximately 39,500 new jobs.

3.1.2 This will be delivered by development within existing urban areas through district plans, existing commitments, urban extensions to Cheltenham and Gloucester, and the provision of Strategic Allocations at Ashchurch. The JCS aims to locate jobs near to the economically active population, reducing out-commuting and thereby reducing carbon emissions from unsustainable car use.

3.1.3 **Figure 7** summarises the apportionment of the strategic allocation by sub area highlighting the status of sites within the JCS Transport Assessment. Evidence will be presented within this section for the following strategic allocations A1, A1a, A3, A5 and A11.

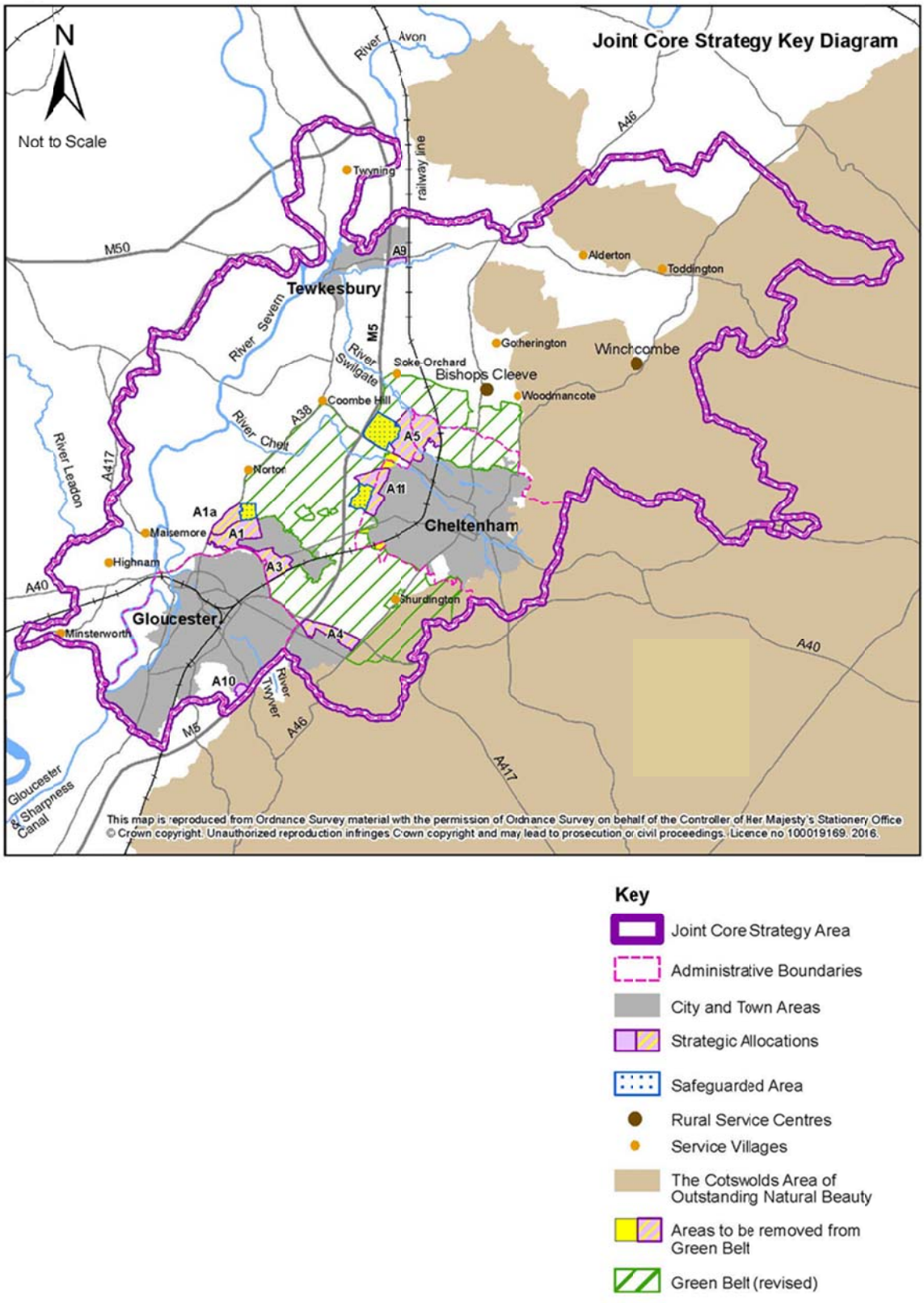
Figure 7 – JCS Strategic Allocation

Sub Area	Area	Indicative Housing to be delivered up 2031	Hectares of Employment Land to be delivered up 2031	Status of allocation within JCS Transport Assessment
Gloucester City supply	Gloucester City Urban Capacity	7,532		Included as Objectively Assessed Need (OAN) growth and is not site specific
	Winnycroft	620		450 – Committed development remaining included as OAN growth and is non site specific
	A1 Innsworth	1,300	9.1	Strategic Allocation
	A1a Twigworth	995		Strategic Allocation
	A3 South Churchdown	1,100	17.4	Strategic Allocation
	A4 North Brockworth	1,500	3	Committed development
Cheltenham Borough supply	Cheltenham District Capacity	5,611		Included as OAN growth and is not site specific
	A5 North West Cheltenham Urban Extension	4,285	23.4	Strategic Allocation
	A11 West of Cheltenham urban extension	1,100	45	Strategic Allocation
Tewkesbury Borough Supply	Tewkesbury Borough District Capacity	6,557		Included as OAN growth and is not site specific
	A9 - Ashchurch		14.3	Committed development
	Mitton (Wychavon)	500		Included as OAN growth and is not site specific

*Figures correct as of the Housing Implementation Strategy (January 2017)

3.1.4 **Figure 8** illustrates the location of the strategic allocation within the wider JCS area.

Figure 8 – Map of JCS Strategic Allocations

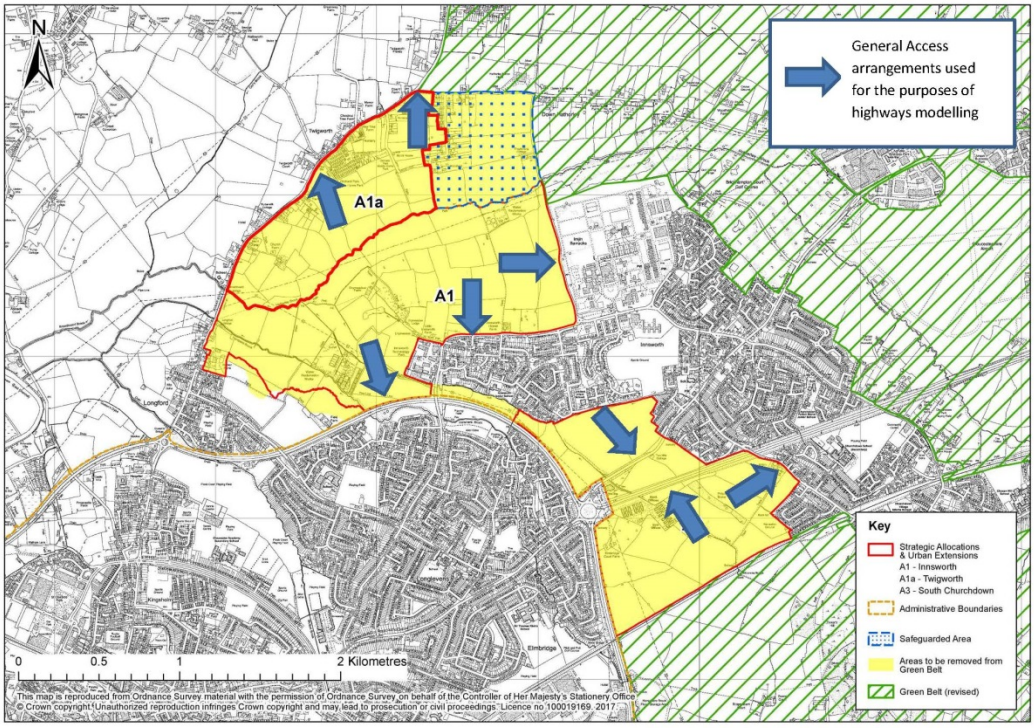


3.2 A1 Innsworth & A1a Twigworth

3.2.1 For the purposes of this assessment the baseline transport assessment considers these sites as one strategic allocation.

3.2.2 This strategic allocation is located to the north of Gloucester and borders the communities of Longford and Innsworth to the south, Twigworth to the north-west and buffers Imjin Barracks to the east. Access from the site will be provided onto the Strategic Road Network via a new junction on the A40 between the A38 Longford roundabout and the Innsworth Lane Bridge. In addition, access to the local highway network will be provided onto Innsworth Lane, Frog Furlong Lane, Down Hatherley lane and the A38 Tewkesbury Road. **Figure 9** illustrates the extent of the site and illustrates the access point assumptions used for the purposes of this assessment.

Figure 9 – Location and access points for site A1 - Innsworth and Twigworth



3.2.3 There are no major trip attractors within the vicinity of the site.

3.2.4 Trip data captured by the 2011 Census provides a useful proxy for likely trip patterns in terms of work based destination and method of transport used. **Appendix A** provides more information on the methodology used in this analysis.

3.2.5 **Figure 10** documents the main method of travel used by existing residents within the vicinity of this site. The table also includes data from Central Severn Vale (CSV) Gloucester and Cheltenham and countywide as a comparison. As is shown, the methods of travel used are highly consistent with the trip patterns across the CSV area, with 70% of work based trips

using the car either as a driver or a passenger, 20% either walk or cycle and 7% using the bus. This demonstrates that this site has a high propensity for sustainable travel use and, with suitable investment linking the site into the existing network, this trend should continue.

Figure 10 - Typical method of transport used when travelling to work destination from Site A1 – Innsworth and A1a Twigworth (2011 Census)

	Site A1 – Innsworth and A1a - Twigworth	Central Severn Vale	Gloucestershire
Driving a car or van	65%	63%	69%
Passenger in a car or van	5%	6%	6%
Motorcycle, scooter or moped	1%	1%	1%
On foot	14%	15%	13%
Bicycle	6%	6%	5%
Bus, minibus or coach	7%	7%	5%
Train	1%	1%	1%

3.2.6 **Figure 11** documents the primary work based destinations of existing residents within the vicinity of this site. As the site is to the north of Gloucester it is not surprising 46% of work trips are Gloucester based. The site also has good access via Churchdown (B4063) to Cheltenham and 16% work trips based there. This high level of local trips indicates the potential for sustainable transport use.

3.2.7 19% of trips are to locations south of Gloucester in Stroud, Bristol or the south west. To access these sites vehicles are likely to use the A40 either travelling east and accessing the M5 and junction 11 or to the west and the A430 South West Bypass. As this site is an urban extension to Gloucester with good access to the strategic highway network it is likely that these long-distance trips will remain as the employment offer provided by Bristol continues to grow.

Figure 11 - Work based destinations from Site A1 – Innsworth and Twigworth (2011 Census)

	Site A1& A1a – Innsworth and Twigworth
Tewkesbury and surrounding areas	6%
Cheltenham and surrounding areas	16%
Gloucester and surrounding areas	46%
Winchcombe and rural Tewkesbury	1%
West Midlands	5%
Forest of Dean, Hereford and Wales	3%
Cotswolds, Swindon, London and South East	4%
Stroud, Bristol and South West	19%

Highway access

3.2.8 The Link and Place spectrum (**Appendix B**) included in Gloucestershire's LTP identifies the A40 as a National Link which is critical for the national economy with limited community interaction. The route links the Forest of Dean with the M5 at junction 11 and junction 12 via Gloucester's south west bypass. This section of highway is one of the busiest in the county and has an average daily vehicle flow of between 20,000 and 30,000 vehicles (**Appendix C**).

3.2.9 The spectrum also identifies the A38 as a Primary Link which, as a mix of urban through routes and rural routes with minimal community interaction, is critical for the local economy. The route links Gloucester to Tewkesbury. It typically has an average daily vehicle flow of between 10,000 and 15,000 vehicles. Innsworth Lane is classified as a Suburban Link where moderate delays are to be expected as it forms part of the built form with significant interactions between highway users and journey end points. It has an average daily vehicle flow of between 6,000 and 10,000 vehicles. Frog Furlong Land is classified as a Local Link, which is not suitable for strategic vehicle flows and, typically, has low vehicle numbers suitable for cycle use.

3.1.10 Average vehicle speeds in the vicinity of the site are mixed (**Appendix D**). The A40 is a fast moving road with queuing traffic at the Longford and Elmbridge Court roundabouts. As to be expected the degree of queuing traffic is dependant on the time of travel. Vehicles can expect to experience long delays travelling west during the PM peak. Delays on the A38 during the AM peak are typical with slow southbound traffic sometimes queuing for several kilometres.

3.2.11 The increase in vehicle demand from this site will need to be mitigated to ensure the highway network can function. A suitable mitigation package to alleviate Longford Roundabout will be required as a minimum.

3.2.12 When reviewing highway collision data from the past five years in the vicinity of the site (**Appendix E**) there have been several serious incidents at the junctions of the A38 between Twigworth and the A40 Longford roundabout. A fatal incident occurred to the north of the Twigworth site on the A38. With the additional traffic generated from the site likely to impact this section of highway will get busier which may reduce speeds, however there is likely to be an increase in conflicts between different modes of transport. Managing vehicle speeds while ensuring the needs of vulnerable road users are considered will need to be part of the mitigation strategy for this site. The same approach also needs to be applied to Innsworth Lane where a series incident also occurred very close to the proposed access arrangements for the site.

3.2.13 Although not part of this assessment emergency access arrangements do need to be considered.

3.2.14 There are no Air Quality Management Areas within the vicinity of the site (**Appendix F**). It is also unlikely that the increase in traffic generated by the site will trigger any designations,

subject to a successful mitigation package being provided to reduce the occurrence of slow moving traffic.

3.2.15 There are three small noise important areas within the vicinity of the site (**Appendix I**). Two are located on the A38 and one on the A40. It is not known how this site will impact these areas.

Bus Access

3.2.16 The site is generally well served by bus and **Figure 12** summarises the bus services that can be accessed.

3.2.17 The Innsworth part of the site can access Cheltenham and Gloucester using the 97 / 98 including Gloucestershire Royal Hospital. Other than re-routing of the service through the site and providing Bus priority measures on Innsworth Lane including a bus gate from the site no further improvements are likely to be required.

3.2.18 The Twigworth part of the site can access Gloucester and Tewkesbury using the 71. Subject to cost and demand it may be appropriate to extend this service into the evening and re-route the service through the site.

Figure 12 - Existing bus accessible from site A1 & A1– Innsworth & A1a Twigworth

Service No.	Point of access	Route	Operator	Mon-Fri	Sat	Sun
71	A38 Tewkesbury Road	Gloucester to Tewkesbury	Stagecoach West	60 mins (6-18) No evening service	60 mins (7-18) No evening service	No service
97 / 98	Innsworth Lane	Gloucester – Churchdown Village - Cheltenham	Stagecoach West	30 mins (6-18) 3 evening services	30 mins (6-18) 3 evening services	Hourly (9-17)
353	Innsworth Lane – Frog Furlong Lane	Gloucester - Sandhurst - Longlevens - St Oswalds - Gloucester	Swanbrook Coaches	1 service a day	1 service a day	No service

3.2.19 Vehicle delay on the A38 at Longford and Innsworth Lane may impact the operation of bus services in the area. It is essential these impacts are minimised to maintain service frequency and reliability. The upgrade of bus stop facilities including Real Time Passenger Information would support bus use from this site.

Rail Access

3.2.20 The nearest station is Gloucester with direct services to London, south Wales, Birmingham and local services to Bristol. Residents requiring direct services to the North and South West may travel to Cheltenham instead.

3.2.21 Access is provided by bus to the station, but the relatively infrequent service may deter potential passengers to access Gloucester station. The station is also too far to walk and it would seem likely that most people would drive or cycle.

Cycle and walk access

3.2.23 The site abuts Innsworth to its east and is spatially close to Gloucester City. One of the justifications for this location is that it is in proximity to Gloucester City as well as Innsworth and Churchdown. Therefore, improving non-motorised connectivity to Gloucester will be a key aim of the development. Opportunities for this will be in association with the A38, Innsworth Lane over the A40, the pedestrian bridge over the A40 between Innsworth and Longlevens, and quiet linkages through Innsworth.

3.2.24 Cycling and walking levels are good in Innsworth at around 20% of trips, and especially in a location that is peripheral and north of the A40. Spatially, distances are well within walking and cycling range between the site and destinations within Gloucester City. There are also close employment and educational facilities within Innsworth and Churchdown to the east. It will be key to ensure that current connections are safeguarded and improved, and new ones are identified and installed.

3.2.25 The public footpath network provides a useful basis for internal and external connectivity both to Innsworth and across the A40. There are no formal cycle routes within or serving the site. Most of the site is bounded by fields and a stream; only a small part of its border, to the east, connects with the settlement of Innsworth.

3.1.26 The qualities of Innsworth Lane, Frog Furlong Lane and Longford Lane are generally adequate for cycling, and Innsworth itself offers opportunities for soft pedestrian and cycling linkages and quiet routes

3.2.27 Detailed pedestrian and cycle audit of Churchdown and Innsworth, including sites A1 and A3, will be needed to understand new and existing walk and cycle desire lines, existing barriers to active travel and barriers which will need to be mitigated through site layouts. This should include the routes crossing Innsworth Lane, the A40 and Longford Lane (as well as the A38 if new or existing desire lines are identified north eastwards).

3.2.28 This audit should also identify measures to improve 4 way junction at intersection between Innsworth Lane and the B4063 for vulnerable road users. Install improvements in tandem with requirements of site A3. Innsworth Lane has the potential to represent an important cycling desire line through from Longford Lane where it intersects with public footpath ‘Innsworth 7A’ and the B4063. This corridor could significantly determine cycling levels in association with the new development. New desire lines will include radial as well as edge to (City) centre flows. Sources of information include the ‘Churchdown and Innsworth Movement of People by Active Travel Study (2016)’ which forms part of the Neighbourhood Development Plan for this area.

3.2.29 Key barriers to pedestrian and cycling movement include the A40 to the south which severs site A1 from Gloucester City; open fields with no foot or cycle ways across them, and which border most of the site; Innsworth Lane, and especially without traffic management. Increased traffic flows due to site development will erode the cycling qualities of Innsworth Lane and Frogfurlong Lane without mitigation. Innsworth Lane has no footway on its edge abutting the site, whilst Frogfurlong Lane has no footways on either side of its length where

it abuts the site; similarly unclassified roads to the north of the site currently offer opportunities for non-motorised connectivity with settlements and locations in the Vale towards west Cheltenham and Twigworth. These will be compromised by increased motorised traffic on the local network; the Roundabout at the south west apex of the site offers a poor environment for pedestrians and cyclists; and the A38 is unpleasant to cycle; the footway is narrow, as is the carriageway. Increased traffic flows here will cause the pedestrian and cycling environment to deteriorate further.

3.2.30 **Appendix H** identifies a list of walking and cycling improvements to maintain and increase walking and cycling from this site.

Thinktravel promotions

3.2.31 'Thinktravel' is the brand name for Gloucestershire's smarter choices programme, designed to help people consider their travel choices and encourage use of more sustainable modes of transport. This encompasses behavioural and transport operational initiatives to encourage and support a smarter approach to journey decision making, planning and undertaking. The outcomes of this behavioural change are a reduction in the number of single occupancy car trips, along with a greater awareness of travel choices and promotion of the 4Rs (Reduce, Retime, Reroute, Remode) to journeys to avoid the most congested times and locations on Gloucestershire's transport network.

3.2.32 Thinktravel initiatives that could be applied to this development include:

- New street signs to aid navigability
- Travel Planning advice targeting
    - New householders
    - Local employers
    - Local schools

3.2.33 **Figure 13** summarises the types of investments required to reach the optimum level of sustainable transport use for this site and **Figure 14** provides a summary of the baseline transport assessment of this site.

Figure 13 Types of sustainable initiatives to be delivered from investment

Types of Improvements			
Bus	**Rail**	**Cycle**	**Walk**
• Bus stops • RTPI • Lighting • curbs • Signing routes • Rerouting • Signal priorities • Physical priority measures	• Promotion • Cycle parking	• Promotion / cycle parking • Lighting • Signing routes • dropped curbs • Point closures - traffic restrictions • Short length of shared use paths • Minor junctions improvements • New crossing points	• Resurfacing of footway • Promotion • Lighting • Signing routes • Short length of shared use paths • Minor junctions improvements • New crossing points

Figure 14 – A1 - Innsworth & A1a Twigworth baseline transport summary

A1 & A1a - Innsworth & Twigworth – baseline transport summary

- Long-distance travel likely to remain due to ease of access to SRN
- New A40 junction (if linked to the existing network outside the site) will have a significant change on traffic movements in this area
- Need a solution for Longford Roundabout
- Review 97/98 bus route corridor for vehicle delay pinchpoints
- Rerouting of 97/98 into site and possible service improvements to 71 for evening service
- Improving non motorised connectivity to Gloucester is important
- Innsworth lane has an important function as a multimodal corridor
- Pedestrian improvements will be required to the network surrounding the site
- Walking and cycling improvements need to be considered as part of a package also benefiting site A3 (Churchdown)

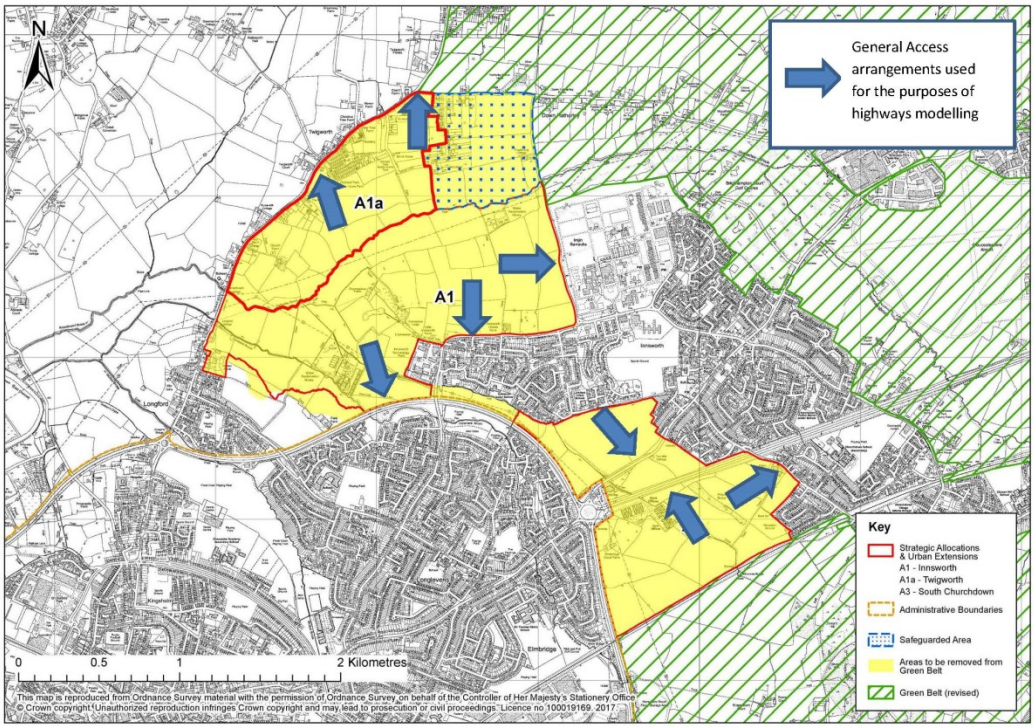
Transport mitigation considerations:

- Improved highway access via new A40 junction to relieve pressure on Longford Roundabout
- Improved walking and cycling links
- Re-routing of 97/98 bus service with necessary bus priority measures
- Promotion of alternatives to car use for local trips

3.3 A3 – South Churchdown

3.3.1 This strategic allocation is located to the north-east of Gloucester. The site will buffer the communities of Innsworth, Longlevens and Churchdown. It is divided into two parts with the B4603 bisecting the site. Residential access will be provided by a new access point onto the B4063 Cheltenham Road East to the north-east of Elmbridge Court roundabout and via extensions to residential roads linking to Pirton Lane in Churchdown. Employment Access from the site will be provided onto the Strategic Road Network via a new junction on the A40 close to the Elmbridge Court roundabout. **Figure 15** illustrates the extent of the site and illustrates the access point assumptions used for the purposes of this assessment.

Figure 15 – Location and access points for site A3 – South Churchdown



3.3.2 Trip data captured by the 2011 Census provides a useful proxy for likely trip patterns in terms of work based destination and method of transport used. **Appendix A** provides more information on the methodology used in this analysis.

3.3.3 **Figure 16** documents the main method of travel used by existing residents within the vicinity of this site. The table also includes data from Central Severn Vale (CSV) Gloucester and Cheltenham)) and county wide as a comparison. With 75% of work based trips using the car as either a driver or passenger this is more consistent with the county as rather than the Central Severn Vale area (CSV).

3.3.4 The proportion of trips walked is significantly lower than the CSV average and this is a consequence of the site being located in a predominately residential area with no major employers in close proximity. The proportion of cycle use (7%) and bus use (8%) is above

the CSV average. The community of Churchdown is well serviced with high frequency bus routes and good cycle facilities providing good connections from the site to these networks. This will ensure a high propensity of use from this development.

Figure 16 - Typical method of transport used when travelling to work destination from Site A3 – South Churchdown (2011 Census)

	A3 – South Churchdown	Central Severn Vale	Gloucestershire
Driving a car or van	69%	63%	69%
Passenger in a car or van	5%	6%	6%
Motorcycle, scooter or moped	2%	1%	1%
On foot	9%	15%	13%
Bicycle	7%	6%	5%
Bus, minibus or coach	8%	7%	5%
Train	0%	1%	1%

3.3.5 **Figure 17** documents the primary work based destinations of existing residents within the vicinity of this site. As the site is located between Cheltenham and Gloucester it is not surprising 77% of work trips are based in these locations. This high level of local trips indicates the potential for sustainable transport use.

3.3.6 11% of trips are to locations south of Gloucester in Stroud, Bristol or the south west. To access these sites vehicles are likely to use the A40 either travelling east and accessing the M5 and junction 11. As this site is located in close proximity to the strategic highway network it is likely that these long-distance trips will remain as the employment offer provided by Bristol continues to grow.

Figure 17 - Work based destinations from Site A3 – South Churchdown (2011 Census)

	A3 – South Churchdown
Tewkesbury and surrounding areas	1%
Cheltenham and surrounding areas	25%
Gloucester and surrounding areas	52%
Winchcombe and rural Tewkesbury	1%
West Midlands	2%
Forest of Dean, Hereford and Wales	3%
Cotswolds, Swindon, London and South East	5%
Stroud, Bristol and South West	11%

Highway access

3.3.7 The Link and Place spectrum (**Appendix B**) included in Gloucestershire's LTP identifies the B4603 as a Suburban Link which provides residential and commercial areas. The route provides access to Churchdown and Staverton Airport; it also provides an alternative link between Cheltenham and Gloucester avoiding the A40. The route is also used to access the North West Cheltenham avoiding large vehicle flows in the west of Cheltenham. This section

of highway has an average daily vehicle flow of between 10,000 and 15,000 vehicles (**Appendix C**).

3.3.8 The spectrum also identifies the A40 as a National Link which is critical for the nation economy with limited community interaction. The A40 links Gloucester to the M5 at junction 11. This section of highway is one of the busiest in the county and has an average daily vehicle flow of between 30,000 and 50,000 vehicles.

3.3.9 During peak travel times delays on the A4063 are common with slow moving traffic impacted by the dominant flow of the A40 at Elmbridge Court Roundabout and at the intersection with the B4634 at Staverton Crossroads. Delays on the A40 accessing Elmbridge Court Roundabout are also typical during peak travel times (**Appendix D**).

3.3.10 The increase in vehicle demand from this site will need to be mitigated to ensure the highway network can function. The planned Elmbridge transport scheme should alleviate much of the existing vehicle delay, but a suitable mitigation package to alleviate vehicle demand for this site will be required. In addition the Staverton crossroads junction of the A4063 and A4634 will need to be managed to ensure it can function with the increase in vehicle demand likely to use this section of highway both from this site and the proposed North West Cheltenham site as more vehicles will seek to avoid travel delay in Cheltenham.

3.3.11 When reviewing highway collision data from the past five years in the vicinity of the site (**Appendix E**) there have been two serious incidents along Pirton Lane. Additional traffic will use this lane and any mitigation will need to consider the potential increase in road user conflicts resulting from this increased in vehicle access. A number of incidents also occurred on the A40 at Elmbridge Court roundabout. The proposed Elmbridge transport scheme when built should reduce the risk of highway incident at this junction.

3.3.12 Although not part of this assessment emergency access arrangements do need to be considered.

3.3.13 There are no Air Quality Management Areas within the vicinity of the site (**Appendix F**). It is also unlikely that the increase in traffic generated by the site will trigger any designations, subject to a successful mitigation package being provided to reduce the occurrence of slow moving traffic.

3.3.14 There are three noise important areas within the vicinity of the site (**Appendix G**). Two are located on the A40 and one on the A417. It is not known how this site will impact these areas. However there is a risk that the residential properties build in proximity to the A40 between M5 junction 11 and Elmbridge Court Roundabout may be impacted by increased vehicle and rail noise.

Bus access

3.3.15 The site is highly accessible by bus and **Figure 18** summarises the bus services that can be accessed.

3.3.16 There are two access points: Cheltenham Road East - served by the high frequency 94 which provides access Cheltenham and Gloucester via Churchdown including access to Gloucestershire Royal Hospital; Pirton Lane – served by the 98 which also provides access to Cheltenham and Gloucester via Churchdown similar to the 94 provides but on a less frequent basis. No improvements are required in terms of bus service provision on the 94 however bus priority may need to be considered along the route. If there is sufficient demand it may also be appropriate to improve the frequency of the 98.

Figure 18 - Existing bus accessible from site A3 – South Churchdown

Service No.	Point of access	Route	Operator	Mon-Fri	Sat	Sun
94	Cheltenham Road East	Gloucester - Longlevens - Churchdown - Cheltenham	Stagecoach West	10 mins (6-18) 20 mins (18-20) 30 mins (20-00)	10 mins (6-18) 20 mins (18-00)	20 mins (8-11) 15 mins (11-19) 30 mins (20-00)
N94	Cheltenham Road East	Gloucester - Longlevens - Churchdown - Benhall - Cheltenham	Stagecoach West	Fridays only 30 mins (00-03)	30 mins (00-03)	No service
98	Pirton Lane	Gloucester – Churchdown Village - Cheltenham	Stagecoach West	60 mins (6-18) 3 evening services	60 mins (6-18) 3 evening services	4 services (9-17)

3.3.17 There is the potential for vehicle delays on this route particularly at Elmbridge Court and Arle Court Roundabouts. It is essential these impacts are minimised to maintain service frequency and reliability along this corridor.

Rail Access

3.3.18 The nearest station is Gloucester with direct services to London, south Wales, Birmingham and local services to Bristol. Residents requiring direct services to the North and South West may travel to Cheltenham instead.

3.3.19 The 94 bus route runs through the northern part of the site providing good connectivity with Gloucester station. The southern part of the site appears to be truncated by the A40 thus drastically reducing access to Gloucester station.

Cycle and walk access

3.3.20 A key challenge is that the site is bisected by the B4063 and A40 creating three lobes, north of the B4063, between the B4063 and A40, and south of the A40. Each have different and contrasting baseline conditions in terms of cycle and walk access, and potential. They need to be considered separately as each offers different potentials to connect with either Gloucester City or the adjacent settlements of Churchdown and Innsworth. The following descriptions refer to A3 (i) – north of the B4063, A3 (ii) – between B4063 and A40 l, A3 (iii) – south of A40.

A3 (i) – northern lobe

3.3.21 This section is not served by public rights of way, but encompasses a segregated pedestrian and cycle link (National Cycle Network route 41) linking Gloucester with Churchdown which is integral to facilitating direct and high cycle flows in the area. Although it is bound on its south western edge by the A40, the other edges are soft and offer potential, not just for walk and cycle permeability, but to improve non-motorised connectivity with adjacent built areas. The development of the site provides the opportunity to unlock access between Innsworth, Churchdown and Gloucester, by creating new pedestrian and cycle routes through the site itself which better meet some area wide walk and cycle desire lines.

3.3.22 Key barriers which will need to be addressed through mitigation include the A40, Increased traffic movements and turnings onto the B4063 (strategic walk and cycle route); and the capacity and condition of the pedestrian bridge over the A40.

A3 (ii) Central Lobe

3.3.23 There is no public footpath, road or cycle route within the site. The site is in proximity to Gloucester and, due to the pedestrian and cycle facilities on the B4063 and the pedestrian and cycle underpass on Elmbridge roundabout, it has strong connectivity to Gloucester City and Churchdown.

3.3.24 Key Barriers include the A40, the B4063 due to increased traffic volumes and due to the development facing the road on the side of the highway without shared use cycle track facility, and increased traffic onto Pirton Lane which is part of Nation Cycle Network and offers tolerable cycling conditions despite carriageway widths, but which may become compromised if motorised flows increase here. An additional barrier may arise through the detailed 'fit' of the development within the site, whereby it does not directly abut Elmbridge Court Roundabout thereby not optimising possible city connectivity via active modes.

A3 (iii) Southern Lobe

3.3.25 This section contains no existing cycle route access. It has a poor, fragmented public footpath network which as been severed through previous surrounding land uses and there are no public roads. Existing access to this section of the site is provided via a minor road into a Business Park adjacent to Elmbridge Court roundabout.

3.3.26 The southern lobe is greatly constrained by the A40, the A417 and the railway lines which bound around 80% of its perimeter. Mitigation needs to be extensive to enable optimal levels of walking and cycling. The site is in proximity to Gloucester and Churchdown but pedestrian and cycle access is extremely poor. Travelling distances far exceed actual proximity to local destinations – such as schools – in Gloucester.

3.3.27 Key barriers to walk and cycle movement are extensive: The site is hemmed in on all sides by the highway network and the railway line; the proposed highway access point at John Daniels Way at the north-east point furthest away from key pedestrian and cycle trip draw which is Gloucester City. Propensity for walk and cycle trips which match those of adjacent area of Longlevens is low due to topographical, development and transport infrastructure

barriers; and Pirton Lane – which is adequate for cycling only because it exhibits low traffic flows - will lose that quality due to traffic arising from new development.

Thinktravel promotions

3.3.28 'Thinktravel' is the brand name for Gloucestershire's smarter choices programme, designed to help people consider their travel choices and encourage use of more sustainable modes of transport.

3.3.29 Thinktravel initiatives that could be applied to this development include:

- Street signs to aid navigability;
- Personal Transport Planning (TPP) based on mosaic analysis or applying understanding that people may be most likely to walk and cycle when they are first, changing travel habits due to house move, and second, moving house to be in better proximity to employment or education.
- Target groups will include
  - New householders;
  - Local employers;
  - Local schools
- Consult Sustrans for advice on promoting higher use of National Cycle Network (NCN) and improvements to its alignment through development.

3.3.32 **Figure 19** summarises the types of investments required to reach the optimum level of sustainable transport use for this site and **Figure 20** provides a summary of the baseline transport assessment of this site.

Figure 19 Types of sustainable initiatives to be delivered from investment

Types of Improvements			
Bus	**Rail**	**Cycle**	**Walk**
• RTPI • Signal priorities • Physical priority measures	• Cycle parking • Small Car parking improvements	• Promotion / cycle parking • Lighting • Signing routes • dropped curbs • Short length of shared use paths • Minor junctions improvements • New crossing points • Strategic greenways and cycle routes • Bridges / underpasses	• Resurfacing of footway • Promotion • Lighting • Signing routes • Dropped curbs • Short length of shared use paths • Minor junctions improvements • New crossing points • Strategic route improvements • Bridges / underpasses

Figure 20 – A3 – South Churchdown baseline transport summary

A3 – South Churchdown– baseline transport summary

- The Elmbridge transport scheme should alleviate much of the existing vehicle delay although additional access onto the A40 may be required
- Need a solution for Staverton crossroads
- Travel demand from North West Cheltenham will impact the surrounding area with vehicles seeking to avoid travel delay in Cheltenham
- Vehicle noise will impact the site
- Highly accessible by bus – but vehicle delays at Elmbridge Court and Arle Court Roundabouts needs to be minimised to maintain service frequency and reliability along this corridor
- Review 94 bus route corridor for vehicle delay pinchpoints
- Consider frequency improvements for 98 bus service
- Provide easy connectivity with the shared use walk and cycle facility on the B4063 and upgrade the existing A40 pedestrian bridge to carry higher pedestrian flows and cyclists
- Optimise non-motorised connectivity with Churchdown
- Upgrade Pirton Lane to safeguard and enhance it as a pedestrian and cycle environment
- Need to active travel access Elmbridge Court subway
- Consider the Neighbourhood Development Plan commissioned 'Churchdown Movement of People Study' which has considered some of the walk and cycle routes within the locality

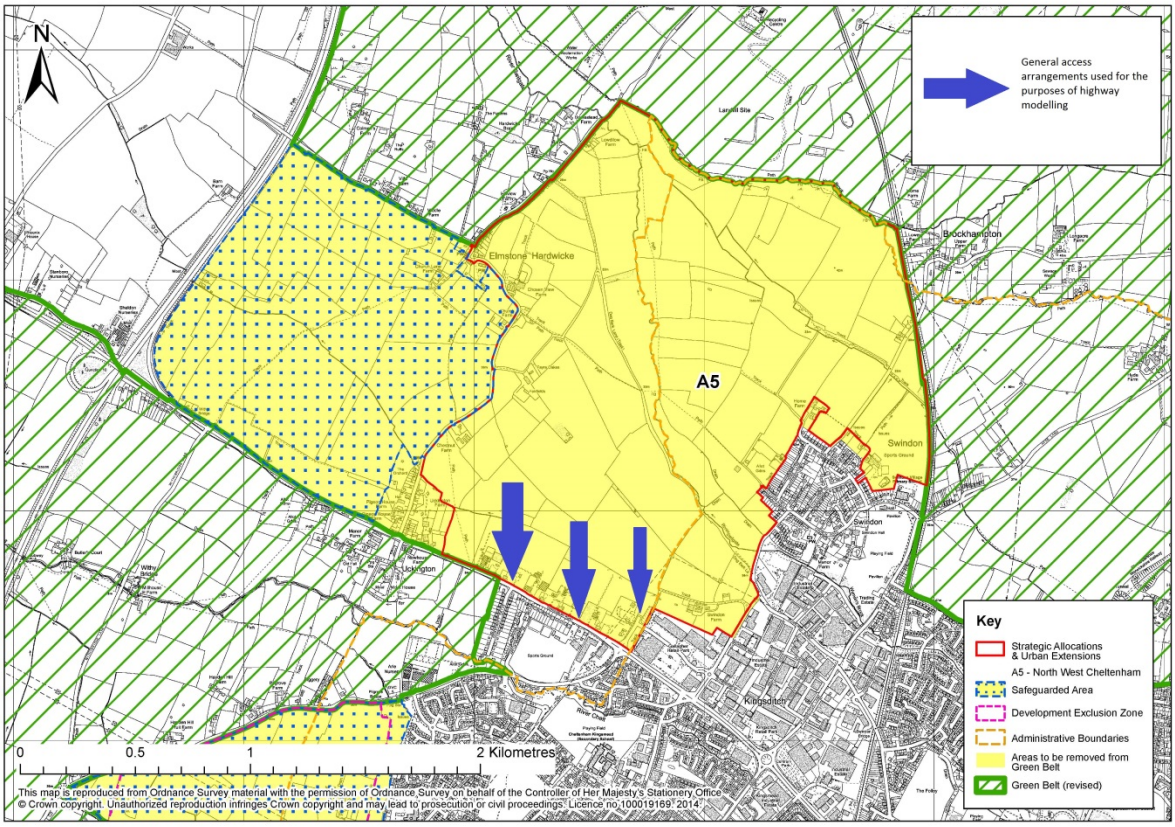
Transport mitigation considerations:

- Need a solution for Staverton crossroads – (B4063 and B4064)
- Bus priority measures for Elmbridge Court and Arle Court roundabouts
- Significant investment to enable improved walking and cycling links
- Promotion of alternatives to car use for local trips
- The role of park and ride to serve the site
- Improved access on to the A40

3.4 A5 – North West Cheltenham

3.4.1 This Strategic Allocation is located adjacent to the north-western edge of Cheltenham, north of the A4019 Tewkesbury Road and west of the Gallagher Retail Park and, Kingsditch Industrial Estate. The M5 Junction 10 is also in close proximity. The main site access points will be via the A4019 Tewkesbury Road. **Figure 21** illustrates the extent of the site and illustrates the access point assumptions used for the purposes of this assessment.

Figure 21 – Location and access points for site A5 – North West Cheltenham



3.4.2 Both Gallagher and Kingsditch retail parks are in close proximity of the site.

3.4.3 Trip data captured by the 2011 Census provides a useful proxy for likely trip patterns in terms of work based destination and method of transport used. **Appendix A** provides more information on the methodology used in this analysis.

3.4.4 **Figure 22** documents the main method of travel used by existing residents within the vicinity of this site. The table also includes data from Central Severn Vale (CSV) Gloucester and Cheltenham) and county wide as a comparison. With 71% of work based trips using the car as either a driver or passenger is highly comparable with the CSV average and below the county average.

3.4.5 The proportion of trips walked and cycled trips are consistent with the CSV average. Bus use accounts for 9% of trips. This is the highest proportion of bus use from any of the JCS strategic allocations and it will be important to maintain this level of service to maintain this level of use.

Figure 22 - Typical method of transport used when travelling to work destination from A5 – North West Cheltenham (2011 Census)

	A5 – North West Cheltenham	Central Severn Vale	Gloucestershire
Driving a car or van	65%	63%	69%
Passenger in a car or van	6%	6%	6%
Motorcycle, scooter or moped	1%	1%	1%
On foot	13%	15%	13%
Bicycle	6%	6%	5%
Bus, minibus or coach	9%	7%	5%
Train	1%	1%	1%

3.4.6 **Figure 23** documents the primary work based destinations of existing residents within the vicinity of this site. 63% of work based trips are to Cheltenham and surrounding areas demonstrating the potential for short distance sustainable transport use. 13% of trips are work based trips are to Gloucester. The comparatively low figure is linked to the limited access issues from the site.

3.4.7 With no southbound access onto the M5 at junction 10 only 7% of trips are to locations south of Cheltenham. Although not significant 12% of trips are to the north of the site either to Tewkesbury or the West Midlands. As this site is located close to M5 Junction 10 with access no southbound access it is likely that these long-distance trips will grow as the employment offer provided by Worcester and Birmingham continues to grow. Should M5 Junction 10 become a full movement junction this trip patterns is likely to change significantly.

Figure 23 - Work based destinations from Site A5 – North West Cheltenham (2011 Census)

	A5 – North West Cheltenham
Tewkesbury and surrounding areas	4%
Cheltenham and surrounding areas	63%
Gloucester and surrounding areas	13%
Winchcombe and rural Tewkesbury	3%
West Midlands	4%
Forest of Dean, Hereford and Wales	1%
Cotswolds, Swindon, London and South East	5%
Stroud, Bristol and South West	7%

Highway access

3.4.8 The Link and Place spectrum (**Appendix B**) included in Gloucestershire's LTP identifies the A4019 (Tewkesbury Road) as a Primary Link which provides strategic access which is critical for the local economy. The route provides access to M5 junction 10 and Cheltenham Town centre. This section of highway has an average daily vehicle flow of between 20,000 and 30,000 vehicles (**Appendix C**).

3.4.9 Despite the high vehicle flows there is no significant travel time delays experienced on the highway network within the vicinity of the site (**Appendix D**). The increase in vehicle demand from this site will need to be managed to not significantly increase vehicle delay in area.

3.4.10 When reviewing highway collision data from the past five years in the vicinity of the site (**Appendix E**) there has been two series incidents within close proximity to M5 Junction 10. For the Tewkesbury Road corridor there have been a number of slight incidents. The largest concentration of incidents is the junction with Old Gloucester Road (B4634) and the link into the retail park. It is important to understand the reason for these conflicts as the site will generate additional travel demand at this junction. An improved junction arrangement may need to be provided as part of the site mitigation package.

3.4.11 Although not part of this assessment emergency access arrangements do need to be considered.

3.4.12 The full extent of administrative boundary of Cheltenham Borough has been declared an Air Quality Management Area (**Appendix F**). Unless a successful mitigation package is provided the traffic generated from this site will impact the A4109 corridor and Princess Elizabeth Way and it is likely to further deteriorate air quality in the area.

3.4.13 There are several noise important areas declared along the A4019 corridor (**Appendix G**). It is not known how this site will impact these areas. There is a risk that properties located to the south of the site adjacent to the A4019 may be impacted by noise and if unmitigated the extent of the noise important areas may be increased.

Bus access

3.4.14 This large site is accessible by bus at multiple locations and **Figure 24** summarises those services that can be accessed.

3.4.15 Access from the site would provided from multiple locations on the Tewkesbury Road (A4019).

3.4.16 The main long distance service accessing the site is the 41/42 which links Tewkesbury and Cheltenham is accessible from Tewkesbury Road. The two town centre services can be accessed at Kingsditch Retail Park and Swindon Village. The later will only be possible should pedestrian access be provided as no highway access is proposed from the site linking Swindon Village.

Figure 24 - Existing bus accessible from site A5 – North West Cheltenham

Service No.	Point of access	Route	Operator	Mon-Fri	Sat	Sun
41	Tewkesbury Road (Uckington)	Cheltenham - Uckington - Tewkesbury - Northway	Stagecoach West	20 mins (6-18) 30 mins (18-20) 60 mins (20-22)	20 mins (6-18) 30 mins (18-20) 60 mins (20-22)	60 mins (10-19)
42 / 42A	Tewkesbury Road (Uckington)	Cheltenham - Walton Cardiff - Tewkesbury	Stagecoach West	30 mins (6-19) 60 min (19-23)	30 mins (6-19) 60 min (19-23)	60 mins (9-17)
650	The Green	Rural Rover: Bamfurlong or Tredington to Cheltenham	Community Connexions	2 services per day Wed and Thurs only Demand Responsive Service	No service	No service
41	Kingsditch	Cheltenham - Uckington - Tewkesbury - Northway	Stagecoach West	20 mins (6-18) 30 mins (18-20) 60 mins (20-22)	20 mins (6-18) 30 mins (18-20) 60 mins (20-22)	60 mins (10-19)
42 / 42A	Kingsditch	Cheltenham - Walton Cardiff - Tewkesbury	Stagecoach West	30 mins (6-19) 60 min (19-23)	30 mins (6-19) 60 min (19-23)	60 mins (9-17)
C	Kingsditch – Hayden Road	Hester's Way - Fiddler's Green - Arle - Cheltenham	Stagecoach West	15 mins (7-19) 30 mins (19-22)	15 mins (7-19) 30 mins (19-22)	20 mins (9-18)
B	Swindon Village	Charlton Kings - Cheltenham - Wyman's Brook - Swindon Village - Pilgrove Way	Stagecoach West	30 mins (7-18)	30 mins (7-18)	60 mins (9-17)
41	Tewkesbury Road (Uckington)	Cheltenham - Uckington - Tewkesbury - Northway	Stagecoach West	20 mins (6-18) 30 mins (18-20) 60 mins (20-22)	20 mins (6-18) 30 mins (18-20) 60 mins (20-22)	60 mins (10-19)
42 / 42A	Tewkesbury Road (Uckington)	Cheltenham - Walton Cardiff - Tewkesbury	Stagecoach West	30 mins (6-19) 60 min (19-23)	30 mins (6-19) 60 min (19-23)	60 mins (9-17)
650	The Green	Rural Rover: Bamfurlong or Tredington to Cheltenham	Community Connexions	2 services per day Wed and Thurs only Demand Responsive Service	No service	No service

3.4.17 Due to the scale of development proposed for this site there is significant potential for public transport use, subject to service delays being reduced along the primary Tewkesbury Road corridor. The frequency of the 41/42 could be increased to become a 10 minute service with the potential for a Park and Ride service. The value of this facility would increase significantly should M5 Junction 10 become a full movement's junction. The B service could be rerouted into the site and the service frequency improved. Cheltenham General Hospital can be accessed using the B, but there is no direct access. The lack of access to Gloucester is an issue as are the lack of direct linkages to Bishops Cleeve and Ashchurch. There may be merit in exploring a possible loop service with the 41 / 42.

3.4.18 Significant bus priority is required for Tewkesbury Road including signals and bus lane allocation where this can be provided without the reduction in highway capacity. A bus gate should also be considered to access the site.

Rail access

3.4.19 The nearest stations are Cheltenham Spa followed by Ashchurch for Tewkesbury. Ashchurch has two hourly GWR local services north to Worcester and south to Bristol and the south coast, with occasional Cross Country Services to Nottingham and South Wales. Cheltenham has good connectivity to the north and south west.

3.4.20 The limited service at Ashchurch for Tewkesbury is unlikely to attract many users although it is relatively easily accessible via the M5 and parking is currently free. Access to Ashchurch for Tewkesbury is also possible via the 41/42 Stagecoach service. Car parking at Cheltenham Spa is at capacity although there are plans to increase spaces as part of a wider redevelopment scheme for the station.

3.4.21 A direct bus link to Cheltenham Spa station would improve connectivity and provide an attractive option for residents

Cycle and walk access

3.4.22 The scale and extent of this development means that the Masterplan and delivery plan cover the entire strategic allocation including land beyond their control. This will be vital to ensuring understanding of adjacent land uses and movement patterns and to delivering local connectivity.

3.4.23 The proposal may be considered as a 'new settlement' in transport terms. It will strongly influence future travel patterns and impacts within and in association with it. The scale of the proposal will be a key factor in shaping new local travel patterns particularly around Cheltenham, Tewkesbury, Bishops Cleeve and other proposed development sites within the JCS. Local connectivity between Bishops Cleeve, North West Cheltenham and west Cheltenham will require that radial pedestrian and cycle routes receive as much attention as edge to centre ones.

3.4.24 In terms of distance alone the site is as close to Bishops Cleeve as it is to Cheltenham town centre. Local trips will be made to either destination depending on their directness, pleasantness and ease. Whilst Cheltenham exhibits cycling levels of 6% the areas of Swindon and Kingsditch have a levels of around 4%. This reflects the challenging walking and cycling conditions in association with the retail park, roundabouts and traffic flows.

3.4.25 Tewkesbury and Bishops Cleeve are easy cycling distances from the site. As referred to in **Section 2.4** this is where it will be cost effective to identify a quiet lane network – possibly to include public rights of way upgrades – which will enable relaxed cycle flows between these settlements. In parts this will tie into Sustrans National Cycle Network (NCN). New local routes should augment this to allow greater fluidity of non-car based movement.

3.4.26 Site A5 public rights of way network affects 3 corridors and offers elements of a useful pedestrian network. One public right of bridle way (Dog Bark Lane) introduces an important piece of pedestrian and cycle network which corresponds to the diagonal course of Wyman's Brook through the site.

3.4.27 There is no formal cycle network across the site and poor provision in terms of routes in its vicinity. The quiet lane network to its north and east offer some opportunities to safeguard non-motorised connectivity across the vale which is accommodating the JCS development allocations.

3.4.28 Only a small section of development edge adjoins Cheltenham town offering weak natural linkages with existing residential or other quietly trafficked streets;

3.4.29 Where the site does abut Cheltenham's urban fabric, conditions for walking and cycling are hostile due to retail development layouts at Gallagher Retail Park; a further barrier arises from the railway line, and there are few routes into Cheltenham town and all carrying high traffic flows and design constraints. The Tewkesbury Road (A4019) defines the main transport corridor serving the site transport with Cheltenham. This also is heavily trafficked and includes two large roundabouts which are highly congested at peak flow.

3.4.30 Without careful mitigation conditions will deteriorate further and the local transport relationship between the new site and Cheltenham town will be unsuccessful by active travel modes.

3.4.31 In addition to providing walk and cycle connectivity and integration between the site and Cheltenham it will be a challenge to overcome barriers to other settlements in the Vale. All roads serving settlements such as Bishop's Cleeve will carry higher flows of traffic.

3.4.32 Proximity and distance is optimal; however barriers to ease of movement will require considerable mitigation.

Thinktravel promotions

3.4.33 'Thinktravel' is the brand name for Gloucestershire's smarter choices programme, designed to help people consider their travel choices and encourage use of more sustainable modes of transport. Thinktravel initiatives that will apply to this development include:

- Site Travel Plan with extended area of interest to include Bishop's Cleeve, Cheltenham and West Cheltenham;
- Update local map to new residents which shows walk and cycle routes to destinations within Cheltenham, Bishops Cleeve and Tewkesbury / Ashchurch;
- Street signs to aid navigability;
- Personalised Travel Planning targeting the following groups:
  - New householders;
  - Local employers;
  - Local schools

3.4.34 **Figure 25** summarises the types of investments required to reach the optimum level of sustainable transport use for this site and **Figure 26** provides a summary of the baseline transport assessment of this site.

Figure 25 Types of sustainable initiatives to be delivered from investment

Types of Improvements			
Bus	**Rail**	**Cycle**	**Walk**
• Bus stops • RTPI • Lighting • curbs • Signing routes • Rerouting • Signal priorities • Additions to fleet • Physical priority measures	• Promotion • Signing routes • Cycle parking • Small Car parking improvements • Rail service improvements (Ashchurch)	• Promotion / cycle parking • Lighting • Signing routes • dropped curbs • Point closures - traffic restrictions • Greenlane networks (rumble strips / chicanes • Short length of shared use paths • Minor junctions improvements • New crossing points • Strategic greenways and cycle routes • Bridges / underpasses	• Resurfacing of footway • Promotion • Lighting • Signing routes • Dropped curbs • Gateway - traffic restrictions • Short length of shared use paths • Minor junctions improvements • New crossing points • Strategic route improvements • Bridges / underpasses

Figure 26 – A5 – North West Cheltenham baseline transport summary

A5 – North West Cheltenham – baseline transport summary

- The proposal may be considered as a 'new settlement' in transport terms
- Increased vehicle use for Tewkesbury Road and Princess Elizabeth Way needs to managed to reduce risk of vehicle delay
- A long-term solution to serve southbound M5 use and reduce the impact on Princess Elizabeth Way and Arle Court Roundabout (A40) must be access improvements to M5 junction 10
- There are likely to be decline of noise and air quality for existing communities within the vicinity of this site
- Tewkesbury Road has an important role as a multimodal corridor which will require significant bus priority enhancements to enable it to function and the provision of shared use cycle footway
- Review 41/42 bus route corridors for vehicle delay pinchpoints
- There is no formal cycle network across the site and poor provision in terms of routes in its vicinity
- Local connectivity between Bishops Cleeve, north west Cheltenham and west Cheltenham will require that radial pedestrian and cycle routes receive as much attention as edge to centre ones this includes soft links to Bishops Cleeve and the Honeybourne cycle track north of Cheltenham

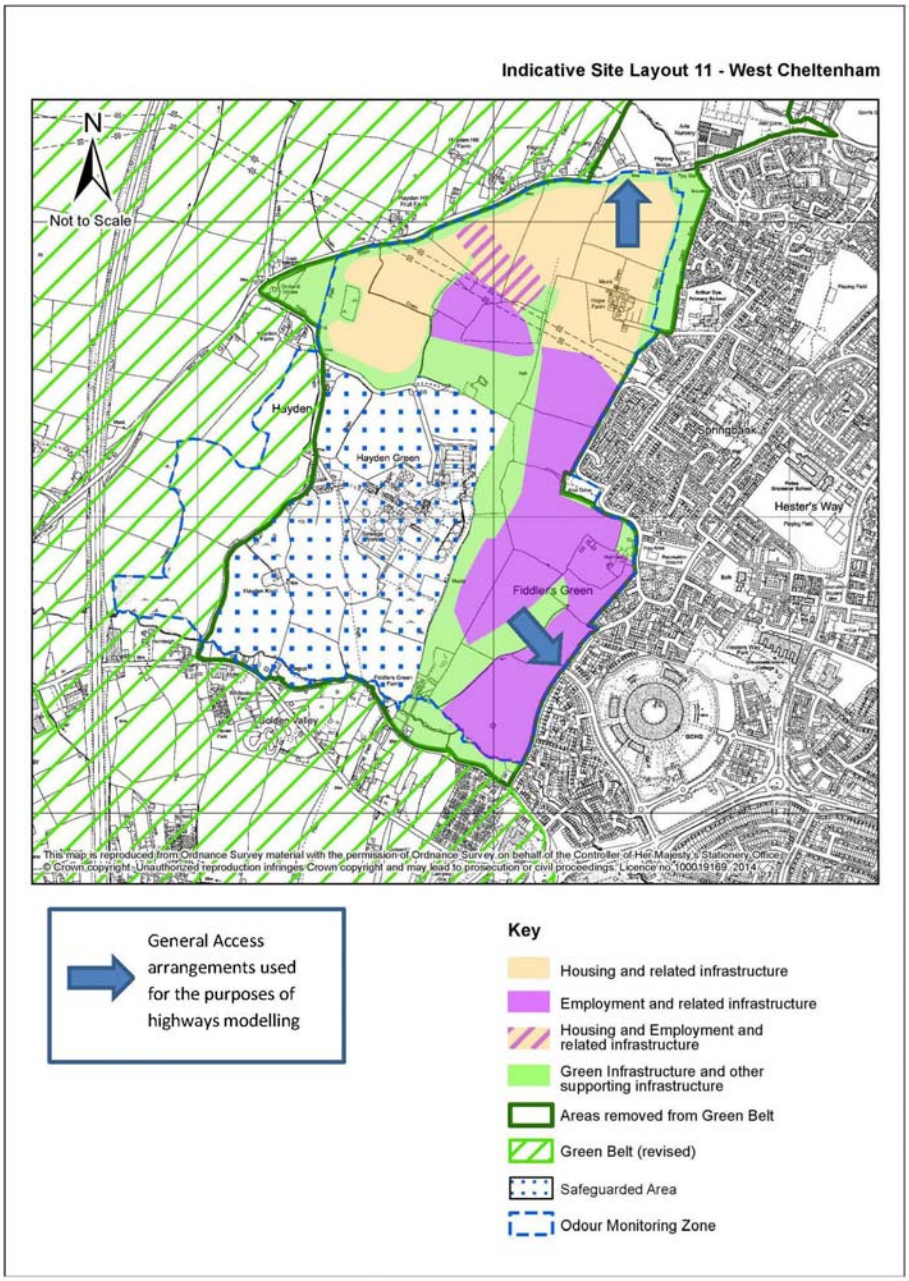
Transport mitigation considerations:

- The additional vehicle demand will significantly impact Tewkesbury Road (A4019), Princess Elizabeth Way and the Arle Court roundabouts
- Need for significant public transport investment
- Need for significant cycling investment
- Rail services can be accessed from Cheltenham and Ashchurch for Tewkesbury stations
- Promotion of alternatives to car use for local trips

3.5 A11 - West of Cheltenham

3.5.1 This Strategic Allocation is located to the west of Cheltenham. The site is bounded by Fiddlers Green Lane to the east, Pheasant Lane to the south, Hayden Lane to west and the Old Gloucester Road (B4634) to the north. The focus of development will be to the west of the site. The main site access points will be via a junction accessing Telstar Way and Arle Court on the A40 and the Old Gloucester Road. **Figure 27** illustrates the extent of the site and illustrates the access point assumptions used for the purposes of this assessment.

Figure 27 – Location and access points for A11 – West of Cheltenham



3.5.2 The Government's Communications Head Quarters and the Arle Court Park and Ride service are located within the vicinity of the site.

3.5.3 Trip data captured by the 2011 Census provides a useful proxy for likely trip patterns in terms of work based destination and method of transport used. **Appendix A** provides more information on the methodology used in this analysis.

3.5.4 **Figure 28** documents the main method of travel used by existing residents within the vicinity of this site. The table also includes data from Central Severn Vale (CSV) Gloucester and Cheltenham)) and county wide as a comparison. With 70% of work based trips using the car as either a driver or passenger this is consistent with the CSV average (69%) and below the county average (75%).

3.5.5 The proportion of trips walked and cycled trips accounts for 20% of trips which is consistent with the CSV average. Bus use accounts for 8% which is above the CSV average and reflects the ease of access from the site to high frequency services accessing both Cheltenham and Gloucester. Ensuring the site is well connected into the existing walking and cycling network to provide ease of access to the bus network should help maintain the level of sustainable transport use.

Figure 28 - Typical method of transport used when travelling to work destination from A11 – West of Cheltenham (2011 Census)

	New Site – West of Cheltenham	Central Severn Vale	Gloucestershire
Driving a car or van	64%	63%	69%
Passenger in a car or van	6%	6%	6%
Motorcycle, scooter or moped	1%	1%	1%
On foot	13%	15%	13%
Bicycle	7%	6%	5%
Bus, minibus or coach	8%	7%	5%
Train	1%	1%	1%

3.5.6 **Figure 29** documents the primary work based destinations of existing residents within the vicinity of this site. 66% of work based trips are to Cheltenham and surrounding areas demonstrating the potential for short distance sustainable transport use. 17% of trips are work based trips are to Gloucester with access provided the A40.

3.5.7 With only 13% of trips to locations outside the JCS area this is potentially the most self-contained site. A possible reason for this is the cost of housing when compared to other locations. It may not therefore be desirable for people to locate to and travel longer distances.

Table 29 - Work based destinations from A11 – West of Cheltenham (2011 Census)

	A11 – West of Cheltenham
Tewkesbury and surrounding areas	3%
Cheltenham and surrounding areas	66%
Gloucester and surrounding areas	17%
Winchcombe and rural Tewkesbury	0%
West Midlands	2%
Forest of Dean, Hereford and Wales	1%
Cotswolds, Swindon, London and South East	6%
Stroud, Bristol and South West	4%

Highway access

3.5.8 The Link and Place spectrum (**Appendix B**) included in Gloucestershire's LTP identifies the primary access points of this site as being local links that provide residential access. The links interact provide access to the A40 at Arle Court on the A40 and the Old Gloucester Road (B4634) which is classified as a local link.

3.5.9 The A40 between M5 junction 10 and Cheltenham Town Centre is classified as Primary Link which provides strategic access that is critical for the local economy. This section of highway is one of the busiest in the county and has an average daily vehicle flow of between 20,000 and 30,000 vehicles (**Appendix C**).

3.5.10 The A40 between M5 junction 10, Arle Court and Benhall Roundabouts experience significant delays during periods of peak travel (**Appendix D**). The increase in vehicle demand from this site will need to be mitigated to ensure the highway network can function. A suitable mitigation package to alleviate Arle Court Roundabout and the link with Benhall Roundabout will be required as a minimum.

3.5.11 When reviewing highway collision data from the past five years in the vicinity of the site (**Appendix E**) two serous have occurred to the south and west of the site on Pheasant Land and Fiddler's Green Lane both involving driver error. Two slight and one serious incident occurred to the north of the site on the Old Gloucester Road (B4634) as a result of drivers loosing control on the bendy section of highway. Demand for using highway link will increase as a result of this site and the strategic allocation at North West Cheltenham. Safety improvements along this road may ned to be considered as part of the site mitigation package.

3.5.12 Although not part of this assessment emergency access arrangements do need to be considered.

3.5.13 The full extent of administrative boundary of Cheltenham Borough has been declared an Air Quality Management Area (**Appendix F**). Unless a successful mitigation package is provided the traffic generated from this site will impact the A40 corridor and it is likely to further deteriorate air quality in the area.

3.5.14 There are no noise important areas within the vicinity of the site (**Appendix G**). It is not known how this site will impact noise.

Bus access

3.5.15 The site is accessible by bus and is in walking distance from Arle Court Park and Ride. **Figure 30** summarises the bus services that can be accessed.

3.5.16 There are no direct access points from the site so bus services will need to be accessed primarily at Gloucester Road (A40) which is approximately 800m from the edge of the site. From the A40 the high frequency 94 can be accessed which accesses Cheltenham and Gloucester.

3.5.17 The C town service is accessible from Fiddler's Green and this could be extended into the site to provide local access to the site. Altering this service into a town centre loop using the A40 into the Town Centre may be worth consideration to maximise local access. Bus priority measures are a key consideration in this area and suitable measures should be provided to maintain bus service frequencies especially for the A40 corridor.

Figure 30 - Existing bus accessible from site New Site - West of Cheltenham

Service No.	Point of access	Route	Operator	Mon-Fri	Sat	Sun
C	Fiddlers Green Lane	Hester's Way - Fiddler's Green - Arle - Cheltenham	Stagecoach West	15 mins (7-19) 30 mins (19-22)	15 mins (7-19) 30 mins (19-22)	20 mins (9-18)
94	Arle Court (Cheltenham Road)	Gloucester - Longlevens - Churchdown - Cheltenham	Stagecoach West	10 mins (6-18) 20 mins (18-20) 30 mins (20-00)	10 mins (6-18) 20 mins (18-00)	20 mins (8-11) 15 mins (11-19) 30 mins (20-00)
N94	Arle Court (Cheltenham Road)	Gloucester - Longlevens - Churchdown - Benhall - Cheltenham	Stagecoach West	Fridays only 30 mins (00-03)	30 mins (00-03)	No service
B	Pilgrim Way	Charlton Kings - Cheltenham - Wyman's Brook - Swindon Village - Pilgrove Way	Stagecoach West	30 mins (7-18)	30 mins (7-18)	60 mins (9-17)

Rail access

3.5.18 Cheltenham station with good connectivity to the national rail network is the nearest railhead to the site. There are regular direct services to Manchester, the North East, South West, South Wales and London.

3.5.19 The site is adjacent to a number of bus routes although none appear to currently serve the station. There is potential for some of these services to be rerouted via the rail station. The A40 runs parallel to the southern boundary of the site which carries the 94, 94U and 94X services but none of which pass the station. However, Great Western Railway are developing plans for the station which include creating a cycle/pedestrian link between the station and the A40 which would facilitate greater bus use.

3.5.20 Given the close proximity of the site to the station direct pedestrian and cycle routes could be created along with an amended/enhanced bus service.

Cycle and walk access

3.5.21 The new development site comprises open land well served by the public rights of way (PRoW) network. There are opportunities for good walk linkages into the western edge of Cheltenham, and the site is walking distance from key employment and education trip attractants. There is no bespoke cycle route within the site. However, the PRoW network offers a useful walk and cycle framework, and provides well for north-south directional flows which will be as important to secure as those serving trips between Cheltenham and Churchdown.

3.5.22 Within the site the PRoW network will help form a traffic free movement framework connecting through and to the development. The development closes distances between existing and proposed sites identified through the core strategy in the Severn Vale.

3.5.23 The site is proximate to Cheltenham, Churchdown, Staverton and the proposed JCS site at north-west Cheltenham. Its implementation will reduce the travel distance between a 'new' edge of Cheltenham and these other settlements. It is within easy walking and cycling distance of key employment, education and shopping facilities to its east predominantly and also to its north and west.

3.5.24 Cheltenham town offers a highly permeable network of footpaths, cycle paths and quiet roads. It is a compact and walkable town which exhibits higher than national average cycle to work levels. 6% of all commute trips in Springbank and the Reddings adjacent to the development site are by cycle, as is Churchdown to the west of the site. The new development should seek to emulate or exceed these levels. It sits at the north east of the A40 corridor between Gloucester and Cheltenham where higher cycling levels are supressed by traffic conditions and the lack of direct routes. The development should seek to improve conditions within its area of influence to enable more cycle movement to its east.

3.5.25 As proximity is good, key determinants of levels of walking and cycling will be the grain of new and existing development layout, levels of permeability and the extent to which opportunities to access adjacent streets, paths and cut-throughs are identified and enabled. Walkers and cyclists, particularly cyclists, do not necessarily need heavily engineered or highly evident routes so much as quietly trafficked streets, slow traffic, cut throughs and softly engineered solutions which this development has the potential to achieve.

Thinktravel promotions

3.5.26 Thinktravel' is the brand name for Gloucestershire's smarter choices programme, designed to help people consider their travel choices and encourage use of more sustainable modes of transport. Thinktravel initiatives that could be applied to this development include:

- New street signs to aid navigability
- Travel Planning advice targeting
    - New householders

- Local employers

3.5.27 **Figure 31** summarises the types of investments required to reach the optimum level of sustainable transport use for this site and **Figure 32** provides a summary of the baseline transport assessment of this site.

Figure 31 Types of sustainable initiatives to be delivered from investment

Types of Improvements			
Bus	**Rail**	**Cycle**	**Walk**
• Bus stops • Lighting • curbs • Signing routes • Rerouting • Signal priorities	• Promotion • Signing routes • Cycle parking	• Promotion / cycle parking • Lighting • Signing routes • dropped curbs • Short length of shared use paths • Minor junctions improvements • Strategic greenways and cycle routes	• Promotion • Lighting • Signing routes • Dropped curbs • Short length of shared use paths • Minor junctions improvements

Figure 32 –West of Cheltenham baseline transport summary

West of Cheltenham baseline transport summary

- Primary access with be onto the local highway network, but the A40 is a short distance away. Arle Court and Benhall Roundabouts experience significant delays during periods of peak travel.
- The high frequency 94 can be accessed from the A40 which is approximately 800m from the edge of the site.
- Town centre bus services may need to be rerouted to serve the site
- The development should seek to improve conditions within its area of influence to enable more cycle movement to its east.
- There will be a strong link for pedestrians and cyclists between the West Cheltenham site and the North-west Cheltenham site i.e. clear radial links as well as edge to centre
- Ensure new junction arrangements – especially if they include new roundabouts – do not create new barriers to walking and cycling movement.

Transport mitigation considerations:

- Improved access to M5
- Junction improvements at A40 Arle Court roundabout and /or M5 Junction 10
- Corridor Improvements for A4019 Tewkesbury Road
- Junction improvements for B4063 / B4064 Staverton crossroads
- Aid access from Cheltenham Station
- Need for strategic walking and cycling links providing north / south access linking to North West Cheltenham
- Promotion of alternatives to car use for local trips

4.0 Central Severn Vale (CSV) SATURN model

4.1 Introduction

4.1.1 The JCS authorities have been supported by Gloucestershire County Council and Highways England (formally known as the Highways Agency), as the Highway Authorities, in developing a transport evidence base which sets out likely future transport network needs and identifies the mitigation measures necessary to satisfy those needs.

4.1.2 The evidence base has been informed by forecast models derived from the 2013 Central Severn Vale (CSV) SATURN model. It was agreed by the Highways Authorities that the2013 CSV model represented the best highways model available to undertake a strategic assessment of JCS.

4.1.3 It should be noted that reliance on SATURN highways model outputs on their own for individual sites would be insufficient to support a of planning application without appropriate interpretation by the applicant's transport consultants, and without the requirement for further, more detailed, micro-simulation and/or individual junction-based traffic modelling.

4.2 The Central Severn Vale (CSV) SATURN model

4.2.1 Gloucestershire County Council in partnership with Highways England, as the Highways Authorities within Gloucestershire own the Central Severn Vale (CSV) SATURN highways traffic model. Although primarily a strategic model, the key urban centres of Gloucester, Cheltenham and the Tewkesbury/Ashchurch area are modelled in relative detail in simulation format, the outputs from which can be used to help inform and facilitate the development of third party micro-simulation and/or stand alone junction models for more localised assessment purposes.

4.2.2 The CSV SATURN highway model detailed (simulation) network coding extends from the M5 Junction 9 in the north to M5 Junction 13 in the south, from west of Tewkesbury eastwards to A46/A435 Teddington Hands junction, and from A40 west of Highnam roundabout eastwards as far as the A417 corridor between the Air Balloon roundabout at Crickley Hill and Cirencester. Geographically, the CSV modelled area therefore covers the whole of the Gloucester, Cheltenham and Tewkesbury urban areas and their surrounding environs.

4.2.3 The CSV SATURN model was been developed in order to:

- Assist in the development of Local Plans and site allocations
- Inform the assessment of individual planning applications
- Inform the development of Gloucestershire's Local Transport Plan

4.2.4 The CSV SATURN model has been developed in accordance with Department for Transport (DfT) guidelines and advice set out in the Design Manual for Roads and Bridges (DMRB) and WebTAG acceptability criteria, with the aim of achieving relevant validation standards, ensuring high levels of confidence associated with the development of the demand (trip

matrix) data. To ensure that all traffic models remain fit for purpose and accurate (in terms of calibration and validation requirements) it is standard practice that they be regularly updated – on a five yearly (six at most) cycle. At the time of writing this Protocol, the CSV SATURN highways model has been successfully validated to a 2013 base year and represents an average weekday during a neutral travel month. The model is currently available for the following two peak hour time periods:-

- The AM Peak Hour (08:00-09:00hrs), and
- The PM Peak Hour (17:00-18:00hrs).

4.2.5 The 2013 CSV SATURN Model base year Local Modal Validation Report (LMVR), dated March 2017, can be provided upon request, free of charge.

4.2.6 The CSV SATURN highways models are managed and maintained directly by GCC who, in association with Highways England, will retain ownership and intellectual rights of the models. Any third party will therefore be required to confirm that the output data from any associated traffic modelling work will not be used for any other purpose, other than assessing a specific site and/or planning application.

4.2.7 The expectations of the Highway Authorities regarding the use and appropriateness of the CSV SATURN highways model shall be confirmed during pre-application discussions, and will be determined on an individual development site basis. The size, nature and location of any development will be a prime determinant in deciding the use of the models, and early contact with the Highways Authorities should be made to 'scope' the extent of any modelling, if deemed required, in support of a proposal for planning application.

4.2.8 It should also be noted that the current CSV SATURN highways model is comprised of highways based models only.

4.2.9 To discuss the use of the CSV SATURN highways model, contact should be made with GCC's Highways Development Management Team as early as possible, initially via the following email address:-

devcoord@gloucestershire.gov.uk

5.0 Highways Modelling Outputs (Do something scenarios)

5.1 Introduction

5.1.1 This sections outline the iterative process followed to inform the JCS Transport Strategy as the JCS emerged through the different stages of plan development.

5.1.2 The modelling outputs provided in support of the JCS represent a robust assessment of the likely travel impacts of the growth proposals. The 2013 CSV SATURN model is a fixed trip matrix and not a variable demand matrix, this means there has been no account taken for peak spreading or modal shift other than where this has been manually adjusted. Details of this are outlined with the supporting JCS Modelling Technical Notes.

5.2 Draft for Consultation JCS (October 2013) Highways Modelling (Autumn 2013 to Spring 2014)

5.2.1 The transport modelling undertaken to assess the impacts of the development proposed within the Draft for Consultation JCS (October 2013) provided an understanding of its likely impacts on the highways network.

5.2.2 The transport schemes included in the highway infrastructure-focussed scenario did have a significant impact in reducing vehicle delay on the network. However, in the absence of further scenario testing the report failed to quantify impact if certain schemes were to be removed from the scenario. In terms of deliverability and affordability, greater refinement of the transport schemes was required before a preferred transport package could be identified within the JCS.

5.3 'Do Something' 1, 2, 3, 3a - Pre-Submission Joint Core Strategy (April 2014) Highways Modelling (Summer 2014 to Spring 2015)

5.3.1 During 2014/15 additional modelling was required to test the updated JCS land-use allocations identified in the Pre-Submission JCS. The scale of proposed developed was reduced from the Draft for Consultation stage and the transport scenario needed to reflect this.

5.3.2 The Highways Authorities helped scope and agree a project brief for this round of modelling. The process was managed by the JCS Team with GCC and Highways England officers actively participating in project meetings.

5.3.3 To identify potential mitigation measures GCC officers managed two workshops with local stakeholders to explore issues and possible mitigation schemes. The output from these sessions was a 'long list' of schemes. GCC then worked with ATKINS Highways and Transport to reduce this to a 'short-list' reflecting more 'realistic and potentially deliverable' schemes, taking viability into account as best as possible.

5.3.4 To enable the planned Pre-Submission JCS growth to take place, a number of transport schemes and sustainable measures were proposed, designed to relieve congestion on the

roads located within the JCS wider area including SRN. A long list of potential mitigation schemes was reduced to a short list using a multi-criteria assessment framework. This assisted in developing measures contained in three 'Do-Something' modelling strategies (DS1, DS2, DS3 and finally DS3a) which were tested against a 'Do-Minimum' (DM) option that contained all known planned and committed highway improvement schemes. The forecasts had been carried out for the AM and PM peak hours and a 2031 future year.

5.3.5 Strategy DS1 primarily focused on the promotion of sustainable transport measures, as featured in the Gloucestershire LTP.

Strategy DS2 included the mitigation measures identified in DS1, but added in physical highway junction improvements.

Strategy DS3 included the mitigation measures included in DS1 and DS2, in addition to a number of traffic management schemes on local roads and the introduction of a new access junction on the A40 to serve the proposed site in Longford. The traffic management measures were designed to limit the speed on local roads, thus moving longer distance traffic onto the Strategic Road Network (SRN) and other major roads, which are better able to accommodate the extra strategic traffic.

Strategy DS3a removed some of the traffic management measures in DS3 to achieve a better balance between traffic using the local network and that using the SRN.

5.3.6 The strategies (DS1 to DS3a) were tested sequentially. Relative to the 'Do Minimum' (DM) strategy, the DS1 strategy was not found to be successful due to the limited impacts of the behavioural change programme and further, major infrastructure interventions were considered necessary to mitigate the development impacts.

5.3.7 Similarly, Strategy DS2 reported minimal improvement to the transport network. However, in resolving a number of junction issues, the impact was over-compensated by encouraging too much traffic onto the local roads, which would be unacceptable. To address this, the impact of the Strategic Allocations was considered in isolation; this identified a number of local roads that were made less attractive through traffic management measure and subsequently tested in DS3.

5.3.8 The model outputs from DS3 indicated that the predicted impacts of the traffic management measures were too severe, reducing traffic flow on the relevant local roads to less than current levels and diverting too much traffic onto the SRN. As a result, Strategy DS3a was introduced to redress the balance between traffic on local roads and the SRN. The mitigation strategy DS3a was an improvement relative to the DM in the following ways:

- The network improvements implemented up to DS3a resulted in a significant reduction in average queued time compared to the DM, and a moderate drop compared to DS3. These improvements caused the over capacity queued time to decrease by 34% compared to the DM during both the AM and PM peak periods; and
- DS3a led to an improvement in the average network speed of around 2% during both peaks compared to the DM

5.3.9 Despite these improvements there continued to be a number of junctions located in the vicinity of the strategic allocations which reported capacity issues during either one or both periods of peak travel. Additional mitigation schemes will need to be identified for the following junctions:

- Junction of Cheltenham Road East and Pirton Lane, near Strategic Allocation Site A2 and A3
- A40 Longford Roundabout
- A46 Shurdington
- M5 Junction10 Southbound Off-slip
- A46 Aston Cross Junction, Tewkesbury

5.3.10 The JCS was submitted on 20th November 2014 before the Do Something 3a JCS Transport modelling had been completed. The evidence base provided to date identified the likely future impacts on the transport network in terms of network capacity of the JCS Strategic Allocations. The scheme identification and appraisal process has also identified a list of measures. However, further understanding of which package of these mitigation measures is required to enable the delivery of the JCS, while not impacting the viability of the plan was required.

5.4 Do Something 4 - Response to Inspector's Interim Report on Pre-Submission Joint Core Strategy (July 2016) Highways Modelling [Summer 2016)

5.4.1 In July 2016, following the Inspector's Interim Report, the JCS authorities requested an additional land use scenario to be tested using the 2008 CSV SATURN model. This scenario within the transport evidence base is referred to 'Do Something 4' (DS4).

5.4.2 DS4 includes a number of significant modifications to the land-use scenario tested in DS3a including the addition of five potential strategic sites (Fiddington, Mitton, Winneycroft Farm, Innsworth and West of Cheltenham) and the removal of one site (North Churchdown). This resulted in an increase of 3,970 dwellings and 45.8 ha of employment; the latter is focussed on a site to the West of Cheltenham.

5.4.3 Within DS4 the existing transport mitigation strategy outlined in DS3a (**Appendix I**) was included as the starting point to assess the impacts of the increased scale of development.

5.4.4 The impacts of DS4 was the significant deterioration in the performance of the highway network in terms of much longer queues, higher average travel times, and reduced average travel speeds.

5.4.5 The significant deterioration was principally highlighted with the increase of queuing time per vehicle at over capacity junctions, which increased from 52 seconds per vehicle in the AM peak under DS3a to 674 seconds in DS4. In DS4 this equates to 11 minutes spent not moving per vehicle in the AM peak (08:00 to 09:00). For the new employment site located to the West of Cheltenham it was modelled assuming to provide 10,000 new jobs. The

impact of this delay was so significant that only 24% of trips were able to arrive at the site during the AM peak.

5.4.6 In the PM peak (17:00 to 18:00) using the same data set, under DS3a each vehicle on average is delayed by 72 seconds, but under DS4 this increases to 785 seconds. This equates to 13 minute spent not moving for every vehicle representing 22% of the journey total trip per vehicle in the AM peak.

5.4.7 The scale of impact on the transport network reflects the significant increase in vehicles operating within each of the peak periods. The land use scenario tested under DS3a generated 16,688 vehicle movements during both peak periods compared to 28,036 vehicle movements under DS4.

5.4.8 The junctions operating over capacity in DS4 included:

- M5 Junction 9
- M5 Junction 11
- M5 Junction 10
- A40 Arle Court roundabout
- A40 Benhall roundabout
- A46 Ashchurch
- A46 Shurdington
- St. Barnabas roundabout
- A417 Air Balloon roundabout

5.5 Do Something 5a - Response to Inspector's Interim Report on Pre-Submission Joint Core Strategy (July 2016) Highways Modelling [Autumn 2016)

5.5.1 In response to the scale of journey time delay experienced by the development proposals outlined in DS4 a revised set of land use assumptions was tested. This scenario within the transport evidence base is referred to as 'Do Something 5a' (DS5a).

5.5.2 DS5a includes a number of modifications to the land-use scenario tested in DS4 including the removal of two strategic sites (Fiddington and Leckhampton) and changes in the development quantum's for North West Cheltenham, West Cheltenham, Twigworth and Mitton. This resulted in a decrease of 2,261 dwellings and 12.9 ha of employment.

5.5.3 Within DS5a the development at Fiddington site has been removed. Transport modelling outputs provided through the testing of scenarios DS3a and DS4 have consistently indicated significant delays on the A46 (part of the strategic corridor) between Aston Cross and M5 Junction 9. The situation was further compounded by the inclusion of the Fiddington site in scenario DS4.

5.5.4 To date, evidence of on-line highway improvements has proved inconclusive. To resolve this issue other options must now be considered including an off-line solution which would seek to separate local and through movements by providing an alternative route option for through traffic accessing the M5 at junction 9.

5.5.5 An off-line solution was previously considered in the 1990's and at the time the Department of Transport promoted a road alignment to the south of the existing A46. As no other scheme has been identified by the strategic highway authority at this stage, for the purposes of this work it has been assumed that this 1993 alignment should be tested within a future highways modelling scenario. This route alignment would bisect the proposed Fiddington site.

5.5.6 It is recognised that this route alignment has not been confirmed, but as work progresses to identify a preferred solution it was considered prudent to exclude the Fiddington site (as tested within DS4) until such time as a preferred solution for this corridor is known. It has therefore been removed in the DS5a scenario.

5.5.7 Within DS5a the transport mitigation strategy outlined in DS3a (**Appendix I**) was included as the starting point to assess the impacts of the increased scale of development. With the same mitigation package used for DS3a, DS4 and DS5a this aided the analysis of the modelling outputs.

5.5.8 The impact of DS5a was the significant improvement in the performance of the highway network in terms of over capacity queued time per vehicle when compared to DS4.

5.5.9 Despite the network improvements between DS4 and DS5a there are significant issues in the scale of delay when compared to the DS3a scenario.

5.5.10 The junctions operating over capacity in DS5a included:

- M5 Junction 9
- M5 Junction 10
- M5 Junction 11
- A38 Longford
- A40 Arle Court roundabout
- A40 Benhall roundabout
- A46 Ashchurch
- A46 Shurdington
- St. Barnabas roundabout
- A417 Air Balloon roundabout

5.6 Do Something 5 - Response to Inspector's Interim Report on Pre-Submission Joint Core Strategy (July 2016) Highways Modelling [Autumn 2016)

5.6.1 The network delays experienced in DS5a remained unacceptable in terms of excessive vehicle delay and a revised mitigation package was required. This scenario within the transport evidence base is referred to 'Do Something 5' (DS5).

5.6.2 DS5 includes no changes in the land-use scenario tested in DS5a.

5.6.3 **Appendix J** outlines details of the revised mitigation package. It represents a radical departure from DS3a and focuses on road building (including major link roads) and the

upgrade of high frequency Public Transport bus corridors. It also includes a number of schemes which are not JCS dependant, but due to changes in their scheme status they have been included as it is assumed that the impact of the schemes will be significant on the transport network. They include:

- M5 J10 – Full Movements
- A417 Missing Link

5.6.4 DS5 had a significant impact on reducing the number of junction arms experiencing prolonged delay. These tend to be more local and are not strategically important.

5.6.5 The junctions operating over capacity in DS5 included:

- A40 Longford Roundabout
- St Barnabas Roundabout
- M5 Junction 11 Southbound
- A435 / Hayfield Way / Finlay Way
- A38 Barnwood Rd / Armscroft Park Rd

5.6.6 Some of the key impacts of the DS5 scenario compared to previous scenarios include:

- A46 through Ashchurch – significant reduction in delay, total time and flows as a result of the new link road
- M5 Flows – slight reduction in northbound flows, with an increase in southbound flows. Note that M5 J10 is all movements in DS5, and therefore more traffic is able to access the motorway and there are significantly improved link routes to the motorways
- A40 Golden Valley, M5 J11 to Princess Elizabeth Way – Eastbound this route shows a significant increase in traffic compared to DS4 and DS5a, with traffic now flowing better as a result of the West Cheltenham Link Road and access to the West Cheltenham Cyber Park. Note that for both DS4 and DS5a, the level of demand to West Cheltenham was unable to flow through the network, causing significant delay. There is also a reduction in both delay and total time (this appears contradictory). For the Westbound in the AM, delay is reduced and flows are reduced as there are now alternative routes and access to the M5 (for example, via the M5 J10 all movements junction);
- M5 J10 to A4019 - significant reduction in eastbound delay and total time (with traffic able to use the new link road to access West Cheltenham. The new Cheltenham Western Relief Road removes significant level of traffic from the congested local road network.

5.6.7 The Do Something 5 scenario mitigates much of the impacts of the JCS strategic allocations and complies with the JCS Transport Strategy Objectives. It should be noted that the Do Something 5 transport mitigation scenario has been devised on a cumulative basis i.e. with new schemes added to the Do Something 3a scenario.

5.6.8 Neither Highway Authority could agree the JCS Transport Strategy until this scenario had been re-assessed using the 2013 CSV SATURN model. This would also provide the opportunity to fully review the scheme included within the scenario.

5.7 Do Something 6 – JCS Proposed Main Modifications (February 2017) Highways Modelling [Spring 2017)

5.7.1 The Do Something 6 scenario was the first of the JCS model runs to use the updated 2013 CSV SATURN base year model. It also tested the revised land use scenario inline with the proposals included in the JCS Proposed Main Modifications document. Details of the land use scenario are included in **Figure 6**.

5.7.2 The schemes included within the scenario were identified in response to process outlined in **Paragraph 1.3** and the outputs from the 'Do Nothing' and 'Do Minimum' modelling scenarios.

5.7.3 The mitigation package differed from previous scenarios and included over 30 interventions. Critical to the scenario were the access arrangements into the West Cheltenham Strategic Site. Within this scenario these are provided via Junction 10 of the M5 and a new distributor road linking into the site from the motorway. The motorway junction improvement comprised a minimum upgrade to allow full movements, with additional capacity provided on the slip roads. (This was based on an earlier scheme proposal tested in the Do Something 5 scenario developed previously by the Highways Agency – now Highways England).

5.7.4 The results of this modelling exercise recorded excessive queuing on the M5 Southbound and Northbound off-slips in the AM peak hour at Junction 10, with major queuing on the A4019 Tewkesbury Road at the new junction with the West of Cheltenham distributor road. During the PM peak hour, there was significant queuing on the distributor road due to traffic exiting the site being delayed at the northern signalised junction with the A4019 Tewkesbury Road, adjacent the M5 J10.

5.7.5 The conclusion reached was that in this scenario, the proposed network mitigation for access to the West of Cheltenham via M5 J10 and a new distributor road linking into the site was insufficient in terms of reducing traffic impact on both the Strategic road network and local road network to a reasonable level. The results however indicated that further work on an improved layout arrangement could potentially allow sufficient distribution of traffic across the network as, apart from the impact on the all-movements arrangements at M5 J10, there are no significant impacts elsewhere along key corridor routes across the modelled network.

5.8 Do Something 6a – JCS Proposed Main Modifications (February 2017) Highways Modelling [Spring 2017)

5.8.1 To robustly assess the access arrangements into the West Cheltenham Strategic Allocation an alternative Do Something 6a scenario was tested. This included the same mitigation measures included in Do Something 6 with the exception of alternative access arrangements to the West of Cheltenham site. This would provide a direct comparison between the scenarios.

5.8.2 Within Do Something 6a access to the West of Cheltenham site would be via a new link road off the A40 Golden Valley bypass, east of M5 Junction 11. This was necessary as a

preliminary review of the site indicated that due to physical restrictions in terms of location of existing nearby development, together with necessary grade separation and turning radii land take requirements, it would prove difficult to upgrade the existing M5 Junction 11 arrangement in order to allow direct access from the M5 into the site.

5.8.3 The modelling assumptions for this DS6a iteration are therefore as follows:

- M5 J10 would remain as current arrangement i.e. not all movements
- Access to the West of Cheltenham site to be from the direction of J11 of the M5, with direct slip roads assumed to the site on the A40 Golden Valley, east of M5 Junction 11

5.8.4 Inline with the Do Something 6a access strategy the arrangements for access to and from the Park and Ride facility at Arle Court have been changed to provide a direct access from the A40 via a new signalised junction, so that traffic does not have to travel through A40 / Arle Court Roundabout to access the Park and Ride.

5.8.5 The outputs from this model test showed that impacts on the M5 were even more significant than those recorded in Do Something 6, with queuing on the M5 mainline and off-slip roads, as well as on the A40 Golden Valley Bypass eastbound on-slip, east of M5. There were a greater number of junctions on the rest of the highway network experiencing delays.

5.8.6 Analysis of the impacts on the M5 indicated the measurable deterioration at the motorway junctions compared to the Do Something 6 scenario, 'Do Minimum' and 'Do Something' scenarios.

5.8.7 Based on the model outcomes and understanding of design constraints for the two access strategies, there is justification for discounting the primary access from the south (M5 Junction 11) in favour of the north (M5 Junction 10). The basis of this justification includes:

- Access to the West of Cheltenham site from the south in Do Something 6a scenario via M5 Junction 11 and A40 has significant implications on the motorway network operational performance
- There are a number of constraints due to the physical restrictions at Junction 11 limiting potential improvements
- The linkages between M5 J10 and access to the West of Cheltenham site could be further integrated and improved
- A revised access improvement from M5 Junction 10 offers potential significant benefit over M5 Junction 11 in terms of
  - linkages to local roads as well as to the wider regional and national road network
  - a range of options for designing a technically feasible and deliverable access to the West Cheltenham site.

5.8.8 The updated scenario would revert back to providing access to the site from M5 Junction 10, based on further improved mitigation and refinement of the proposed junction design and layout.

6.0 The JCS transport strategy (Do something 7)

6.1 Introduction

6.1.1 The JCS Transport Strategy's Six Point Plan identified in **Figure 5** shows the desired approach to managing the transport network within the JCS area. It highlights the importance of minimising the impact of development to ensure an efficient, safe and resilient transport network. It recognises the importance of place and the removal of strategic or 'through' traffic from local environments. It also strongly supports the role of walking, cycling and public transport use underpinning its long-term aim of reducing reliance on the car for short and longer distance trips.

6.1.2 The transport mitigation strategy outlined within the 'Do Something 7' scenario is the preferred package of transport improvements. The schemes included within the scenario supports delivery of the JCS Transport Strategy Objectives identified in **Figure 4**, is consistent with the Six Point Plan identified in **Figure 5** and will help achieve the Transport Outcomes identified in **Figure 6**. A full list of mitigation measures included in the 'Do Something 7' scenario is outlined in **Appendix K**.

6.1.3 The schemes identified within the mitigation strategy were informed by the technical modelling outputs provided by the 2013 CSV SATURN highway base year model in line with the process identified in **Para 1.3**. To understand the impacts of the 'Do Something' 6 and 7 scenarios, modelling outputs from the 'Do nothing' scenario and 'Do minimum' scenarios were created and used as benchmarks against which to measure the impacts of the 'Do Something' scenarios.

6.1.4 It is important to note that this assessment has been undertaken based on the delivery of the full JCS plan. At this stage no assessment has been made regarding delivery phasing or the prioritisation of mitigation schemes.

6.1.5 The JCS plan period is to 2031. Regardless of the scale of growth identified in the plan, the transport network will be considerably busier than it is today as a result of planned growth outside the JCS area alongside existing committed growth already taking place within the JCS area. The JCS Transport Strategy is not required to resolve all of these issues, but only those attributed to the scale of growth outlined in the JCS plan.

6.1.6 The JCS transport strategy is therefore only required to mitigate those impacts on the highway network occurring between the 'Do Nothing' and 'Do Minimum' scenarios.

6.1.7 The assumptions used to create the 'Do Nothing' scenario include all JCS strategic allocation growth where planning permission has been granted at the time of the modelling assessment; and committed / delivered transport schemes since 2013. This includes:

- M5 J9 / A46 Improvement (2014)
- A417 Walls & C&G roundabouts pinch-point schemes (2014)
- A40 Longford & A40 Over roundabouts pinch-point schemes (2014)

- A40 Elmbridge roundabout improvement scheme (currently under construction – projected opening date – August 2017)
- A40 Over roundabout improvement Phase 2 – Growth Fund Scheme
- A40 Cheltenham Westbound Corridor Bus Priority scheme - Arle Court to Benhall section (part of the Elmbridge Transport scheme)
- Gloucester Central Transport Hub (Bus Station); Abbeymead/Metz Way bus priority scheme
- Cheltenham Transport Plan (CTP) phases 1 to 3 only (Boot's Corner Closure - Trial Scheme excluded)

6.1.8 The assumptions used to create the 'Do Minimum' scenario cover all JCS strategic allocation growth where planning permission has not been granted at the time of the modelling assessment, along with all other unallocated non strategic housing development, and transport schemes where funding has been allocated but not committed. This includes:

- A417 Missing Link (previously coded for DS5 Scenario);
- St Barnabas Roundabout;
- Gloucester South West Bypass, Llanthony Road Section Widening

6.1.9 The transport schemes identified within the 'Do Nothing' and 'Do Minimum' scenarios are therefore included as part of the 'Do Something' 7 scenario.

6.1.10 To assess the impact of the transport strategy, 11 strategic travel corridors were identified within the JCS area. Within those corridors, highway junctions considered to be critical to their function have been identified. The operation of these junctions will be used to assess journey time reliability as a proxy of how well the corridor is functioning. The 11 corridors are illustrated in **Appendix L.** They were identified on the basis of their importance to support national and local economic growth, and informed by the Link and Place Spectrum outlined within Gloucestershire's Local Transport Plan (2015-2031).

6.1.11 No definition of 'severe' shall be provided within this assessment as its application depends on local context. The severity of any impacts for individual sites will be assessed as part of the Transport Assessment accompanying the planning application.

6.1.12 As the CSV SATURN model is a strategic highways model, only those junctions identified where a 'significant' increase in delay or any safety issues occur for the M5 would be mitigated are taken forward as part of the strategy. The definition of 'significant' in the JCS strategic context is for any junction with a Ratio of Flow to Capacity (RFC) greater than 100% where a 10% increase is recorded between the 'Do Nothing' and 'Do Minimum' scenario for any part of the junction. Junctions are assumed to be operating within capacity if the RFC is less than 100%.

6.1.13 For the remainder of this section, the impacts of 'Do Something' 7 will be described for each of the strategic corridors.

6.2 Corridor 1 - M5 – between (and including) M5 Junction 9 and Junction 13

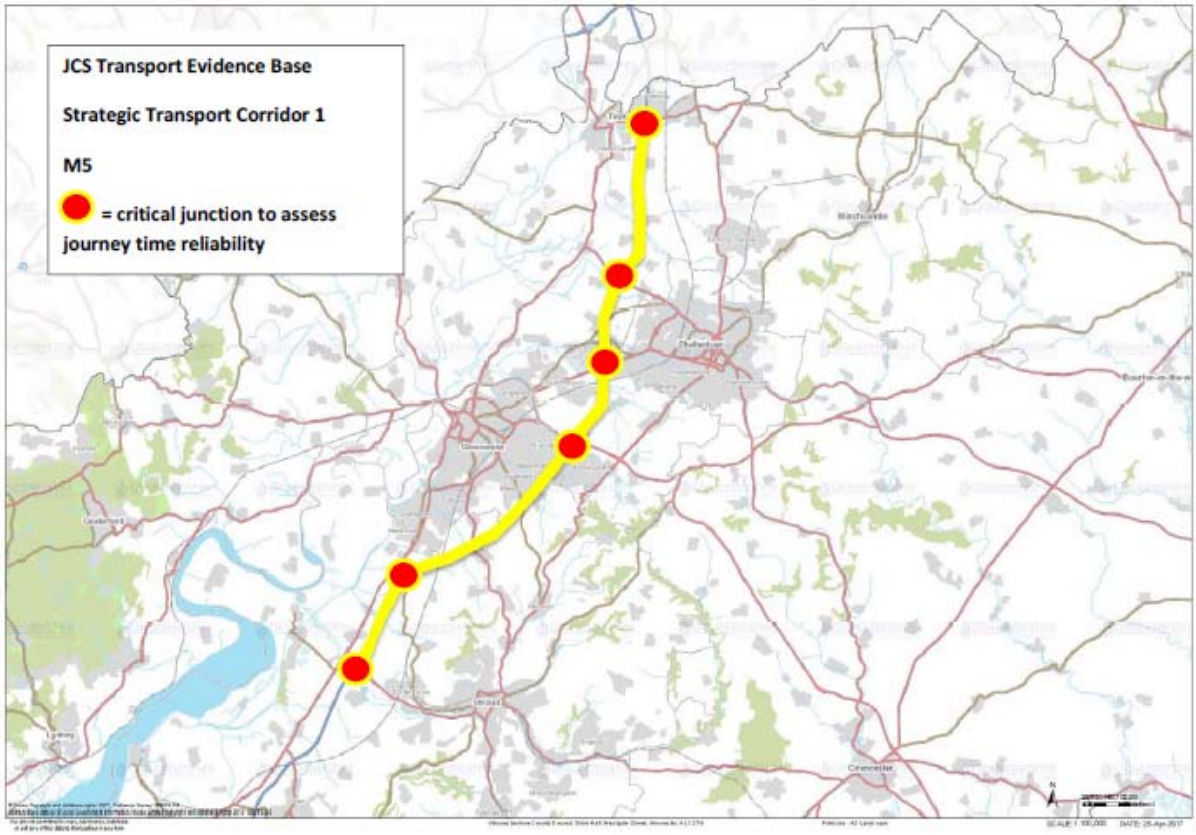
6.2.1 Corridor 1 includes the M5 mainline, from Junction 13 (Stroud), to Junction 9 (Tewkesbury). This forms part of the Strategic Road Network and is managed by Highways England. It is essential to maintain highway operation and safety by avoiding any queuing traffic on the motorway mainline caused by congestion at the motorway junctions impacting vehicles on the off-slips.

6.2.2 Within Gloucestershire Local Transport Plan's Link and Place Spectrum (**Appendix B**) the route is classified as a national link critical to the national economy. This section of highway has an average daily vehicle flow of over 50,000 vehicles (**Appendix C**).

6.2.3 **Figure 33** illustrates the location of those junctions considered critical to assess journey time reliability. Six junctions have been identified and they are:

- M5 Junction 13 – Stroud, Dursley A419
- M5 Junction 12 – Gloucester A38
- M5 Junction 11a – Gloucester, Cirencester, London A417
- M5 Junction 11 – Cheltenham, Gloucester A40
- M5 Junction 10 – Cheltenham A4019
- M5 Junction 9 – Tewkesbury A438 Evesham A46

Figure 33 - Corridor 1 – critical junctions



6.2.4 **Figure 34** documents the network performance during the AM and PM peak scenarios in terms of Ratios of Flow to Capacity for each junction. Despite operating over 100%, the JCS Transport Strategy will not consider mitigation for M5 Junction 13 as this is already operating over 100% in the 'Do nothing' scenario and therefore impact at the junction is not attributable to JCS growth. On the basis of change from the Do Nothing and the Do Minimum, mitigation will need to be considered for the following junctions:

- M5 Junction 12 – B4008 approach from the south towards Gloucester
- M5 Junction 11a – capacity issues on northbound off-slip
- M5 Junction 9 – westbound approach from A46 Ashchurch

Figure 34 – Corridor 1 Ratios of Flow to Capacity – DN and DM

Junction Name	Ratios of Flow to Capacity			
	AM Peak		PM Peak	
	Do Nothing	Do Minimum	Do Nothing	Do Minimum
M5 Junction 13	87.6%	88.0%	105.0%	105.1%
M5 Junction 12	99.3%	102.5%	95.5%	95.4%
M5 Junction 11a	88.2%	102.9%	84.1%	91.4%
M5 Junction 11	89.2%	93.7%	75.4%	92.0%
M5 Junction 10	89.5%	91.0%	76.9%	84.2%
M5 Junction 9	96.9%	111.9%	101.8%	101.3%

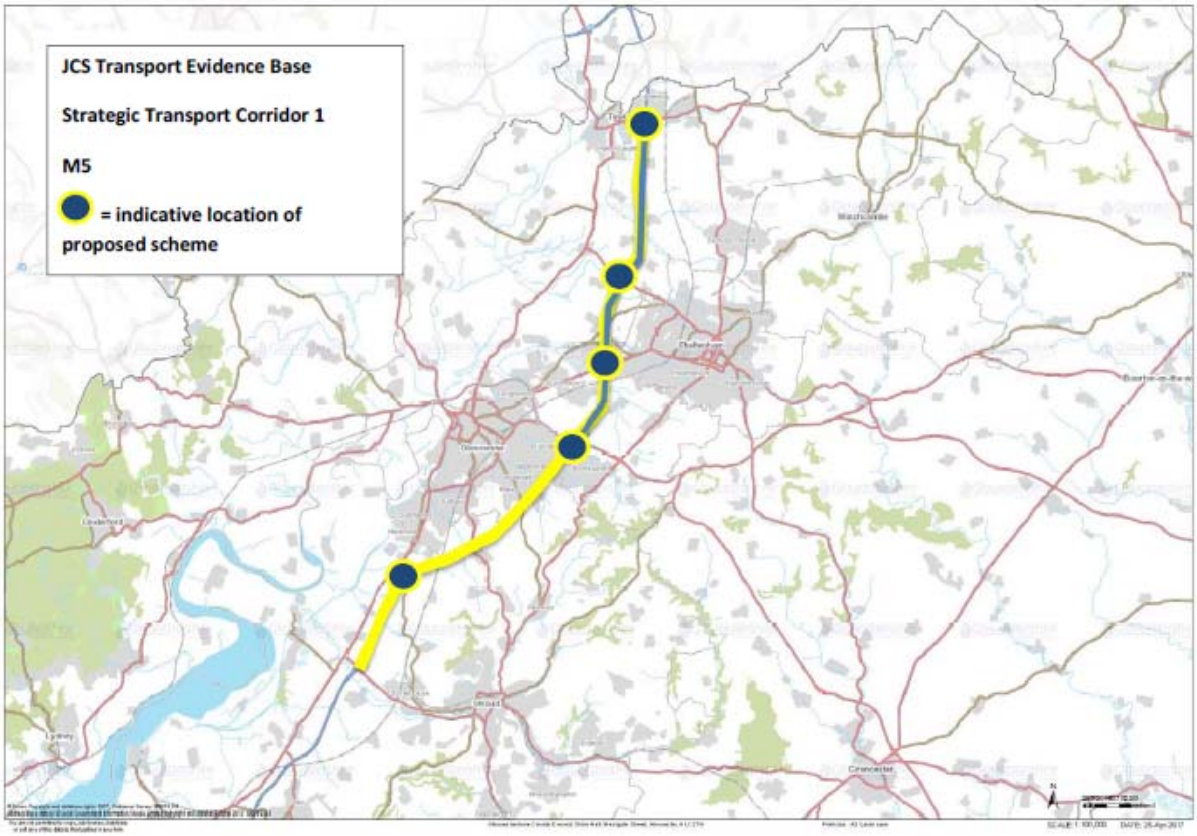
6.2.5 The preferred mitigation package for this corridor (intended to account for the capacity issues identified in **Figure 34** and other trip reassignment resulting from the JCS growth strategy and other network changes which impact travel demand within the corridor) includes:

- M5 J11a to M5 J9 - Upgrade motorway to a smart motorway increasing capacity during peak times and controlling vehicle flows
- M5 J12 -Upgrade to junction to include 2 lane wide off and on slips
- M5 J11a - Optimise junction operation with improved signing and lining and area wide reassignment
- M5 J11 - Signalise Southbound off-slip. Northbound off slip extra lane
- M5 J10 - 'All Movements' junction improvements including complementary measures to M5 mainline. This includes a high capacity upgrade of M5 J10 junction including three lane motorway off slips and a three circulatory lane grade separated roundabout with A4019, and a new signal controlled junction immediately west of the M5 to accommodate the associated West of Cheltenham development access road (see corridor 6 for more information). This will be a high capacity signal controlled junction, with a separate left turn slip road from M5J10 northbound off-slip onto Cyber Park link road (southbound). There would also be new signals on the A4019 westbound entry to the new grade separated motorway junction
- M5 J9 - Extended junction to accommodate new off-line route for the A46 (see corridor 2 for more information)

- As the corridor is related to the motorway there are no sustainable transport schemes

6.2.6 **Figure 35** illustrates the location of the mitigation measures outlined above.

Figure 35 - Corridor 1 – Location of mitigation measures



6.2.7 **Figure 36** summarises the impacts of the Do Something 7 Strategy.

Figure 36 – Corridor 1 Ratios of Flow to Capacity – DM and DS7

Junction Name	Ratios of Flow to Capacity			
	AM Peak		PM Peak	
	Do Minimum	Do Something 7	Do Minimum	Do Something 7
M5 Junction 13	88.0%	94.2%	105.1%	109.2%
M5 Junction 12	102.5%	102.1%	95.4%	105.0%
M5 Junction 11a	102.9%	93.9%	91.4%	89.0%
M5 Junction 11	93.7%	99.6%	92.0%	93.8%
M5 Junction 10	91.0%	96.8%	84.2%	93.9%
M5 Junction 9	111.9%	87.2%	101.3%	97.8%

6.2.8 The outcome of the Do Something 7 changes are that the M5 mainline and motorway off slips now operating within capacity. This is despite an increase in motorway traffic as a result of improvements to M5 Junction 10 and conversion to a full-movements junction.

6.2.9 There remains an issue at M5 Junction 12 despite the improvements outlined in Do Something 7. The junction is marginally over 100% capacity in both peak hours and this is specifically linked to the B4008 internal roundabout approach arms. Through further detailed junction modelling and iterative design it is considered probable that increased efficiencies would be achievable at this junction.

6.3 Corridor 2 - A46 – M5 Junction 9 to county boundary (east of Teddington Hands)

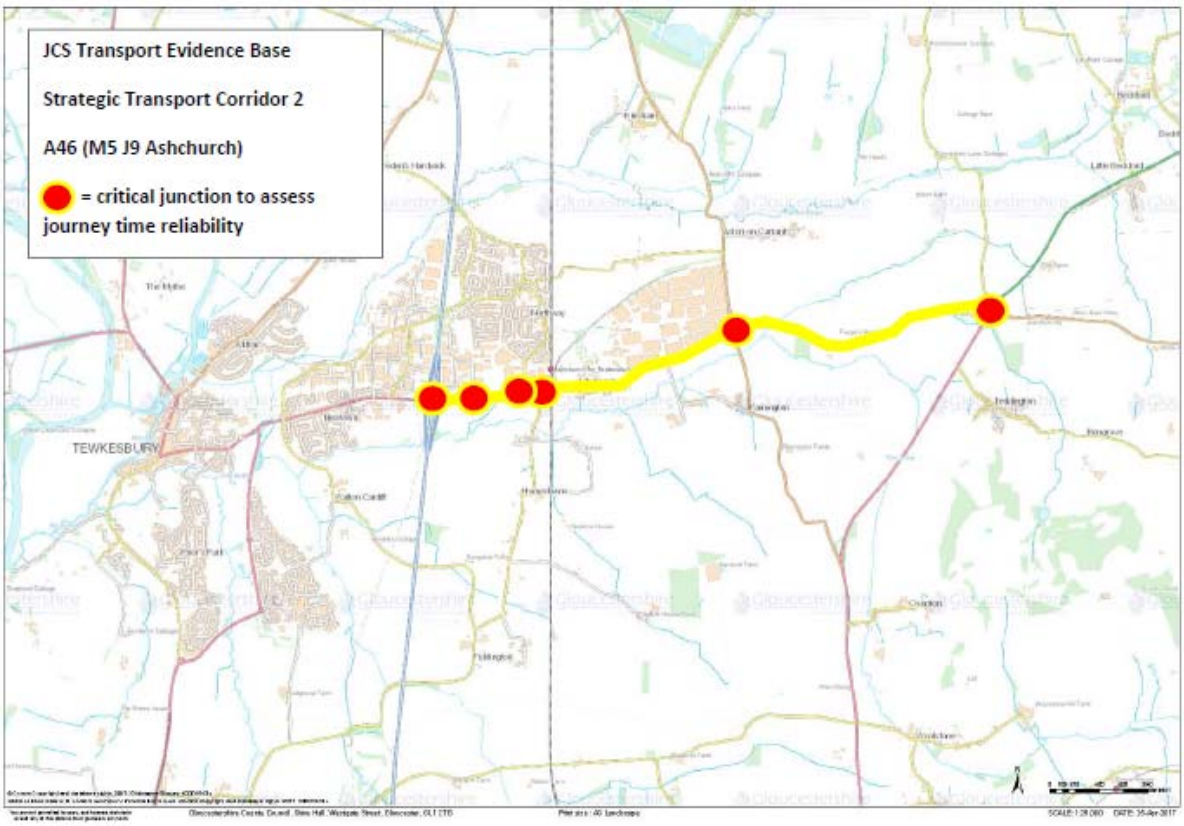
6.3.1 Corridor 2 includes the A46 from M5 Junction 9 Tewkesbury, up to the county boundary. This forms part of the Strategic Road Network and is managed by Highways England. The A46 provides a link between the M40 Junction 15 and the M5. The route is identified as being of regional importance and Midland Connects are prioritising investment within the strategic corridor. The section of the route within Gloucestershire is not typical of the wider route as it is highly constrained with numerous side roads, direct accesses, existing development up to the highway boundary

6.3.2 Within Gloucestershire Local Transport Plan's Link and Place Spectrum (**Appendix B**) the route is classified as a national link critical to the national economy. This section of highway has an average daily vehicle flow of over 15,000 to 20,000 vehicles (**Appendix C**).

6.3.3 **Figure 37** illustrates the location of those junctions considered critical to assess journey time reliability. Six junctions have been identified and they include:

- A438 / A46 Rbt (M5 J9)
- A46 Ashchurch Rd / Alexandra Way
- A46 Ashchurch Rd / Northway Lane
- A46 Ashchurch Rd /Fiddington Lane
- A46 Ashchurch Rd / B4079 Aston Cross
- A46 Ashchurch Rd / A46 / A435 Teddington Hands Roundabout

Figure 37 - Corridor 2 – critical junctions



6.3.4 **Figure 38** documents the network performance during the AM and PM peak scenarios in terms of Ratios of Flow to Capacity for each junction. With the exception of Teddington Hands and Northway Lane there are capacity issues at each of the junctions identified. However the issues at Aston Cross exist in the Do Nothing scenario, and are therefore not attributed to JCS growth. On the basis of change from the Do Nothing and the Do Minimum mitigation will need to be considered for the following junctions:

- M5 Junction 9 - A46 westbound approach to junction
- Alexandra Way – side road approach from Business Park
- Fiddington Lane – side road approach from Fiddington

Figure 38 – Corridor 2 Ratios of Flow to Capacity – DN and DM

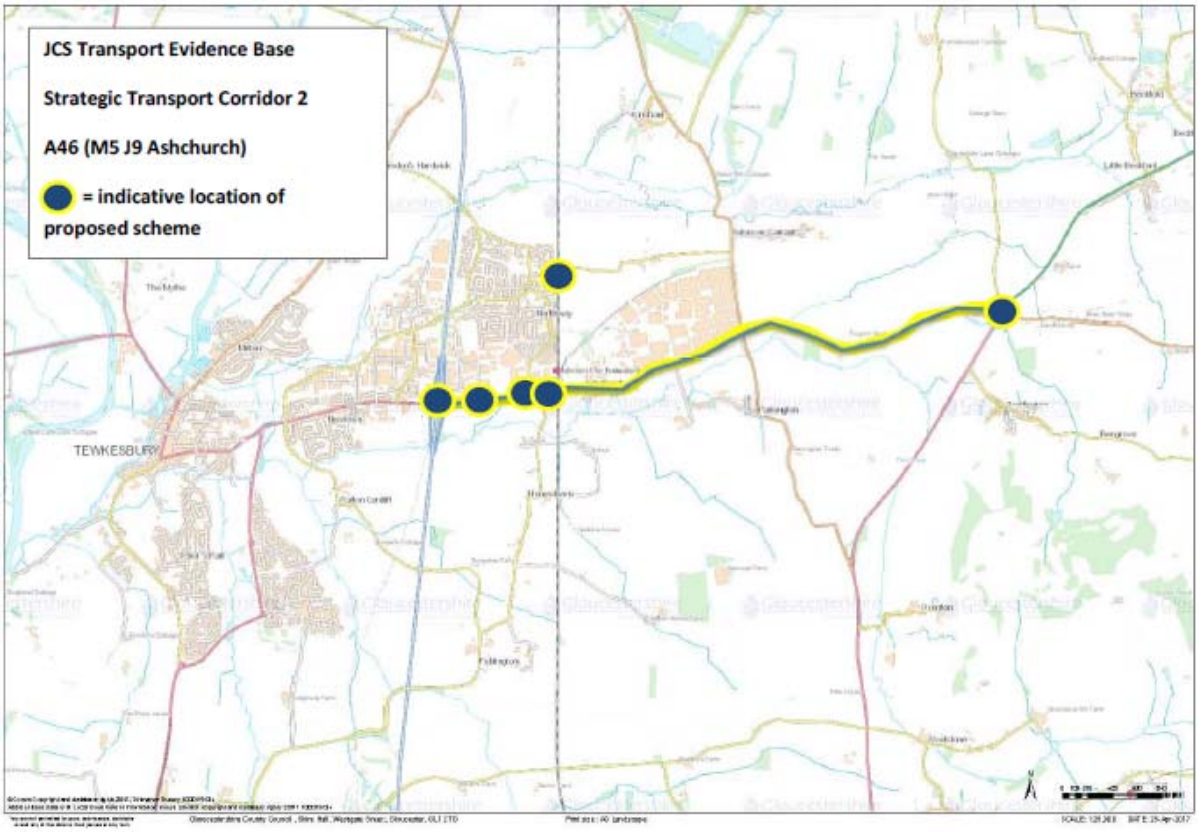
Junction Name	Ratios of Flow to Capacity			
	AM Peak		PM Peak	
	Do Nothing	Do Minimum	Do Nothing	Do Minimum
A438 / A46 Rbt (M5 J9)	96.9%	111.9%	101.8%	101.3%
A46 Ashchurch Rd / Alexandra Way	104.0%	129.5%	469.7%	497.3%
A46 Ashchurch Rd / Northway Ln	99.9%	87.7%	78.9%	84.8%
A46 Ashchurch Rd /Fiddington Lane	78.5%	115.1%	102.7%	114.5%
A46 Ashchurch Rd / B4079 Aston Cross	101.3%	105.4%	103.9%	106.9%
A46 Ashchurch Rd / A46 / A435 Teddington Hands Rbt	60.1%	69.0%	56.3%	59.3%

6.3.5 The preferred mitigation package for this corridor (intended to account for the capacity issues identified in **Figure 38** and other trip reassignment resulting from the JCS growth strategy and other network changes which impact travel demand within the corridor) include:

- A46 through Ashchurch – New dual carriageway bypass linking Teddington Hands roundabout with M5 Junction 9 and associated changes to junctions. Based on the Department for Transport's 1993 alignment to provide an alternative to the south of the existing A46 alignment;
- Upgrade signals to MOVA or SCOOT operation to optimise signal timings along existing alignment;
- Close Railway Level Crossing, and replace with new bridge linking Grange Road with Hardwicke Bank Road to improve alternative access to the north of A46.

6.3.6 **Figure 39** illustrates the location of the mitigation measures outlined above.

Figure 39 - Corridor 2 – Location of mitigation measures



6.3.7 **Figure 40** summarises the impacts of the Do Something 7 Strategy.

Figure 40 – Corridor 2 Ratios of Flow to Capacity – DM and DS7

Junction Name	Ratios of Flow to Capacity			
	AM Peak		PM Peak	
	Do Minimum	Do Something 7	Do Minimum	Do Something 7
A438 / A46 Rbt (M5 J9)	111.9%	87.2%	101.3%	92.5%
A46 Ashchurch Rd / Alexandra Way	129.5%	67.9%	497.3%	95.4%
A46 Ashchurch Rd / Northway Ln	87.7%	91.8%	84.8%	49.6%
A46 Ashchurch Rd /Fiddington Lane	115.1%	39.2%	114.5%	42.3%
A46 Ashchurch Rd / B4079 Aston Cross	105.4%	100.4%	106.9%	97.3%
A46 Ashchurch Rd / A46 / A435 Teddington Hands Rbt	69.0%	50.7%	59.3%	59.1%

6.3.8 The outcome of the Do Something 7 changes result in a significant improvement to the operation of the A46, with all junctions along this corridor now operating within acceptable levels. The advantages of the offline improvement and new bridge over the railway crossing will bring about significant improvements to the existing A46 route encouraging walking, cycling and public transport use.

6.4 Corridor 3 - A40 –M5 Junction 11 to county boundary (east of Ross on Wye)

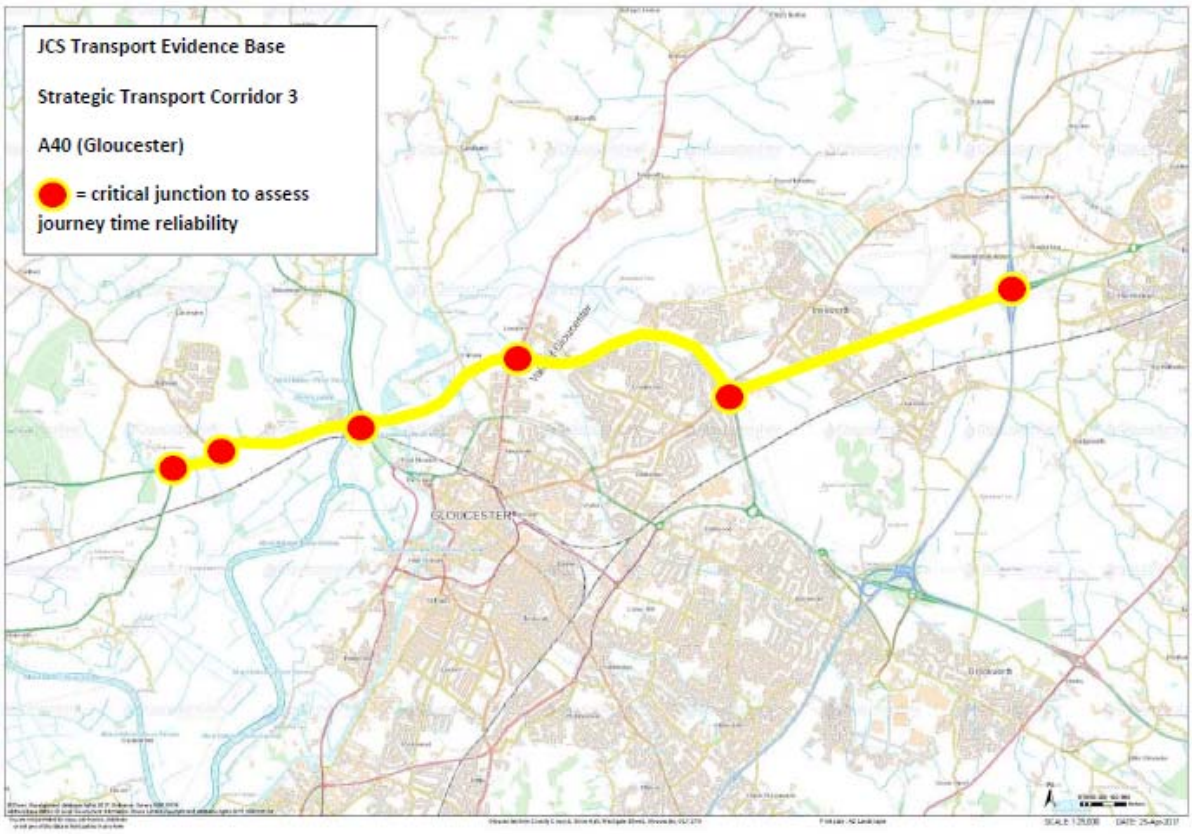
6.4.1 Corridor 3 includes the A40 from M5 Junction 11 to the county boundary. This forms part of the Strategic Road Network and is managed by Highways England. The A40 provides Gloucester's northern bypass and interacts with a number of locally important routes. It also provides the primary access linking the Forest of Dean with the JSC area.

6.4.2 Within Gloucestershire Local Transport Plan's Link and Place Spectrum (**Appendix B**) the route is classified as a national link critical to the national economy. This section of highway has an average daily vehicle flow of over 20,000 to 50,000 vehicles (**Appendix C)**.

6.4.2 **Figure 41** illustrates the location of those junctions considered critical to assess journey time reliability. Six junctions have been identified:

- A40/ A48 Roundabout Highnam Roundabout
- A40/ B4215 Newent Junction
- A40/ A417 Over Roundabout
- A40/ A38 Longford Roundabout
- A40 Elmbridge Court Roundabout
- M5/ A40 (Junction 11)

Figure 41 - Corridor 3 – critical junctions



6.4.3 **Figure 42** documents the network performance during the AM and PM peak scenarios in terms of Ratios of Flow to Capacity for each junction. Please note that within this route

analysis it does not include the proposed new junction on the A40 Northern Bypass between Longford and Elmbridge Court that may be added as a result of access to the A1 Innsworth and A1a Twigworth Strategic Allocations. With the exception of M5 Junction 11 there are capacity issues at each of the junctions identified Despite operating over 100% the JCS Transport Strategy will consider some high level mitigation for the A40 /A48 Highnam and A40/B4215 Newent junctions despite the capacity issues not being directly caused by the JCS allocation. On the basis of change from the Do Nothing and the Do Minimum mitigation will need to be considered for the following junctions:

- A40 / A48 Highnam – due to demand from the West of Severn towards Gloucester
- A40 / B4215 Newent Junction – due to demand from the West of Severn towards Gloucester
- A40 / A417 / Over – due to demand from the A417 northern approach (Maisemore)
- A40 / A38 Longford – due to demand from the A38 northern approach and A40 western approaches
- A40 Elmbridge Court – due to demand from B4063 (Churchdown) and adjacent junction circulatory queuing

Figure 42 – Corridor 3 Ratios of Flow to Capacity – DN and DM

Junction Name	Ratios of Flow to Capacity			
	AM Peak		PM Peak	
	Do Nothing	Do Minimum	Do Nothing	Do Minimum
A40/ A48 Rbt Highnam Rbt	134.7%	139.6%	102.9%	115.7%
A40/ B4215 Newent Junction	115.1%	118.1%	104.4%	104.4%
A40/ A417 Over Roundabout	115.3%	117.0%	124.6%	118.6%
A40/ A38 Longford Roundabout	105.3%	139.7%	99.1%	95.4%
A40 Elmbridge Court Roundabout	120.6%	173.1%	107.9%	110.2%
M5/ A40 (Junction 11)	89.2%	93.7%	75.4%	92.0%

6.4.4 The preferred mitigation package for this corridor (intended to account for the capacity issues identified in **Figure 42** and other trip reassignment resulting from the JCS growth strategy and other network changes which impact travel demand within the corridor) includes:

- A40/A48 Highnam Roundabout - Signalise roundabout – MOVA signals
- A40 Over Roundabout - Add a dedicated left slip from A40 east to the south towards Gloucester
- A40 Longford Roundabout and new Innsworth site access
- New junction on A40 - New signalised junction on A40 between Longford and Elmbridge Court roundabouts
- New junction on A38 - New priority junction on A38 giving priority to new highway link and accessing the new junction on A40

- New section of highway - New 50 mph highway link, joining upgraded junctions on A40 and A38 through / adjacent to Twigworth / Innsworth development sites
- A40 Longford Roundabout - Existing A40 / A38 Longford junction changed from a roundabout to a signalised crossroads. Junction arrangement designed to complement the introduction of Longford Bypass. Turn from A40 east to A38 north not allowed. Bus priority – traffic signals will be used to facilitate north / south movements
- A40 Longford Roundabout - Removal of existing A40 pedestrian crossing and replacement with new pedestrian and cycle over bridge
- A38 Tewkesbury Road - A38 Tewkesbury Rd to be downgraded between A40/A38 Longford signalised crossroads and new A38/Twigworth junction to 20mph, and encourage as a sustainable travel corridor. Access from A38 north is restricted to one lane entry to crossroads, A40 west to A38 north - right hand turn banned with alternative route via A40 / A38 Link Road
- A38 Tewkesbury Road – Downgrading of junction with Longford Lane, to remove right turn holding lane into Longford Lane
- A38 Tewkesbury Road - Upgrade A38 Tewkesbury Rd / Down Hatherley Lane junction, to include a dedicated right turn from A38 south
- A40 Elmbridge Court Roundabout - Remove B4063 Cheltenham Rd East approach arm from the junction and also the Elmbridge Court access road to / from existing Business Park; New free flow left turn link from A40 East to A40 Barnwood Link, and similar free flow left turn link from A40 Northern Bypass to A40 East
- New A40 junction east of Elmbridge – four way signals with turning restrictions. New link road from B4063 Cheltenham Rd East and access to existing Business Park and South Churchdown strategic employment site. Both roads would access the new junction

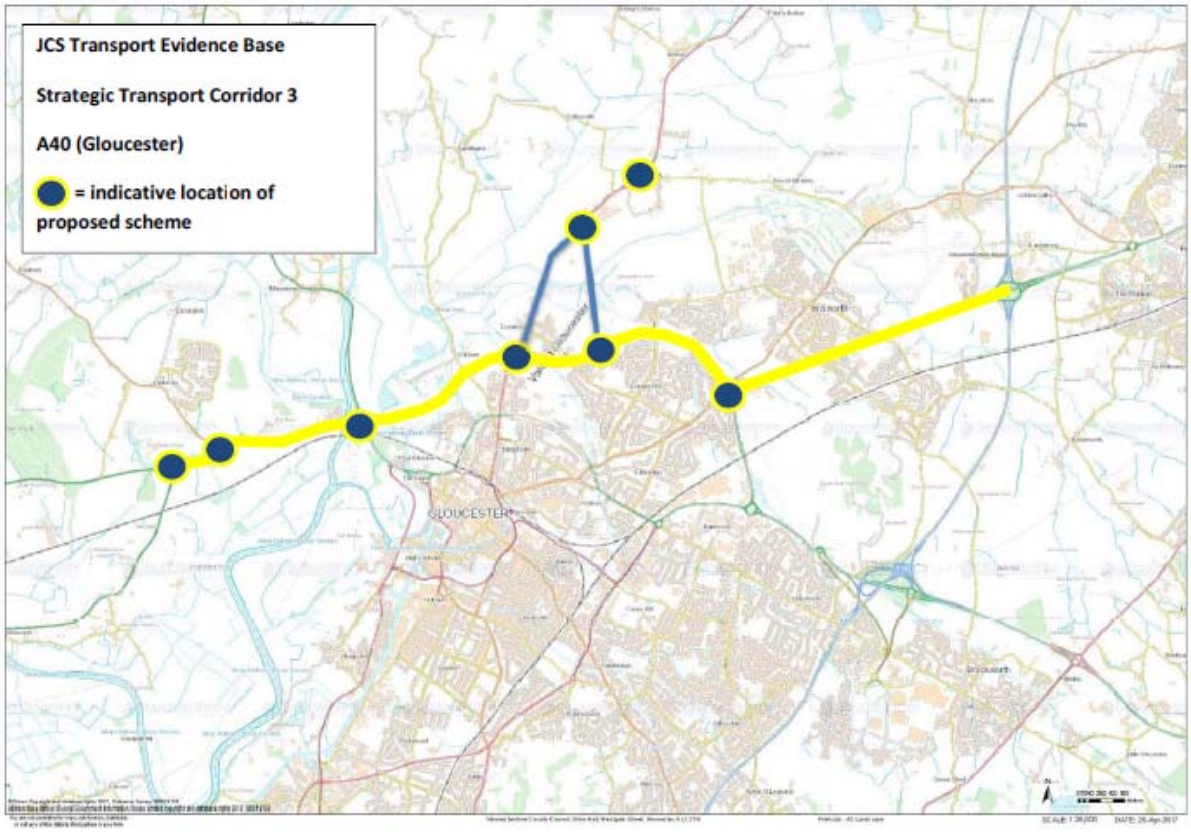
6.4.5 **Figure 43** illustrates the location of the mitigation measures outlined above.

6.4.6 **Figure 44** summarises the impacts of the Do Something 7 Strategy.

Figure 43 – Corridor 2 Ratios of Flow to Capacity – DM and DS7

Junction Name	Ratios of Flow to Capacity			
	AM Peak		PM Peak	
	Do Minimum	Do Something 7	Do Minimum	Do Something 7
A40/ A48 Rbt Highnam Rbt	139.6%	153.6%	115.7%	131.7%
A40/ B4215 Newent Junction	118.1%	128.4%	104.4%	104.4%
A40/ A417 Over Roundabout	117.0%	117.8%	118.6%	120.7%
A40/ A38 Longford Roundabout	139.7%	100.6%	95.4%	100.5%
A40 Elmbridge Court Roundabout	173.1%	103.8%	110.2%	103.0%
M5/ A40 (Junction 11)	93.7%	99.6%	92.0%	93.8%

Figure 44 - Corridor 4 – Location of mitigation measures



6.4.7 The outcome of the Do Something 7 scenario improves the operation of critical junctions and the corridor can continue to operate, but there are several junctions where capacity concerns remain. These are principally as a result from travel demand originating from the West of Severn and are related to accessing employment opportunities within the JCS area.

6.4.8 The remaining issues for corridor 3 include:

- Highnam Roundabout (both peaks); A40/B4215 Newent Junction (AM peak) and Over Roundabout (both peaks). Through further detailed junction modelling and iterative design it is considered probable that increased efficiencies would be achievable at these junctions
- Longford Roundabout (PM peak); the Longford changes are part of the wider scheme to provide an acceptable network to access both Innsworth and Twigworth. Note that the operation of the junction is significantly improved for the AM peak compared to the Do Minimum, and the PM is only just over 100% (100.5%). Therefore, this is considered acceptable given expected network efficiencies gained as the planning process proceeds and more details of the scheme become known
- Elmbridge Roundabout (both peaks);Despite major improvements when compared to the 'Do Nothing' there remains operational capacity concerns with the new four arm signalised junction on the A40 to the east of Elmbridge Roundabout. A potential variation to a staggered junction arrangement could improve the operational efficiency of this new junction.

6.4.9 For most of the corridor the A40 acts as a barrier to walking and cycling. Much of the A40 does not have a footway and walking along this corridor is not to be encouraged and only the most experienced cyclist should consider using this route. However, as the route does interact with a number of local highway links where walking and cycling are to be encouraged. The existing grade separated crossings at Over, Longford, Innsworth and Elmbridge provide a environment to cross the route in safety. The proposed replacement of the at grade crossing at Longford roundabout with a grade separated facility and downgrade of the existing A38 should enhance the attractiveness for people wanting to Gloucester from the JCS strategic allocations in Innsworth and Twigworth.

6.4.10 The bus priority improvements incorporated into the Longford scheme will also assist in maintaining journey times for routes 71 and 97 / 98, this is essential for maximising public transport desirability and ridership.

6.5 Corridor 4 - A417 – M5 Junction 11a to Nettleton roundabout

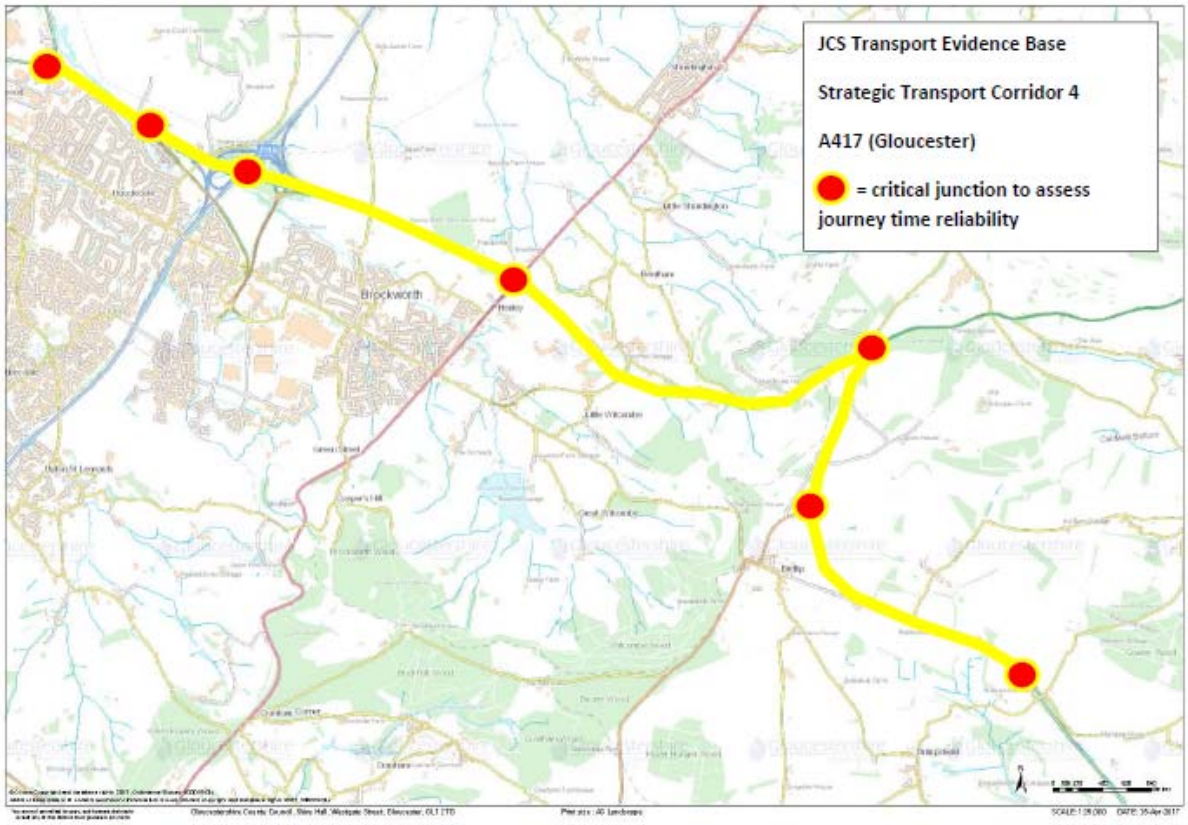
6.5.1 Corridor 4 includes the A417 M5 Junction 11a to Nettleton roundabout covering Birdlip and the Air Balloon junctions to the east up to the Corinium Avenue junction on the edge of Gloucester. This forms part of the Strategic Road Network and is managed by Highways England.

6.5.2 Within Gloucestershire Local Transport Plan's Link and Place Spectrum (**Appendix B**) the route is classified as a national link critical to the national economy. This section of highway has an average daily vehicle flow of over 30,000 to 50,000 vehicles (**Appendix C)**.

6.5.3 **Figure 45** illustrates the location of those junctions considered critical to assess journey time reliability. Seven junctions have been identified and they include:

- A417/ Stockwell Junction
- A417/ Birdlip Junction
- A417/ Air Balloon Roundabout
- A417/ A46 Junction
- A417/ B4641 M5 J11a Intersection
- A417/ Delta Way Roundabout
- A417/ Barnett Way/ Corinium Avenue Roundabout

Figure 45 - Corridor 4 – critical junctions



6.5.4 **Figure 46** documents the network performance during the AM and PM peak scenarios in terms of Ratios of Flow to Capacity for each junction. Please note that the Do Minimum scenario includes the proposed major scheme at Birdlip and the Air Balloon, known as the "Missing Link", resulting in the significant improvements at these junctions within the Do Minimum scenario. On the basis of change from the Do Nothing and the Do Minimum mitigation will need to be considered for the following junctions:

- A417/A46 junction – A46 southbound (Shurdington) and A417 eastbound off slip
- A417 / Delta Way 'Zoons' Roundabout – Delta Way northbound approach and A417 westbound approach

Figure 46 – Corridor 4 Ratios of Flow to Capacity – DN and DM

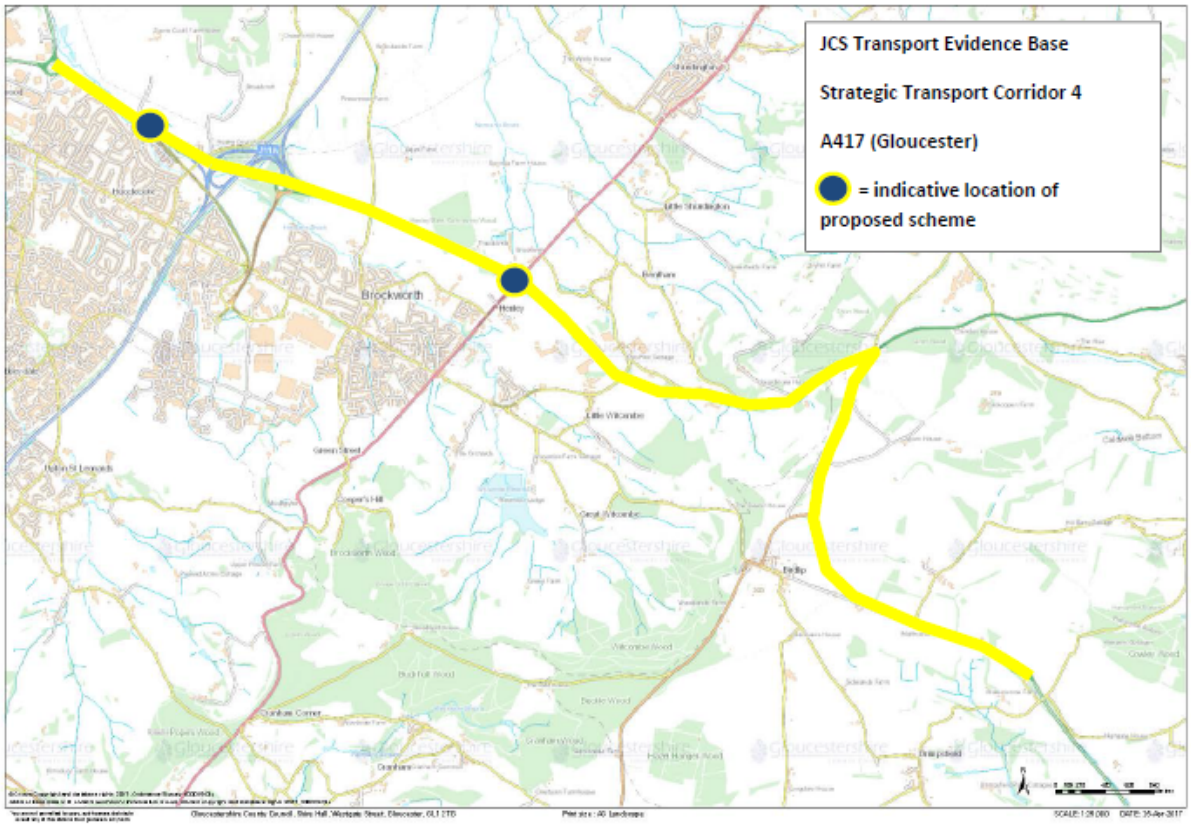
Junction Name	Ratios of Flow to Capacity			
	AM Peak		PM Peak	
	Do Nothing	Do Minimum	Do Nothing	Do Minimum
A417/ Stockwell Junction	100.5%	63.6%	114.3%	60.1%
A417/ Birdlip Junction	122.9%	105.3%	112.7%	47.5%
A417/ Air Balloon Roundabout	129.7%	69.9%	120.6%	50.1%
A417/ A46 Junction	100.5%	107.7%	88.9%	101.2%
A417/ B4641 M5 J11a Intersection	71.3%	95.1%	82.5%	86.4%
A417/ Delta Way Roundabout	94.5%	107.9%	82.8%	101.7%
A417/ Barnett Way/ Corinium Avenue Roundabout	83.0%	97.0%	109.0%	110.1%

6.5.5 The preferred mitigation package for this corridor (intended to account for the capacity issues identified in **Figure 46** and other trip reassignment resulting from the JCS growth strategy and other network changes which impact travel demand within the corridor) includes:

- A417 / Delta Way 'Zoons' Roundabout - Junction Improvement: Removing the existing left turn slip from Delta Way (Brockworth) to C&G Roundabout, and signalising the A417 approach (from Cirencester) and the opposing roundabout circulatory movement
- A417 Brockworth Bypass - Signalising the westbound and eastbound 'Off-slips'

6.5.6 **Figure 47** illustrates the location of the mitigation measures outlined above.

Figure 47 - Corridor 4 – Location of mitigation measures



6.5.7 **Figure 48** summarises the impacts of the Do Something 7 Strategy.

Figure 48 – Corridor 4 Ratios of Flow to Capacity – DM and DS7

Junction Name	Ratios of Flow to Capacity			
	AM Peak		PM Peak	
	Do Minimum	Do Something 7	Do Minimum	Do Something 7
A417/ Stockwell Junction	63.6%	58.4%	60.1%	60.6%
A417/ Birdlip Junction	105.3%	97.9%	47.5%	56.5%
A417/ Air Balloon Roundabout	69.9%	64.6%	50.1%	51.7%
A417/ A46 Junction	107.7%	104.0%	101.2%	102.9%
A417/ B4641 M5 J11a Intersection	95.1%	103.4%	86.4%	84.1%
A417/ Delta Way Roundabout	107.9%	100.0%	101.7%	90.1%
A417/ Barnett Way/ Corinium Avenue Roundabout	97.0%	88.1%	110.1%	103.4%

6.5.8 The outcome of these changes results in significant improvements when compared to the 'Do Minimum' operating conditions, with the majority of junctions operating within or at capacity during both peak hour periods. There remain minor issues during both peak for the A417 / A46 junction with both A46 approaches. Possible signalisation of these approaches may mitigate the scale of delay experienced.

6.6 Corridor 5 - A438 / A38 – M5 Junction 9 to A38 Coombe Hill

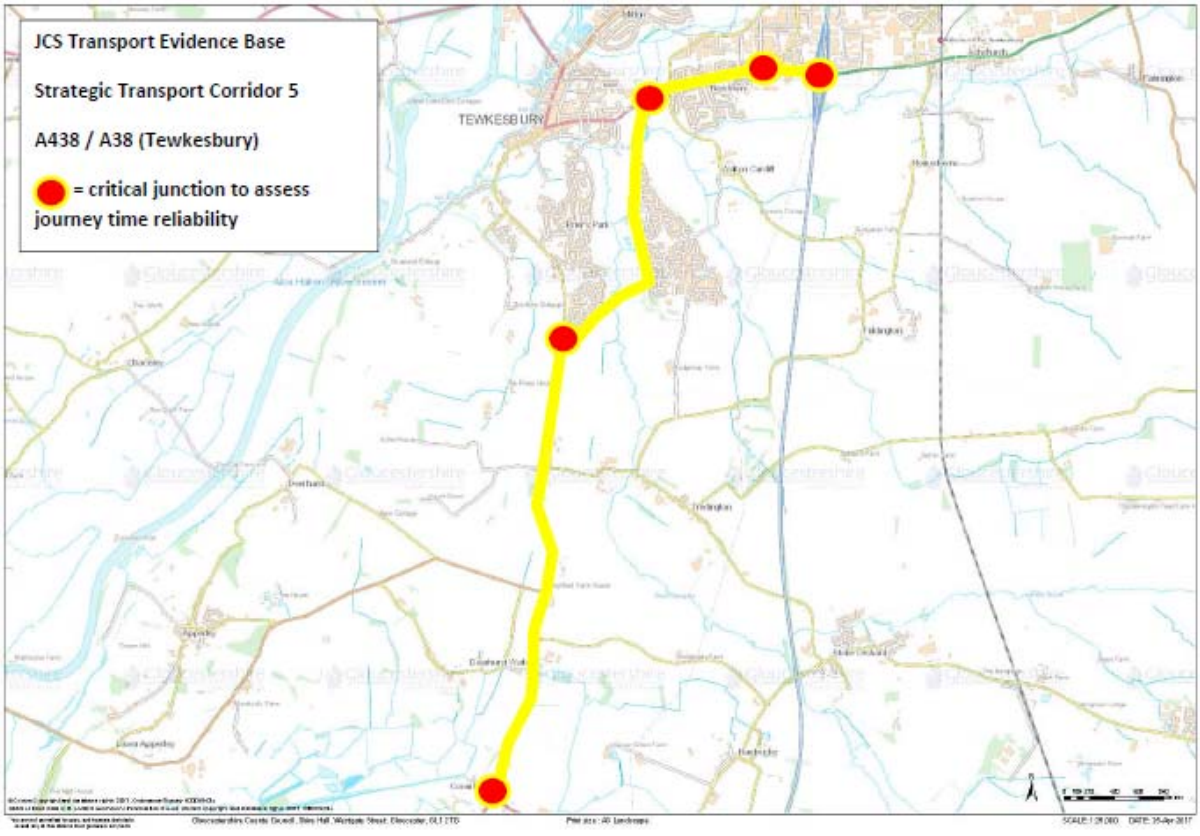
6.6.1 Corridor 5 starts at M5 Junction 9 Tewkesbury and includes the A438, and the A38 through Walton Cardiff to Coombe Hill. The route forms part of the local highway network and is managed by Gloucestershire County Council.

6.6.2 Within Gloucestershire Local Transport Plan's Link and Place Spectrum (**Appendix B**) the route is classified as a primary link critical to the local economy. This section of highway has an average daily vehicle flow of over 10,000 to 15,000 vehicles (**Appendix C**). It also forms part of the 41/42 public transport corridor.

6.6.3 **Figure 49** illustrates the location of those junctions considered critical to assess journey time reliability. Five junctions have been identified and they include:

- A438 / M5 Junction 9
- A438 / Shannon Way
- A438 / A38 Tewkesbury Bypass
- A38 / Gupshill Close Rbt
- A38/Coombe Hill

Figure 49 - Corridor 5 – critical junctions



6.6.4 **Figure 50** documents the network performance during the AM and PM peak scenarios in terms of Ratios of Flow to Capacity for each junction. Within the corridors there are two sections which require mitigation - the A438 approach to M5 Junction 9 from Shannon Way,

and the A38 Coombe Hill junction. Both highway links experiencing congestion are related to accessing the M5. On the basis of change from the Do Nothing and the Do Minimum mitigation will need to be considered for the following junctions:

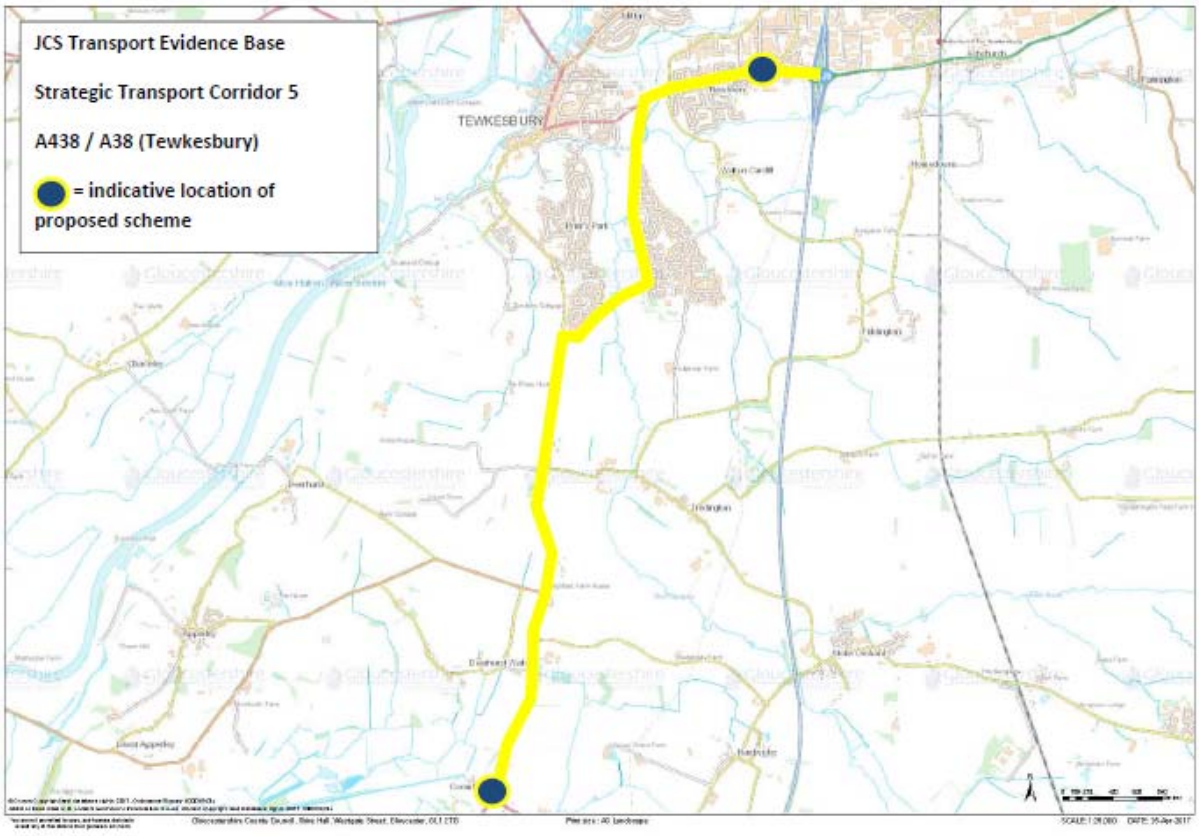
- M5 Junction 9 – approach from A438 Shannon Way
- A38 / A419 – Coombe Hill – approach from A38 towards M5 Junction 10

Figure 50 – Corridor 5 Ratios of Flow to Capacity – DN and DM

Junction Name	Ratios of Flow to Capacity			
	AM Peak		PM Peak	
	Do Nothing	Do Minimum	Do Nothing	Do Minimum
A438 / M5 Junction 9	96.9%	111.9%	101.8%	101.3%
A438 / Shannon Way	116.4%	117.1%	101.3%	104.4%
A438 / A38 Tewkesbury Bypass	96.9%	98.5%	91.1%	98.2%
A38 / Gupshill Close Rbt	40.6%	51.2%	52.2%	52.5%
A38/Coombe Hill	101.6%	115.0%	103.7%	108.3%

6.6.5 **Figure 51** illustrates the location of the mitigation measures outlined above.

Figure 51 - Corridor 5 – Location of mitigation measures



6.6.5 The preferred mitigation package for this corridor (intended to account for the capacity issues identified in **Figure 50** and other trip reassignment resulting from the JCS growth strategy and other network changes which impact travel demand within the corridor) includes:

- Shannon Way – Improvement to the A438/Shannon Way traffic signal junction to provide an additional eastbound exit lane from the junction to M5J9; separate left turn lane from A438 (west) to Shannon Way, with two straight ahead lanes eastbound

- A38 / A419 – Coombe Hill – signals optimisation

6.6.6 **Figure 51** summarises the impacts of the Do Something 7 Strategy.

Figure 51 – Corridor 5 Ratios of Flow to Capacity – DM and DS7

Junction Name	Ratios of Flow to Capacity			
	AM Peak		PM Peak	
	Do Minimum	Do Something 7	Do Minimum	Do Something 7
A438 / M5 Junction 9	111.9%	87.2%	101.3%	92.5%
A438 / Shannon Way	117.1%	103.9%	104.4%	103.5%
A438 / A38 Tewkesbury Bypass	98.5%	83.4%	98.2%	94.4%
A38 / Gupshill Close Rbt	51.2%	59.6%	52.5%	43.8%
A38/Coombe Hill	115.0%	91.9%	108.3%	106.8%

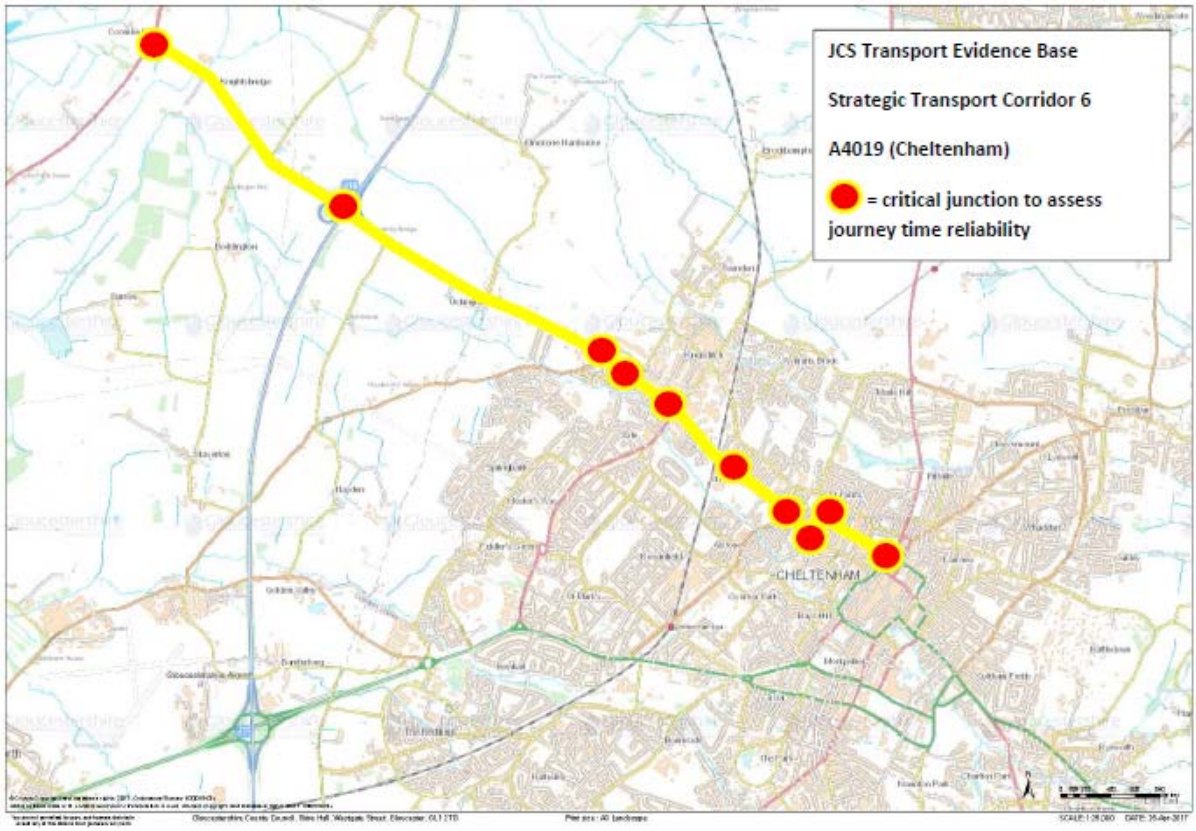
6.6.7 The outcome of these changes results in no significant delays within this corridor resulting from JCS allocations. Delays do remain, but additional signal optimisation at these junctions may result in further efficiencies at these junctions reducing the scale of delay experienced.

6.6.8 The expected impact on the 41/42 public transport corridor is expected to be minimal. If delays do persist then as part of the signal optimisation bus priority measures could be incorporated into the final scheme.

6.7 Corridor 6 - A4019 – Coombe Hill to A46 Albion Street / St Johns Avenue

6.7.1 Corridor 6 starts within Cheltenham Town Centre and continues to the A38 Coombe Hill junction to the west of M5 Junction 10. The largest of the JCS Strategic housing allocations at North West Cheltenham will have direct access onto this corridor. It also forms parts part of the strategic public transport corridor served by the 41/42 linking Tewkesbury with Cheltenham. The route forms part of the local highway network and is managed by Gloucestershire County Council.

6.7.2 Within Gloucestershire Local Transport Plan's Link and Place Spectrum (**Appendix B**) the route is classified as a primary link critical to the local economy. This section of highway has an average daily vehicle flow of over 10,000 to 30,000 vehicles (**Appendix C**). **Figure 52 - Corridor 6 – Critical Junctions**



6.7.3 **Figure 52** illustrates the location of those junctions considered critical to assess journey time reliability. Ten junctions have been identified:

- A4019 / North Place
- A4019 Swindon Rd / Poole Way Jct
- A4019 High St / Poole Way
- A4019 Tewkesbury Rd / B4633 Gloucester Road
- A4019 Tewkesbury Rd / Elm St
- A4019 Tewkesbury Rd / Princess Elizabeth Way
- A4019 Tewkesbury Rd / Hayden Rd
- A4019 Tewkesbury Rd / B4634 Old Gloucester Road

- M5/ A4019 (Junction 10)
- A4019 Tewkesbury Rd / A38 Coombe Hill

6.7.4 **Figure 53** documents the network performance during the AM and PM peak scenarios in terms of Ratios of Flow to Capacity for each junction. Within the corridors there are two junctions that operate over capacity including Coombe Hill which was discussed in **Section 6.6** and the A4019 Hayden Road/Manor Road Junction where capacity issues are linked to accessing Cheltenham Town Centre.

Figure 53 – Corridor 6 Ratios of Flow to Capacity – DN and DM

Junction Name	Ratios of Flow to Capacity			
	AM Peak		PM Peak	
	Do Nothing	Do Minimum	Do Nothing	Do Minimum
A4019 / North Place	81.5%	86.3%	68.8%	65.6%
A4019 Swindon Rd / Poole Way Jct	79.5%	80.8%	26.3%	24.8%
A4019 High St / Poole Way	55.5%	72.1%	60.7%	64.0%
A4019 Tewkesbury Rd / B4633 Gloucester Road	93.4%	94.3%	88.9%	98.7%
A4019 Tewkesbury Rd / Elm St	90.0%	96.0%	56.1%	83.8%
A4019 Tewkesbury Rd / Princess Elizabeth Way	81.3%	86.3%	77.6%	88.2%
A4019 Tewkesbury Rd / Hayden Rd	98.8%	116.6%	95.8%	93.7%
A4019 Tewkesbury Rd / B4634 Old Gloucester Road	73.6%	84.4%	77.1%	94.1%
M5/ A4019 (Junction 10)	89.5%	91.0%	76.9%	84.2%
A4019 Tewkesbury Rd / A38 Coombe Hill	101.6%	115.0%	103.7%	108.3%

6.7.5 A significant change to this corridor is required to provide access to the West of Cheltenham Strategic Allocation. The Do Something 6a scenario considered access to the south of the site via M5 Junction 11 and the A40 resulting in significant delays including issues with the M5 mainline. Converting junction 10 to an 'All movements' junction and providing access from the A4019 to the West of Cheltenham via a new distributor link road significantly reduces the impact of the site on the local network.

6.7.6 The preferred mitigation package for this corridor (intended to account for the capacity issues identified in **Figure 53** and other trip reassignment resulting from the JCS growth strategy and other network changes which impact travel demand within the corridor) includes:

- M5 J10 - 'All Movements' junction improvements (see corridor 1)
- New 50 mph dual carriageway two-lane link road, providing free-flow access from A4019 / M5 J10 to West of Cheltenham site only

- West of M5 J10 - Major/Minor Priority Junction on new 50 mph dual carriageway two-lane link road, with Minor junction arm for West of Cheltenham residential site access only
- West of M5 J10 - Change to highway priorities west of M5 J10, with a new Major/Minor Priority Junction, with A4019 (West) as Minor junction arm
- Withybridge Lane - Close access onto A4019
- A4019 / A4013 Kingsditch (Centrum Park) Roundabout – replacing existing roundabout with traffic signals
- New A4019 traffic signals site access junction, west of B4634 Old Gloucester Rd
- Revised A4019 traffic signals site access junction at B4634 Old Gloucester Rd / Gallagher Retail Park
- A4019 Tewkesbury Road corridor - Upgrade signals to SCOOT operation to optimise signal timings with bus priority along A4019 corridor junctions including
  - B4634 Old Gloucester Rd/A4019 Junction
  - Hayden Road/A4019/Manor Road Junction
  - A4019 / Elm Street Junction
  - B4633 Gloucester Rd / A4019 /Townsend Street

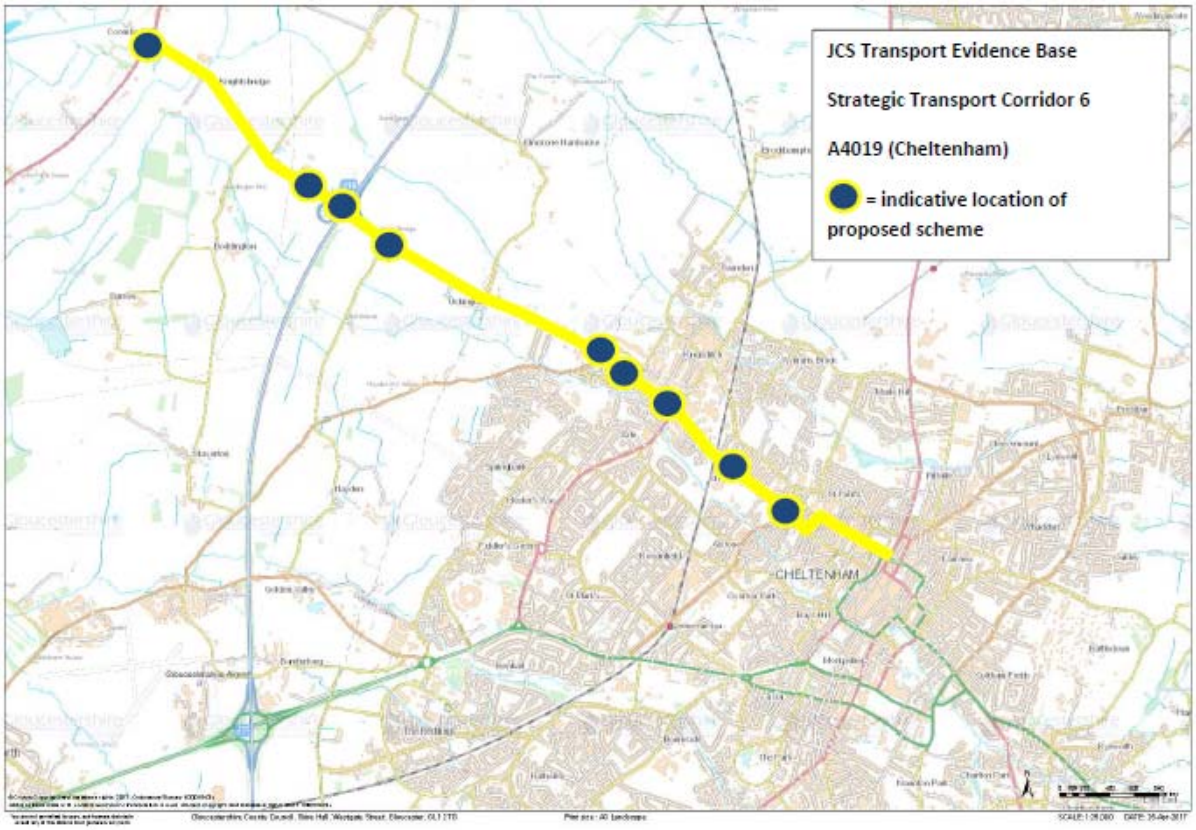
6.7.7 **Figure 54** illustrates the location of the mitigation measures outlined above.

6.7.8 **Figure 55** summarises the impacts of the Do Something 7 Strategy.

Figure 54 – Corridor 6 Ratios of Flow to Capacity – DM and DS7

Junction Name	Ratios of Flow to Capacity			
	AM Peak		PM Peak	
	Do Minimum	Do Something 7	Do Minimum	Do Something 7
A4019 / North Place	86.3%	74.7%	65.6%	62.2%
A4019 Swindon Rd / Poole Way Jct	80.8%	73.7%	24.8%	21.7%
A4019 High St / Poole Way	72.1%	51.9%	64.0%	62.4%
A4019 Tewkesbury Rd / B4633 Gloucester Road	94.3%	92.7%	98.7%	97.1%
A4019 Tewkesbury Rd / Elm St	96.0%	95.9%	83.8%	82.5%
A4019 Tewkesbury Rd / Princess Elizabeth Way	86.3%	93.9%	88.2%	95.6%
A4019 Tewkesbury Rd / Hayden Rd	116.6%	103.9%	93.7%	100.7%
A4019 Tewkesbury Rd / B4634 Old Gloucester Road	84.4%	100.8%	94.1%	95.2%
M5/ A4019 (Junction 10)	91.0%	96.8%	84.2%	93.9%
A4019 Tewkesbury Rd / A38 Coombe Hill	115.0%	91.9%	108.3%	106.8%

Figure 55 - Corridor 6 – Location of mitigation measures



6.7.9 The outcome of changes to M5 Junction 10 results in increased travel demand within the corridor. On the majority of the junctions in this corridor journey time delays have been minimised, however further efficiencies could be achieved through additional iterations of the layout designs for the following junctions: B4634 Old Gloucester Rd/A4019 Junction and Hayden.

6.8 Corridor 7 - A435 – Teddington Hands (A46) to A46 St. Margaret's Road / Fairview Road

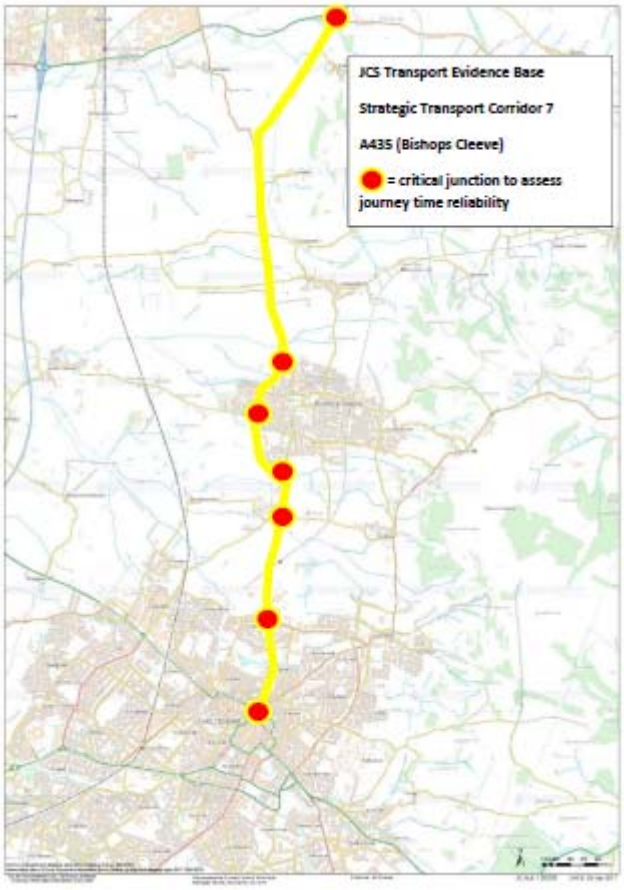
6.8.1 Corridor 7 starts within Cheltenham Town Centre and continues north to the A46 / A435 Teddington Hands roundabout. The corridor includes the link around Bishops Cleeve and along the A435 passing the racecourse. The route forms part of the local highway network and is managed by Gloucestershire County Council.

6.8.2 Within Gloucestershire Local Transport Plan's Link and Place Spectrum (**Appendix B**) the route is classified as a primary link critical to the local economy. This section of highway has an average daily vehicle flow of over 6,000 to 15,000 vehicles (**Appendix C**). .

6.8.3 **Figure 56** illustrates the location of those junctions considered critical to assess journey time reliability. Seven junctions have been identified:

- A435 St Margarets Rd / Fairview Rd Jct
- A435 Swindon Ln / B4075 Racecourse Rbt
- A435 / Hyde Ln / Southam Ln
- A435 / Cheltenham Rd Rbt (GE Aviation)
- A435 / Stoke Orchard Rd / Voxwell Ln Rbt
- A435 / Finlay Way Rbt
- A435 Teddington Hands Roundabout

Figure 56 - Corridor 7 – critical junctions



6.8.5 **Figure 57** documents the network performance during the AM and PM peak scenarios in terms of Ratios of Flow to Capacity for each junction. There are issues caused by the volume of vehicles using the A435 corridor and almost of all of the junctions require some form of mitigation to increase capacity. On the basis of change from the Do Nothing and the Do Minimum, improvements will need to be considered for the following junctions:

- A435 / Finlay Way Roundabouts – demand from A435 corridor
- A435/ Stoke Road - demand from Stoke Road
- A435/GE Aviation Roundabout – demand from A435 corridor
- A435 / Hyde Lane / Southam Lane Signalised Junction - demand from A435 northbound and Hyde Lane eastbound approaches
- A435 / Racecourse Roundabout – demand from A435 southbound and Swindon Lane eastbound approaches

Figure 57 – Corridor 7 Ratios of Flow to Capacity – DN and DM

Junction Name	Ratios of Flow to Capacity			
	AM Peak		PM Peak	
	Do Nothing	Do Minimum	Do Nothing	Do Minimum
A435 St Margaret's Rd / Fairview Rd Jct	86.2%	91.0%	93.2%	93.8%
A435 Swindon Ln / B4075 Racecourse Rbt	91.5%	100.7%	81.7%	90.9%
A435 / Hyde Ln / Southam Ln	64.2%	82.0%	82.7%	90.7%
A435 / Cheltenham Rd Rbt (GE Aviation)	68.6%	101.4%	94.8%	104.4%
A435 / Stoke Orchard Rd / Voxwell Ln Rbt	84.6%	102.9%	94.3%	103.1%
A435 / Finlay Way Rbt	76.0%	102.2%	88.0%	101.0%
A435 Teddington Hands Roundabout	60.1%	69.0%	56.3%	59.3%

6.8.6 The preferred mitigation package for this corridor (intended to account for the capacity issues identified in **Figure 57** and other trip reassignment resulting from the JCS growth strategy and other network changes which impact travel demand within the corridor) includes:

- A435/ Stoke Road and A435 / Finlay Way Roundabouts - Capacity Improvements by approach arm widening;
- A435/GE Aviation Roundabout - Capacity Improvements by increasing the number of circulatory lanes to 2, and the A435 south bound exit to two lanes;
- A435 / Hyde Lane / Southam Lane Signalised Junction - Signalised Junction -Upgraded to provide additional straight ahead lanes on all junction approaches;
- A435 / Racecourse Roundabout - Capacity Improvements by approach arm widening.

6.8.7 **Figure 58** illustrates the location of the mitigation measures outlined above.

6.8.8 **Figure 59** summarises the impacts of the Do Something 7 Strategy.

Figure 58 - Corridor 7 – Location of mitigation measures

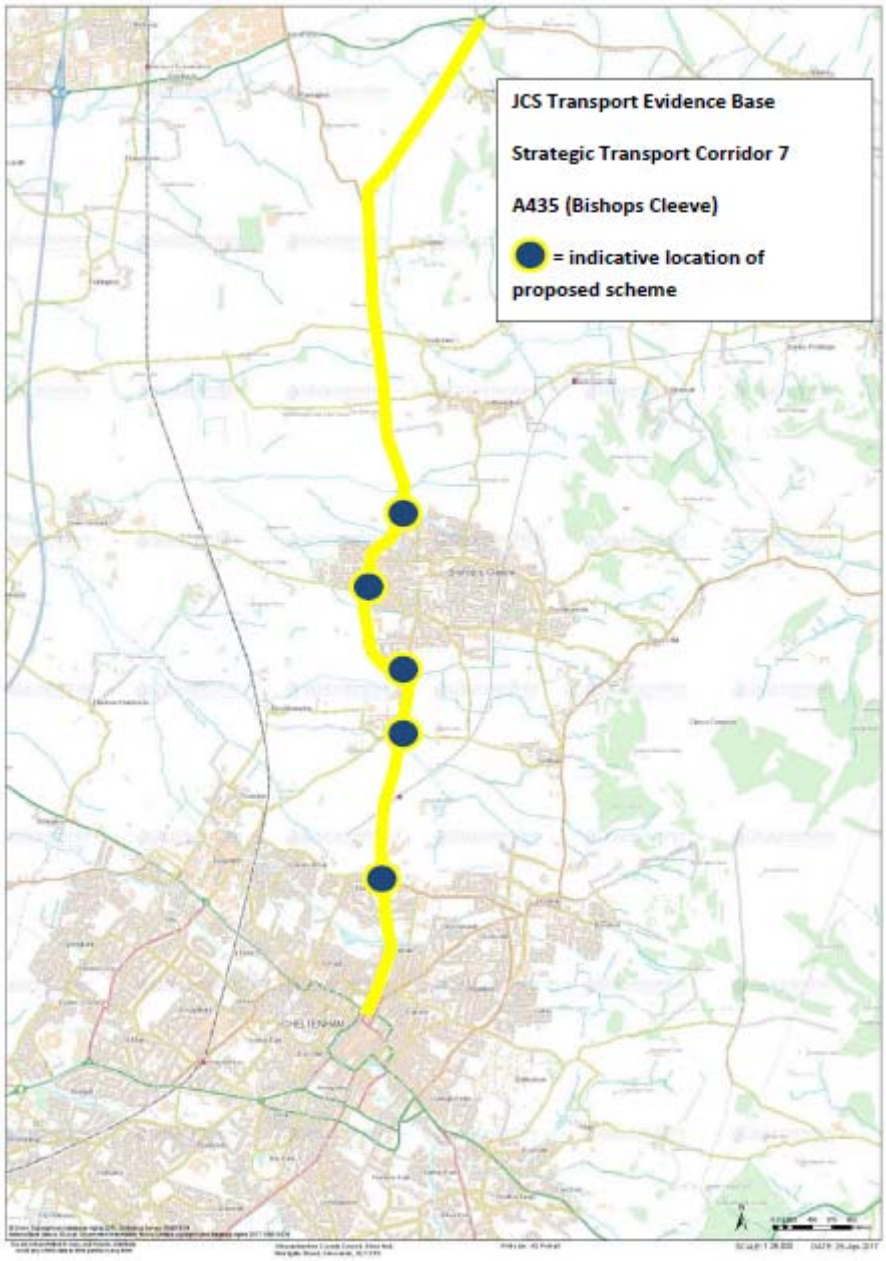


Figure 59 – Corridor 7 Ratios of Flow to Capacity – DM and DS7

Junction Name	Ratios of Flow to Capacity			
	AM Peak		PM Peak	
	Do Minimum	Do Something 7	Do Minimum	Do Something 7
A435 St Margaret's Rd / Fairview Rd Jct	91.0%	85.5%	93.8%	94.2%
A435 Swindon Ln / B4075 Racecourse Rbt	100.7%	77.0%	90.9%	94.5%
A435 / Hyde Ln / Southam Ln	82.0%	64.3%	90.7%	83.4%
A435 / Cheltenham Rd Rbt (GE Aviation)	101.4%	61.5%	104.4%	83.5%
A435 / Stoke Orchard Rd / Voxwell Ln Rbt	102.9%	70.7%	103.1%	89.2%
A435 / Finlay Way Rbt	102.2%	69.3%	101.0%	79.4%
A435 Teddington Hands Roundabout	69.0%	50.7%	59.3%	59.1%

6.8.9 The outcome of these changes, and the wider area impact of the new A46 Ashchurch off-line bypass, has resulted in no delays reported within this corridor (from the JCS allocations). The new A46 off-line improvement reduces non-local vehicle flows from the corridor demand which will have positive impact on bus service time reliability and improve the quality of the environment for cycling along this important local corridor.

6.9 Corridor 8 - A40 – M5 Junction 11 to A435 London Road

6.9.1 Corridor 8 starts at M5 Junction 11 and flows eastwards via the A40 through Cheltenham Town Centre. The corridor has the highest vehicle flows on the local highway network and accesses several major employers in the JCS area. It also forms part of the main public transport corridor linking Cheltenham and Gloucester and provides access to Arle Court Park and Ride. The route is managed by Gloucestershire County Council.

6.9.2 Within Gloucestershire Local Transport Plan's Link and Place Spectrum (**Appendix B**) the route is classified as a primary link critical to the local economy. This section of highway has an average daily vehicle flow of over 10,000 to 50,000 vehicles (**Appendix C**). .

6.9.3 **Figure 60** illustrates the location of those junctions considered critical to assess journey time reliability. Nine junctions have been identified and they include:

- M5/ A40 (Junction 11)
- A40/ B4063 Roundabout Arle Court
- A40/ Princess Elizabeth Way Roundabout
- A40 Lansdown Rd / B4633 Gloucester Rd
- A40 / Hatherley Rd
- A40 / Queen's Rd
- A40 Suffolk Rd / Bath Road
- A40 Thirlestaine Rd / Old Bath Rd Mini Rbt
- A40 London Rd / Hales Road

6.9.4 **Figure 61** documents the network performance during the AM and PM peak scenarios in terms of Ratios of Flow to Capacity for each junction. Within the Do Something 7 scenario it should be noted that the primary access to the West of Cheltenham site is provided via M5 Junction 10 with an expanded Park and Walk facility provided at the Arle Court Park and Ride site. Providing access via Junction 10 does have a significant impact on vehicle flows using this corridor resulting in fewer junctions reporting vehicle delay issues. On the basis of change from the Do Nothing and the Do Minimum mitigation will need to be considered for the following junctions:

- A40 Arle Court – demand from A40 eastbound and B4063 eastbound with traffic being blocked due to increased demand when accessing the West of Cheltenham site
- A40/ B4633 Gloucester Road – demand from B4633 Gloucester Road southbound approach

Figure 60 - Corridor 8 – critical junctions

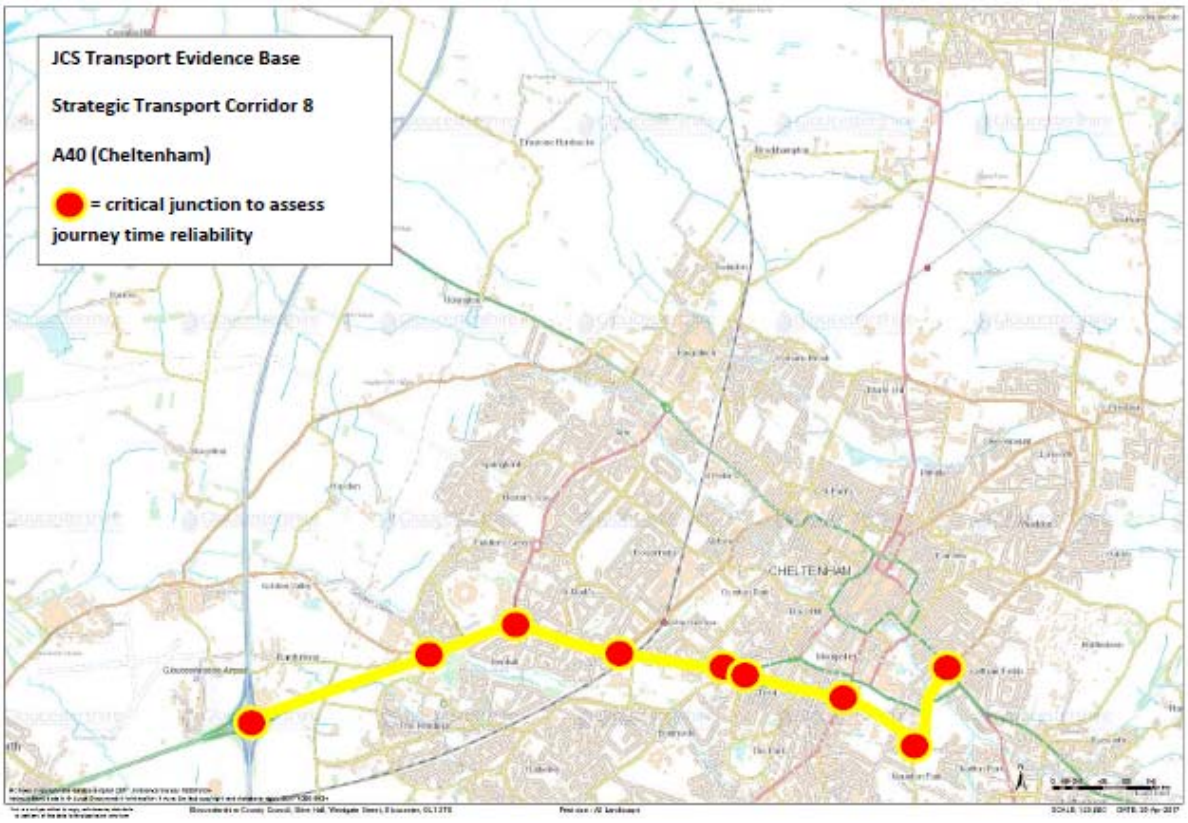


Figure 61 – Corridor 8 Ratios of Flow to Capacity – DN and DM

Junction Name	Ratios of Flow to Capacity			
	AM Peak		PM Peak	
	Do Nothing	Do Minimum	Do Nothing	Do Minimum
M5/ A40 (Junction 11)	89.2%	93.7%	75.4%	92.0%
A40/ B4063 Roundabout Arle Court	112.1%	184.7%	98.6%	111.3%
A40/ Princess Elizabeth Way Roundabout	64.5%	99.1%	83.6%	92.6%
A40 Lansdown Rd / B4633 Gloucester Rd	95.9%	100.0%	99.1%	100.9%
A40 / Hatherley Rd	73.6%	92.6%	81.1%	84.1%
A40 / Queen's Rd	34.4%	32.5%	41.0%	43.0%
A40 Suffolk Rd / Bath Road	64.8%	95.4%	66.2%	70.2%
A40 Thirlestaine Rd / Old Bath Rd Mini Rbt	40.8%	53.4%	31.1%	35.6%
A40 London Rd / Hales Road	97.7%	97.4%	102.2%	102.1%

6.9.5 The preferred mitigation package for this corridor (intended to account for the capacity issues identified in **Figure 61** and other trip reassignment resulting from the JCS growth strategy and other network changes which impact travel demand within the corridor) includes:

- Arle Court Park and Ride - Expansion of existing Arle Court P&R parking facilities (100% Increase in Capacity), and new walking and cycling improvements to link P&R site with the new West of Cheltenham Employment site;
- A40 Arle Court Roundabout - New signalised junction on the A40 to the west of Arle Court roundabout to provide access into Park and Ride site only. With left turn out and right turn in only. This will not allow through traffic into Hatherley Lane.

Figure 62 – Corridor 8 – Location of mitigation measures

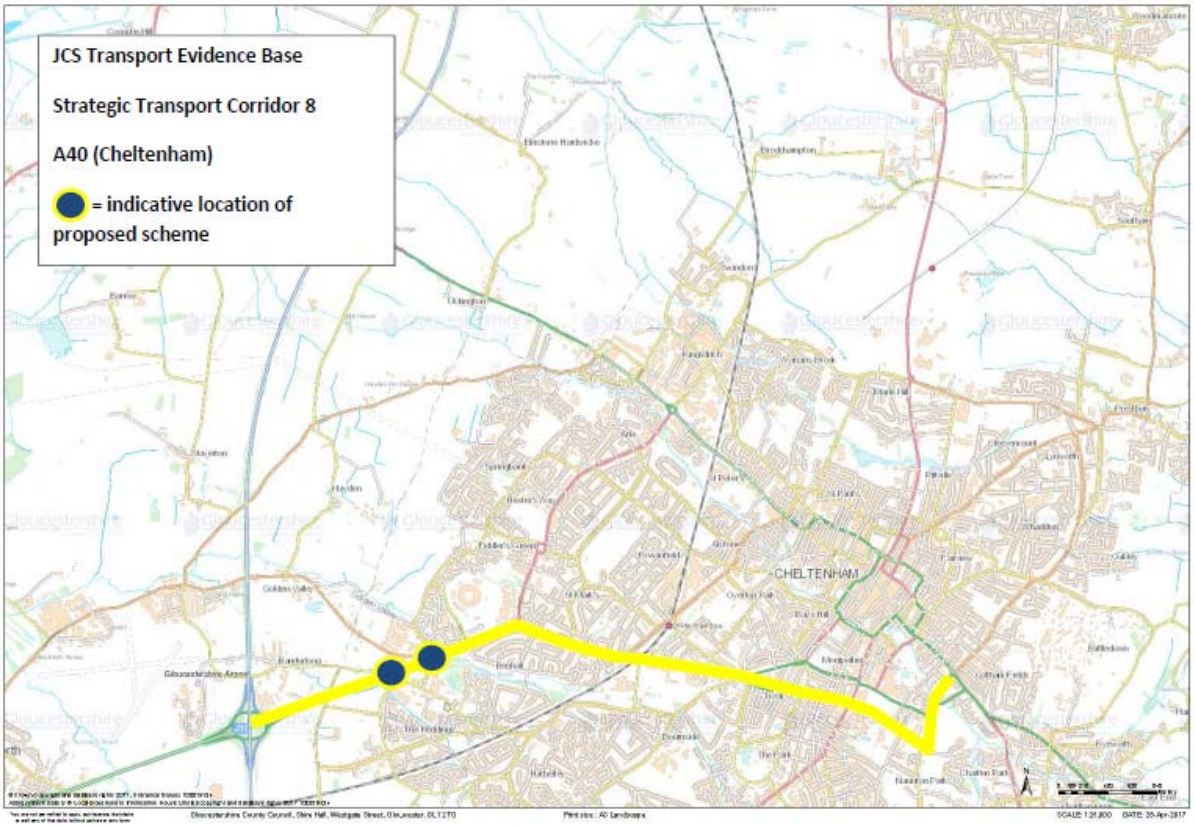


Figure 63 – Corridor 8 Ratios of Flow to Capacity – DM and DS7

Junction Name	Ratios of Flow to Capacity			
	AM Peak		PM Peak	
	Do Minimum	Do Something	Do Minimum	Do Something
M5/ A40 (Junction 11)	93.7%	99.6%	92.0%	93.8%
A40/ B4063 Roundabout Arle Court	184.7%	105.4%	111.3%	102.2%
A40/ Princess Elizabeth Way Roundabout	99.1%	66.5%	92.6%	79.2%
A40 Lansdown Rd / B4633 Gloucester Rd	100.0%	89.1%	100.9%	98.1%
A40 / Hatherley Rd	92.6%	75.0%	84.1%	80.4%
A40 / Queen's Rd	32.5%	35.3%	43.0%	39.5%
A40 Suffolk Rd / Bath Road	95.4%	68.2%	70.2%	59.6%
A40 Thirlestaine Rd / Old Bath Rd Mini Rbt	53.4%	44.3%	35.6%	31.7%
A40 London Rd / Hales Road	97.4%	97.9%	102.1%	100.2%

6.9.6 **Figure 62** illustrates the location of the mitigation measures outlined above.

6.9.7 **Figure 63** summarises the impacts of the Do Something 7 Strategy.

6.9.8 The outcome of these changes has minimised the sizeable increase in demand using this route when compared to the Do Minimum scenario. This has been achieved by altering the access arrangements into the west of Cheltenham site from M5 Junction 10, and the expansion of Park and Ride primarily for employees working at the West of Cheltenham site.

6.9.9 These changes will benefit all modes of travel within the corridor. Some further bus priority measures may be required at pinch points along the route to ensure service time reliability, but this will require more detailed modelling and design work to finalise the scale and type of improvements required.

6.10 Corridor 9 - A46 – Bath Road (central Cheltenham) to A417 junction

6.10.1 Corridor 9 starts at A46 junction with the A417 at Brockworth and heads northwards along the A46 through Shurdington to the Bath Road/Oriel Road junction in Cheltenham Town Centre. The route is a strategic public transport corridor serving Cheltenham and Gloucester with the high frequency 10 service. The route forms part of the local highway network and is managed by Gloucestershire County Council.

6.10.2 Within Gloucestershire Local Transport Plan's Link and Place Spectrum (**Appendix B**) the route is classified as a primary link critical to the local economy. This section of highway has an average daily vehicle flow of over 15,000 to 20,000 vehicles (**Appendix C**). .

6.10.3 **Figure 64** illustrates the location of those junctions considered critical to assess journey time reliability. Nine junctions have been identified and they include:

- A46 / A417 Shurdington Rd Rbt
- A46 / Badgeworth Lane
- A46 Shurdington Rd / Leckhampton Lane
- A46 Shurdington / Up Hatherley Way
- A46 Shurdington Rd / Moorend Park Rd
- A46 Shurdington Rd / Bath Rd Rbt
- A46 Bath Rd / Thirlestaine Rd
- A46 Bath Rd / Sandford Rd
- A46 Bath Rd /Oriel Road

6.10.4 **Figure 65** documents the network performance during the AM and PM peak scenarios in terms of Ratios of Flow to Capacity for each junction. There are issues with the A417 Brockworth Bypass and the Badgeworth Lane junction caused by vehicles rerouting to avoid delays elsewhere on the network. On the basis of change from the Do Nothing and the Do Minimum mitigation will need to be considered for the following junctions:

- A46 Badgeworth Lane junction – demand from Badgeworth Lane;
- A417 Brockworth Bypass – A46 southbound (Shurdington) and A417 eastbound off slip.

Figure 64 - Corridor 9 – critical junctions

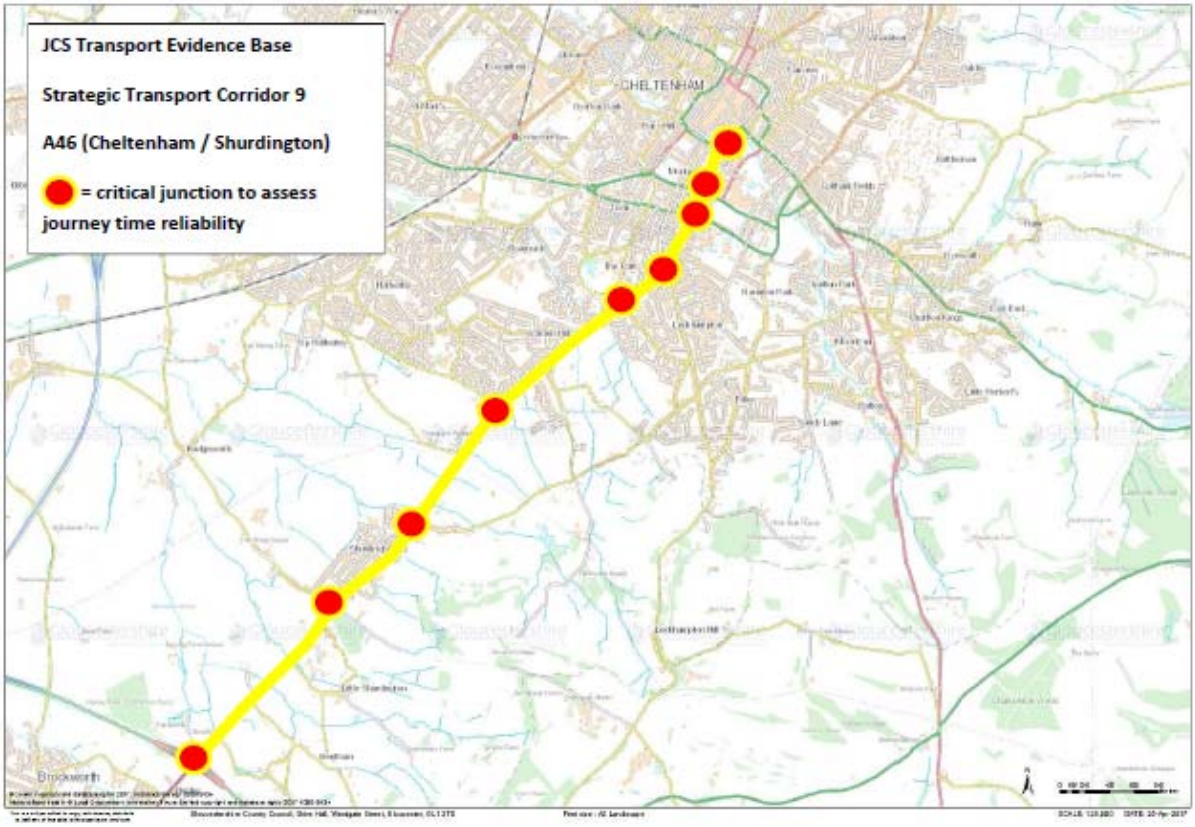


Figure 65 – Corridor 9 Ratios of Flow to Capacity – DN and DM

Junction Name	Ratios of Flow to Capacity			
	AM Peak		PM Peak	
	Do Nothing	Do Minimum	Do Nothing	Do Minimum
A46 / A417 Shurdington Rd Rbt	100.5%	107.7%	88.9%	101.2%
A46 / Badgeworth Lane	120.5%	120.8%	71.5%	93.4%
A46 Shurdington Rd / Leckhampton Lane	100.3%	87.6%	99.3%	99.8%
A46 Shurdington / Up Hatherley Way	74.3%	93.9%	60.3%	72.8%
A46 Shurdington Rd / Moorend Park Rd	94.8%	97.4%	64.9%	79.6%
A46 Shurdington Rd / Bath Rd Rbt	45.6%	41.0%	52.5%	57.3%
A46 Bath Rd / Thirlestaine Rd	80.0%	95.5%	78.4%	84.8%
A46 Bath Rd / Sandford Rd	87.2%	89.5%	83.3%	87.3%
A46 Bath Rd /Oriel Road	46.6%	53.8%	36.9%	35.3%

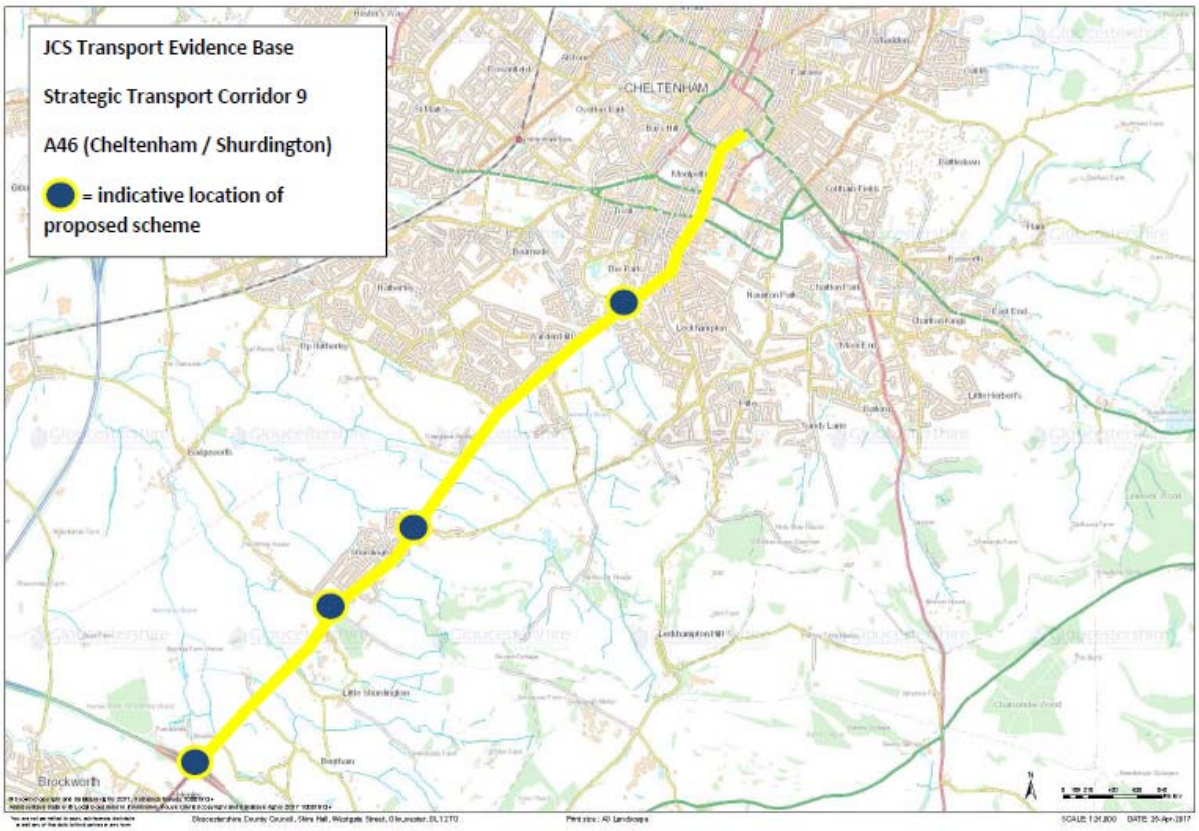
6.10.5 The preferred mitigation package for this corridor (intended to account for the capacity issues identified in **Figure 65** and other trip reassignment resulting from the JCS growth

strategy and other network changes which impact travel demand within the corridor) includes:

- Leckhampton Lane - upgrade A46 / Leckhampton Lane priority junction, to include a dedicated right turn from A46 south into Leckhampton Lane;
- Moorend Park Road - A46 Shurdington Road northbound approach to Moorend Park Road – additional highway space for right turning traffic by providing a longer stacking lane;
- Badgeworth Lane - A46 / Badgeworth Lane priority Junction – Signalisation of junction to provide improved access to/from Badgeworth.

6.10.6 **Figure 66** illustrates the location of the mitigation measures outlined above.

Figure 66 - Corridor 9 – Location of mitigation measures



6.10.7 **Figure 67** summarises the impacts of the Do Something 7 Strategy.

Figure 67 – Corridor 9 Ratios of Flow to Capacity – DM and DS7

Junction Name	Ratios of Flow to Capacity			
	AM Peak		PM Peak	
	Do Minimum	Do Something 7	Do Minimum	Do Something 7
A46 / A417 Shurdington Rd Rbt	107.7%	104.0%	101.2%	102.9%
A46 / Badgeworth Lane	120.8%	102.0%	93.4%	99.2%
A46 Shurdington Rd / Leckhampton Lane	87.6%	76.2%	99.8%	100.7%
A46 Shurdington / Up Hatherley Way	93.9%	70.0%	72.8%	68.9%
A46 Shurdington Rd / Moorend Park Rd	97.4%	91.5%	79.6%	88.8%
A46 Shurdington Rd / Bath Rd Rbt	41.0%	39.5%	57.3%	56.9%
A46 Bath Rd / Thirlestaine Rd	95.5%	77.2%	84.8%	78.1%
A46 Bath Rd / Sandford Rd	89.5%	82.2%	87.3%	83.4%
A46 Bath Rd /Oriel Road	53.8%	43.6%	35.3%	31.4%

6.10.8 The outcome of these changes resolves delays along the Shurdington Road corridor. There remain minor issues during both peaks for the A417 / A46 junction at both A46 approaches. Possible signalisation of these approaches may mitigate the scale of delay predicted by the model.

6.10.9 The improvements will significantly benefit public transport specifically the operation of the 10 service within the A46 corridor by reducing the risk of journey time uncertainty.

6.11 Corridor 10 - A40 / A417 / A38 – Elmbridge Court Rbt to A430 Cole Avenue junction

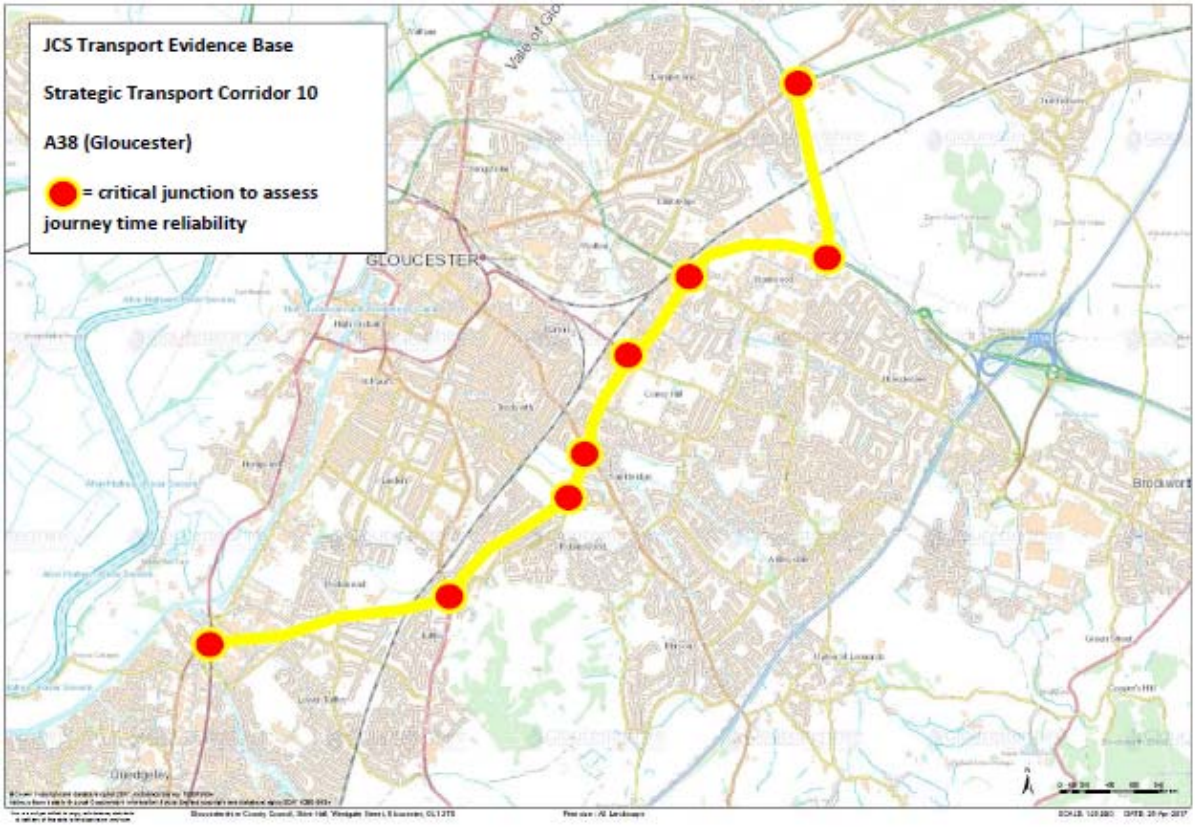
6.11.1 Corridor 10 starts at A38/A430 junction at Cole Avenue it then follows Gloucester's southern and eastern bypass before linking into the Elmbridge Court Roundabout on the A40 and access to M5 Junction 11. The route records some of the highest non-strategic vehicle flows in the county and forms part of the local highway network. It is managed by Gloucestershire County Council and suffers from heavy peak hour vehicle flows resulting in congestion.

6.11.2 Within Gloucestershire Local Transport Plan's Link and Place Spectrum (**Appendix B**) the route is classified as a primary link critical to the local economy. This section of highway has an average daily vehicle flow of over 20,000 to 50,000 vehicles (**Appendix C**). .

6.11.3 **Figure 68** illustrates the location of those junctions considered critical to assess journey time reliability. Eight junctions have been identified and they include:

- A38 / A430 Cole Avenue
- St Barnabas Roundabout
- A38 Finlay Rd / Tredworth Roundabout
- A38 Eastern Ave / B4073 Painswick Roundabout
- A38 Eastern Ave / Metz Way Signals
- A38 Walls Roundabout
- A38 / A417 C&G Roundabout
- A417 / A40 Elmbridge Ct Roundabout

Figure 68 - Corridor 10 – critical junctions



6.11.4 **Figure 69** documents the network performance during the AM and PM peak scenarios in terms of Ratios of Flow to Capacity for each junction. Due to the number of interactions with other routes accessing parts of the city there are a number of congestion issues which due to the close proximity of junctions cause wide spread delays due to vehicles backing up from one junction impacting another. On the basis of change from the Do Nothing and the Do Minimum, mitigation will need to be considered for the following junctions:

- A40 / A417 C&G roundabout – demand from Barnett Way (Barnwood Business Park)
- A38 / Walls roundabout – demand northbound from Eastern Avenue;
- A38 / A4173 St. Barnabas roundabout – demand from all approaches;
- A38 / A430 / B4008 –Cole Avenue – demand from Quedgeley.

Figure 69 – Corridor 10 Ratios of Flow to Capacity – DN and DM

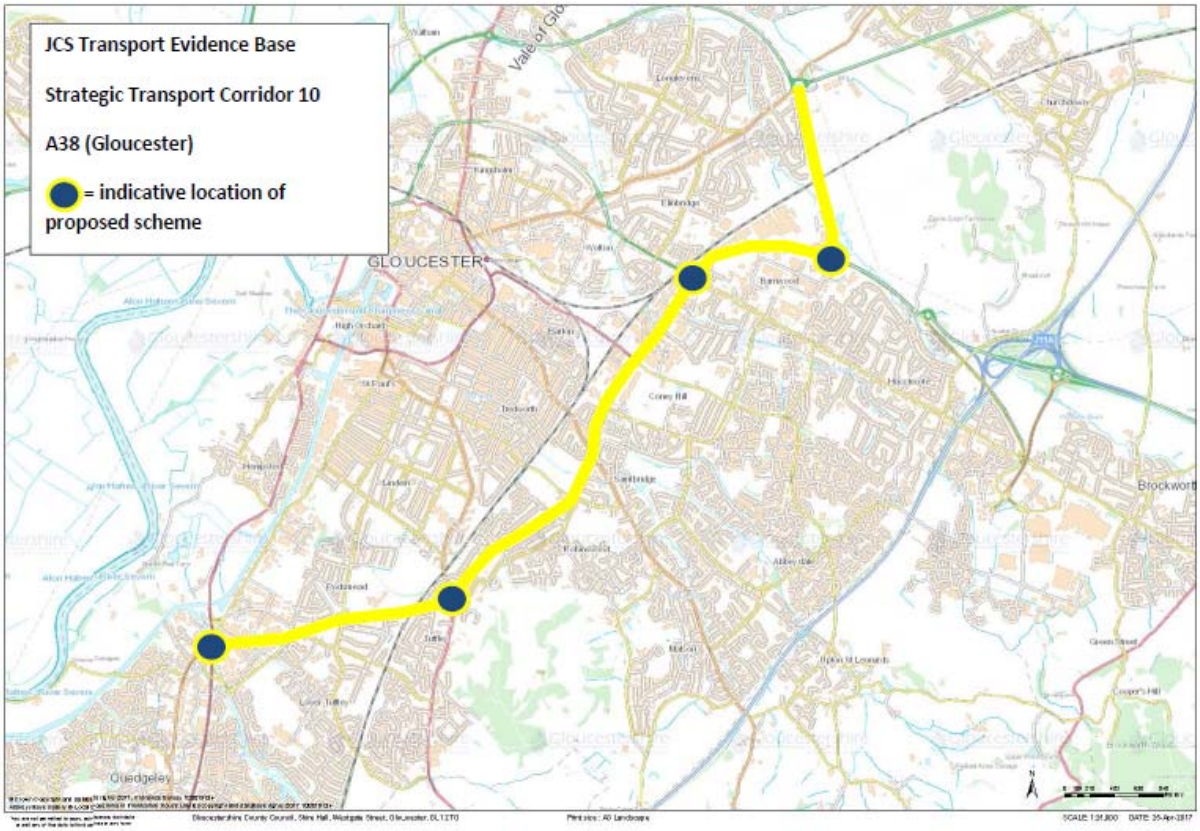
Junction Name	Ratios of Flow to Capacity			
	AM Peak		PM Peak	
	Do Nothing	Do Minimum	Do Nothing	Do Minimum
A38 / A430 Cole Avenue	123.3%	123.9%	114.3%	111.5%
St Barnabas Roundabout	65.1%	65.3%	96.0%	100.3%
A38 Finlay Rd / Tredworth Rbt	88.5%	103.4%	92.0%	94.9%
A38 Eastern Ave / B4073 Painswick Rbt	80.8%	104.8%	82.6%	82.5%
A38 Eastern Ave / Metz Way Signals	96.8%	102.3%	102.3%	103.4%
A38 Walls Rbt	112.8%	126.3%	104.8%	109.3%
A38 / A417 C&G Rbt	83.0%	97.0%	109.0%	110.1%
A417 / A40 Elmbridge Ct Rbt	120.6%	173.1%	107.9%	110.2%

6.11.5 The preferred mitigation package for this corridor (intended to account for the capacity issues identified in **Figure 69** and other trip reassignment resulting from the JCS growth strategy and other network changes which impact travel demand within the corridor) includes:

- A40 / A417 C&G roundabout - A40 / A417 C&G roundabout –provision of a 'free left turn lane' from the A40 Barnwood Link approach arm to A417 Barnwood Bypass, and from A417 Corinium Avenue approach arm to A40 Barnwood Link;
- A38 / Walls roundabout - Capacity Improvement on 2014 Pinch Point Scheme, by providing 3 lane circulatory on the roundabout between Barnwood Rd / A38 Eastern Avenue approaches;
- A38 / A4173 St. Barnabas roundabout - Remove roundabout and signalising junction (with removal of Reservoir Rd approach arm);
- A38 / A430 / B4008 Cole Avenue Junction - Grade separation to allow straight through movement of north / south traffic on A38 Southern Connector/A430 corridor.

6.11.6 **Figure 70** illustrates the location of the mitigation measures outlined above.

Figure 70 - Corridor 10 – Location of mitigation measures



6.11.7 **Figure 71** summarises the impacts of the Do Something 7 Strategy.

Figure 71 – Corridor 10 Ratios of Flow to Capacity – DM and DS7

Junction Name	Ratios of Flow to Capacity			
	AM Peak		PM Peak	
	Do Minimum	Do Something 7	Do Minimum	Do Something 7
A38 / A430 Cole Avenue	123.9%	106.6%	111.5%	112.9%
St Barnabas Roundabout	65.3%	103.7%	100.3%	101.6%
A38 Finlay Rd / Tredworth Rbt	103.4%	98.9%	94.9%	101.1%
A38 Eastern Ave / B4073 Painswick Rbt	104.8%	79.5%	82.5%	96.3%
A38 Eastern Ave / Metz Way Signals	102.3%	88.4%	103.4%	101.9%
A38 Walls Rbt	126.3%	107.9%	109.3%	103.7%
A38 / A417 C&G Rbt	97.0%	88.1%	110.1%	103.4%
A417 / A40 Elmbridge Ct Rbt	173.1%	100.0%	110.2%	102.1%

6.11.8 The outcome of these changes reduces the extent of many of the delays, but the route remains highly trafficked and as a result will be prone to congestion during peak times. There remain issues with St. Barnabas roundabout due to the volume of traffic and the

limited scope for physical infrastructure improvements. Issues also remain at Cole Avenue junction which would be resolved with through more detailed signal redesign.

6.12 Corridor 11 - A40 / A430 / A38 – Over Roundabout to Cross Keys Roundabout

6.12.1 Corridor 11 starts at A38/A430 junction at Cole Avenue. It then follows Gloucester's South West bypass before linking into the Over Roundabout on the A40 and access to the Forest of Dean. The route records high levels of strategic vehicle flows as it provides one of the primary links into the Forest of Dean from the M5 and Gloucester. The corridor forms part of the local highway network and is managed by Gloucestershire County Council. It should be noted that the scheme to widen the South West Bypass at Llanthony Priory was included within the Do Minimum scenario and removal of this pinch point has impacted vehicle flows through the route.

6.12.2 Within Gloucestershire Local Transport Plan's Link and Place Spectrum (**Appendix B**) the route is classified as a primary link critical to the local economy. This section of highway has an average daily vehicle flow of over 20,000 to 50,000 vehicles (**Appendix C**). .

6.12.3 **Figure 72** illustrates the location of those junctions considered critical to assess journey time reliability. Seven junctions have been identified and they include:

- Cross Keys Roundabout
- A38 Waterwells Roundabout
- A38 Kingsway
- A38 / A430 Cole Avenue
- A430 Hempsted Ln / St Ann Way Jct
- A430 Castle Meads Way / A417 Over Causeway Jct
- Over Roundabout

6.12.4 **Figure 73** documents the network performance during the AM and PM peak scenarios in terms of Ratios of Flow to Capacity for each junction. Due to the high levels of vehicles flows there are a number of congestion issues throughout the corridor but these are not directly related to the impacts of JCS growth, withseveral of the junctions recording Ratios of Flow to Capacity greater than 100% in the 'Do Nothing' scenario. On the basis of change from the Do Nothing and the Do Minimum, mitigation will need to be considered for the following junctions:

- A38 Crosskeys Roundabouts
- A38 / A430 / B4008 –Cole Avenue – demand from Quedgeley
- A430/A417 Castlemeads
- A40 / A417 Over Roundabout -demand from the A417 northern approach (Maisemore)

Figure 72 - Corridor 11 – critical junctions

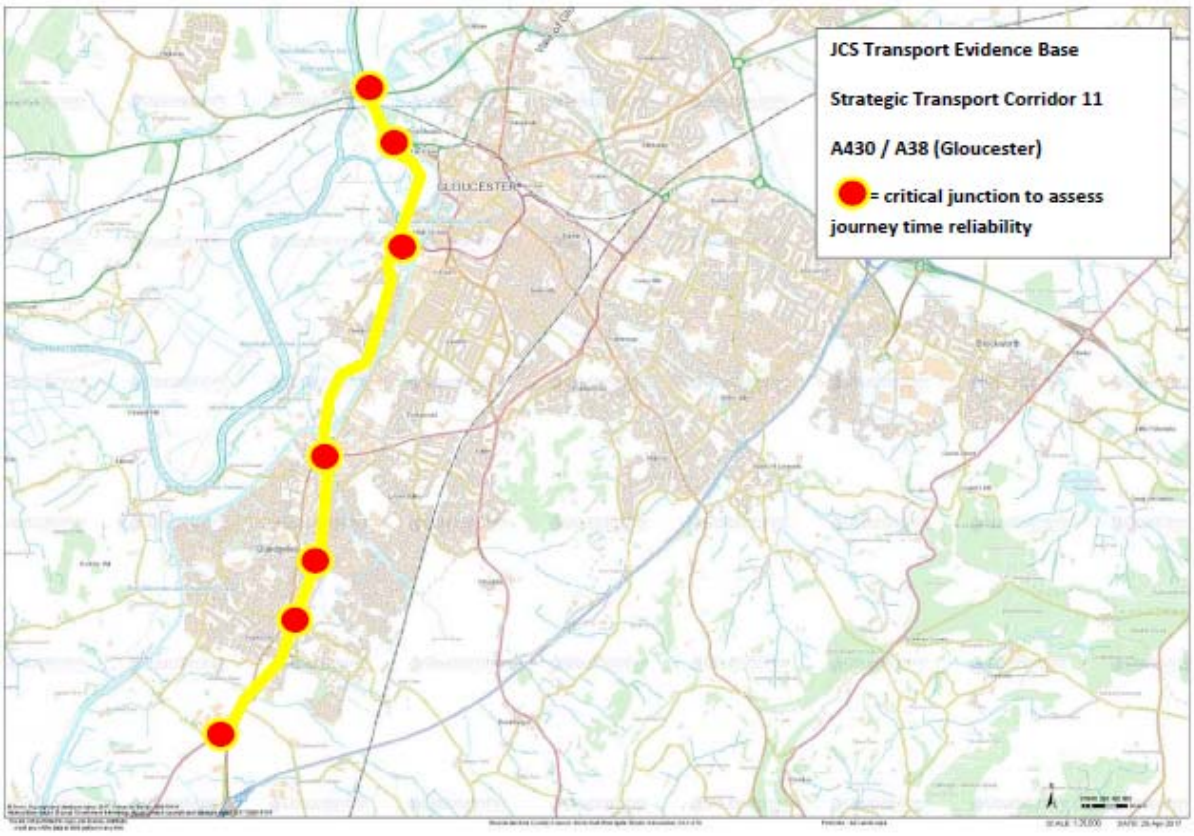


Figure 73 – Corridor 11 Ratios of Flow to Capacity – DN and DM

Junction Name	Ratios of Flow to Capacity			
	AM Peak		PM Peak	
	Do Nothing	Do Minimum	Do Nothing	Do Minimum
Cross Keys Roundabout	123.3%	123.3%	123.3%	123.3%
A38 Waterwells Roundabout	73.0%	70.7%	74.5%	69.2%
A38 Kingsway	115.8%	115.0%	128.2%	124.6%
A38 / A430 Cole Avenue	123.3%	123.9%	114.3%	111.5%
A430 Hempsted Ln / St Ann Way Jct	110.7%	106.1%	101.3%	87.2%
A430 Castle Meads Way / A417 Over Causeway Jct	109.1%	108.5%	130.8%	127.5%
Over Roundabout	115.3%	117.0%	124.6%	118.6%

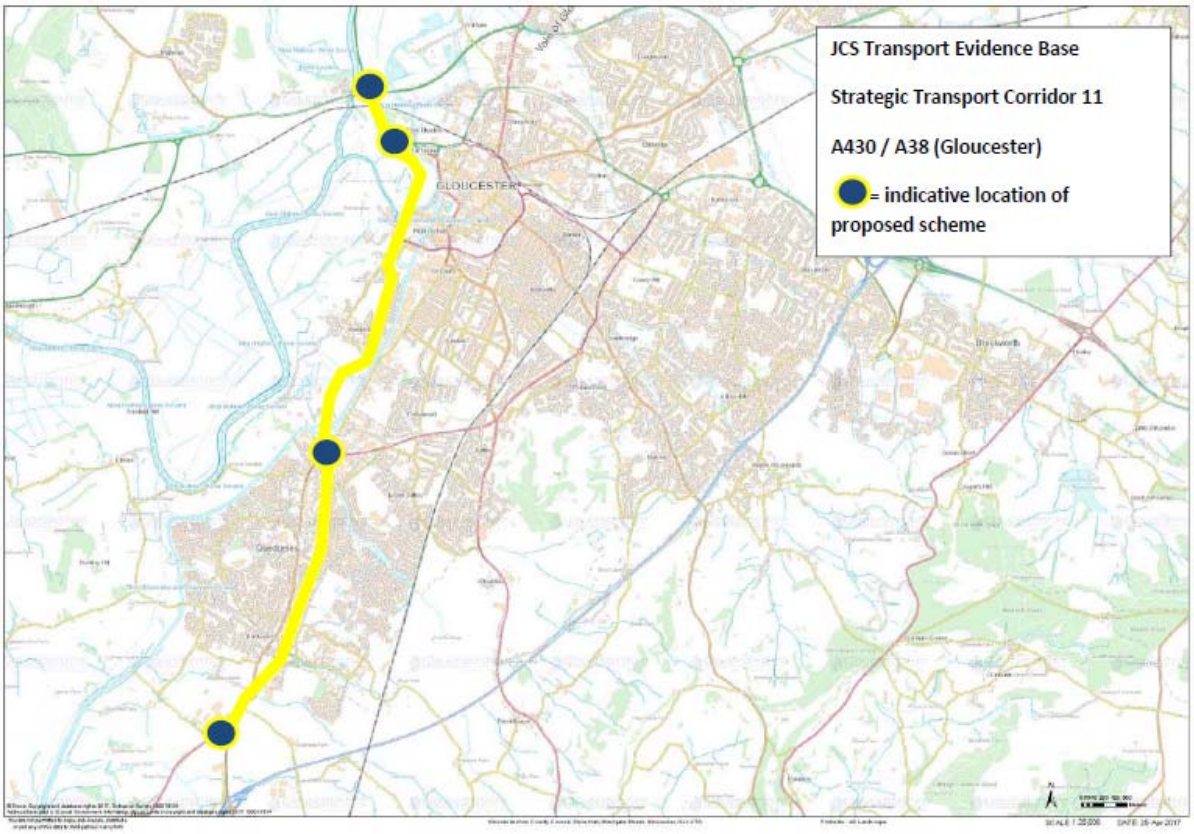
6.12.5 The preferred mitigation package for this corridor (intended to account for the capacity issues identified in **Figure 73** and other trip reassignment resulting from the JCS growth strategy and other network changes which impact travel demand within the corridor) includes:

- A38 / A430 / B4008 Cole Avenue Junction - Grade separation to allow straight through movement of north / south traffic on A38 Southern Connector/A430 corridor;

- A40 Over Roundabout - Add a dedicated left slip from A40 east to the south towards Gloucester;
- A40 / A417 Over Roundabout, A430/A417 Castlemeads, A38 Crosskeys Roundabouts - upgrade signals to MOVA or SCOOT operation to optimise signal timings.

6.12.6 **Figure 74** illustrates the location of the mitigation measures outlined above.

Figure 74 - Corridor 11 – Location of mitigation measures



6.12.7 **Figure 75** summarises the impacts of the Do Something 7 Strategy.

- **Figure 75 – Corridor 11 Ratios of Flow to Capacity – DM and DS7**

Junction Name	Ratios of Flow to Capacity			
	AM Peak		PM Peak	
	Do Minimum	Do Something 7	Do Minimum	Do Something 7
Cross Keys Roundabout	123.3%	117.5%	123.3%	113.4%
A38 Waterwells Roundabout	70.7%	69.1%	69.2%	71.3%
A38 Kingsway	115.0%	106.9%	124.6%	117.5%
A38 / A430 Cole Avenue	123.9%	106.6%	111.5%	112.9%
A430 Hempsted Ln / St Ann Way Jct	106.1%	103.7%	87.2%	90.0%
A430 Castle Meads Way / A417 Over Causeway Jct	108.5%	104.2%	127.5%	125.7%
Over Roundabout	117.0%	117.8%	118.6%	120.7%

6.12.8 The outcome of these changes reduces the scale of delays, but it does not remove it from occurring during peak times. The routes remains highly trafficked and as a result will be prone to congestion during peak times. There remain issues with several of the junctions and through further detailed junction modelling and iterative signal plan redesign it is considered probable that increased efficiencies would be achievable within this corridor.

7.0 The JCS Mitigation Package

7.1 Based on the technical highways weekday peak hour modelling outputs provided by the 2013 CSV SATURN base year model, the Do Something 7 scenario represents an effective and viable transport strategy to successfully support the delivery of the JCS. A full list of mitigation measures included in the 'Do Something 7' scenario is outlined in **Appendix K.**

7.2 It is important to note that SATURN is a strategic (highways only) model and the schemes modelled within this assessment do not have sufficient design detail at this stage to resolve all vehicle delay issues. Further efficiency savings will be achieved by this more detailed design and comprehensive review of traffic signal

7.3 The mitigation package works, but it does not resolve all congestion issues. The network will be considerably busier than it its at the current time, but the impact of the mitigation schemes included within the Do Something 7 scenario has minimised the impact of the sizeable increase in travel demand using the transport network.

7.4 The Do Something 7 Scenario includes a number of large infrastructure schemes including:

- M5 Junction 10 - the conversion to a full-movements junction and the access arrangements for accessing the West of Cheltenham site;
- Grade separated junction improvement at Cole Avenue to ensure Gloucester's South West Bypass functions to its maximum capacity;
- A46 Ashchurch offline improvement which will bring about significant improvements to the existing A46 route encouraging walking, cycling and public transport use;
- New junction on the A40 Gloucester Northern Bypass and new link road with the A38 Tewkesbury Road. This improvement will enable changes to be made to the existing A40 Longford Roundabout junction including and downgrading of the existing A38 Tewkesbury Road link north of the junction in Longford to encourage walking, cycling and public transport use

7.5 The outcomes of the Do Something 7 Scenario fully supports the JCS Transport Strategy's Six Point Plan by:

- Minimising the increase in travel demand derived from the scale of growth outlined in the JCS. The highway network will continue to operate in a safe and efficient manner. The network is also more resilient as pinch points within the existing network are removed improving radial route options.

- Delivering the large infrastructure schemes listed above enables the separation of local and strategic or 'through' traffic from highway routes which are intended for community growth. This removal of non-local traffic will significantly improve the quality of place and reduce community severance.

- The strategy includes several bus priority measures, including both new highway capacity and signal optimisation. These improvements are targeted on the existing high frequency routes with the aim of maximising bus use within the JCS area. If delays do

persist then, as part of the traffic signal optimisation, bus priority measures could be further incorporated to reduce journey time uncertainty.

- By providing increased journey time reliability on the highway network it is intended that public transport operators continue to provide high frequency services. This gives a high quality customer experience and increases the attractiveness of public transport for more people for more of their trips.

- The removal of traffic from the A38 in Longford and A46 in Ashchurch, along with new walking and cycling infrastructure between Bishops Cleeve and Cheltenham and Arle Court Park and Ride, will increase the ease and desirability of walking and cycling within the JCS area.

- The use of smart technology includes traffic signal replacement, travel information and Smart Motorway running, will further maximise network efficiencies and support the delivery of the JCS Transport Strategy's Six Point Plan.

7.6 Despite the many benefits provided by the Do Something 7 scenario there remain several unresolved issues which would require further mitigation. However, these are not viewed as being fundamental to the operation of the transport network.

7.7 The routes included within the key corridors analysis remain highly trafficked and as a result will be prone to congestion during peak times. There remain issues with several of the junctions. These issues are likely to be resolved through further detailed junction modelling and iterative design resulting in increased efficiencies being achieved.

7.8 Issues remain at the following locations:

- M5 Junction 12
- A40 Highnam and Newent junctions
- New four arm signalised junction on the A40 Golden Valley bypass to the east of Elmbridge Roundabout
- St, Barnabas Roundabout, Gloucester
- Cole Avenue / A38 junction, Gloucester

Conclusion

7.9 The Do Something 7 represent an effective and viable transport mitigation package which successfully supports the delivery of the JCS growth proposals and complies with the JCS Transport Strategy.

7.10 However, it should be noted that it is one of many possible methods to manage the impact on the transport network of the growth proposals included in the JCS.

8.0 Likely funding for mitigation package

8.1 It is unrealistic to assume that monies accrued through developer contributions will be able to fund all improvements identified in the Do Something 7 scenario. Delivery will be dependant on a range of funding sources including:

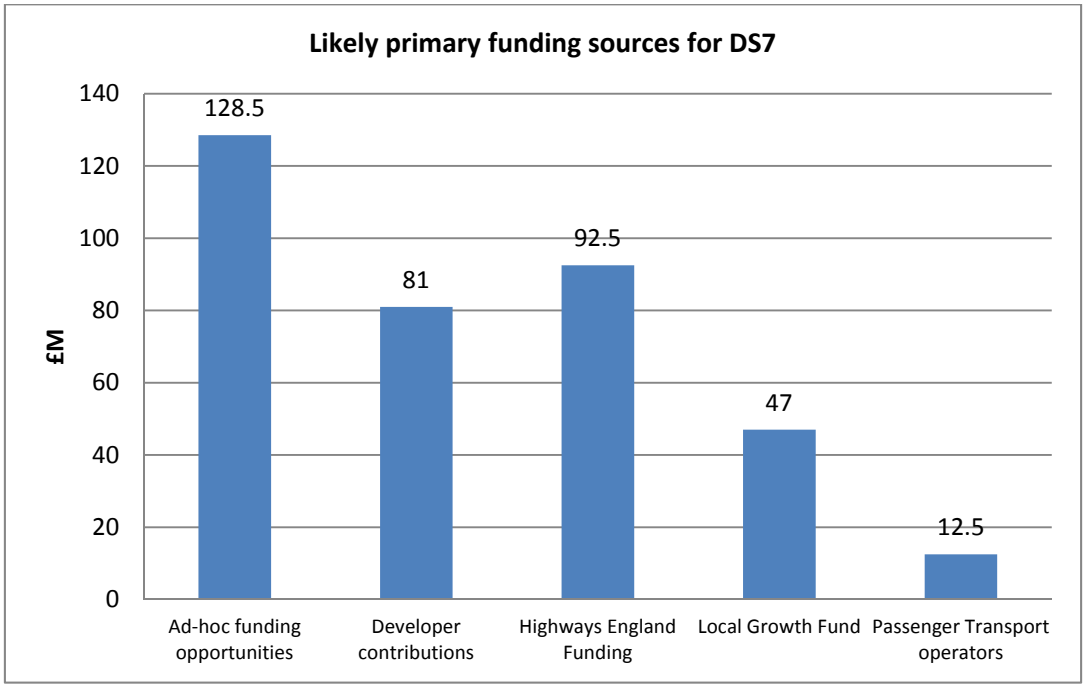
- Developer contributions
- Local Growth Fund (including. GCC capital programme)
- Highways England funding
- Passenger Transport operators
- Ad-hoc funding opportunities (other Government competitive funding bids)

8.2 As many of the schemes outlined in Do Something 7 scenario are at this stage only concepts there are no scheme designs available to inform likely costs. To address this, a series of high level cost bandings have been used and allocated to each of the scheme elements.

8.3 Once assigned a mid point has been used to attribute a cost estimate for each scheme element. **Appendix M** outlines the assumptions made for each scheme element at this stage.

8.4 Based on these assumptions the cost of Do Something 7 scenario is estimated to be £361m, **Figure 76** outlines the likely primary funding sources for these improvements.

Figure 76 – Likely primary sources of funding to deliver Do Something 7



8.5 Due to the number of improvements identified on the Strategic Road Network it has been assumed that £92.5 or 26% will be sourced from Highways England's investments. Funding is accessed through a competitive funding process and if this process is unsuccessful an alternative funding stream will need to be accessed.

8.6 £81m or 22% has been assumed will be accessed through developer contributions. For the purposes of this assessment it has been assumed that this means developer contributions provided through the JCS. Of the other funding sources identified it has been assumed that the Local Growth Fund would contribute £47m or 13% towards the cost through future Local Growth Deals. Transport operators have also been identified as contributing towards the costs of delivering service improvements.

8.7 £128.5m or 36% of the funding is identified as originating from Ad hoc funding streams as opportunities arise from Government during the JCS plan period.

8.8 How the funding sources are ultimately attributed will depend on the phasing of delivery both of sites and schemes. At the time of writing this Evidence Base the scheme delivery prioritisation and phasing are not known. As this becomes understood and schemes progress from concept to fully designed projects there will be greater certainty over costs and the source of funding.

JCS Transport Strategy Evidence Base Appendices

List of Appendices

Appendix A – Travel to work data (2011 Census Outputs)

JCS Transport Strategy Evidence Base

APPENDIX A – Travel to work data (2011 Census Outputs)

Trip data captured by the 2011 Census is recorded using Mid Super-Output-Areas (MSOA) level. To aid understanding of the possible trip patterns from the proposed strategic allocations two types of data will be presented.

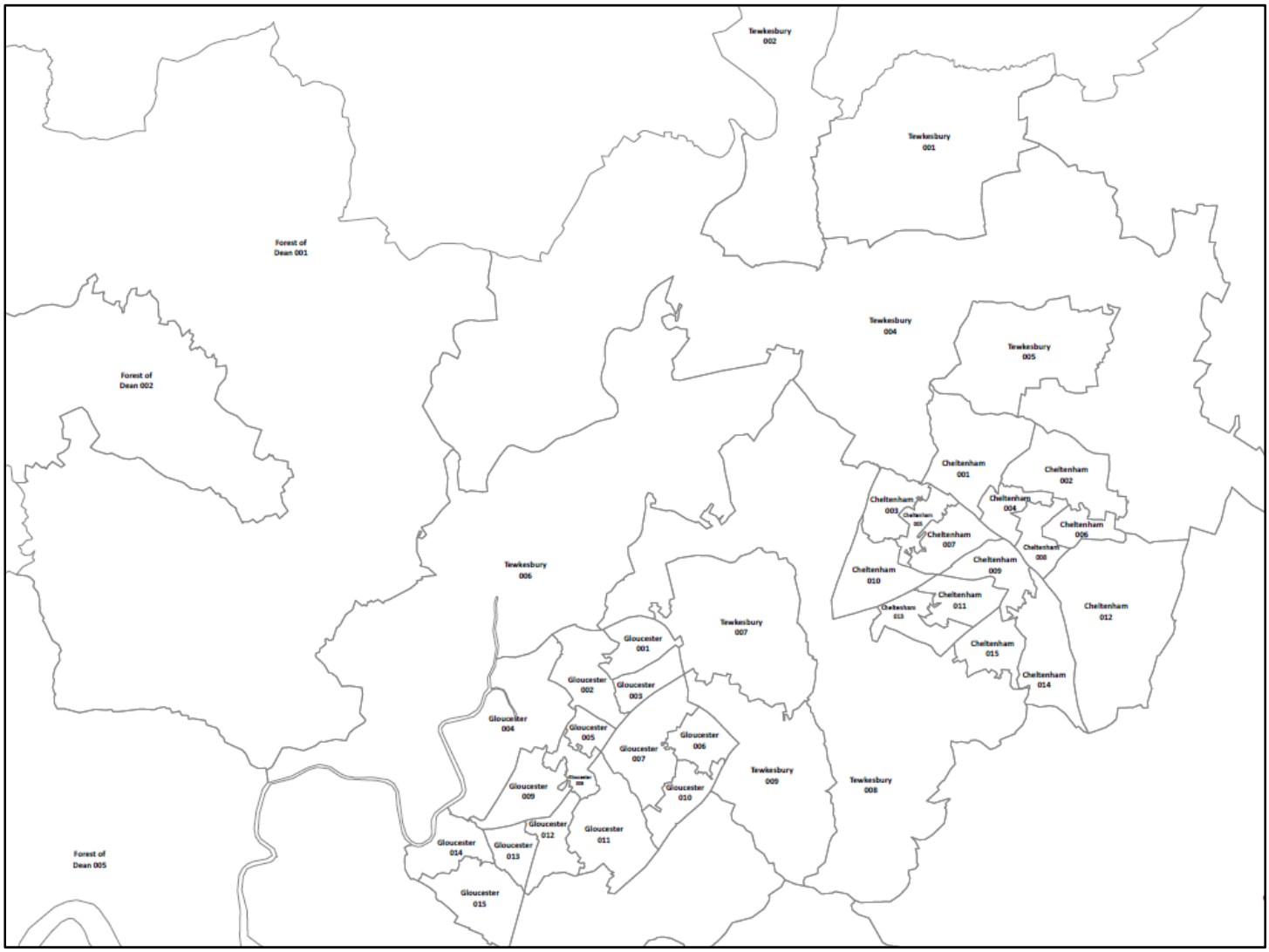
- Method of travel used from usual residence to place of work
- Location of usual place of work

As the proposed JCS developments are urban extensions it would not be appropriate to assume existing transport trips would be replicated by the new development. To address this analysis of neighbouring MSOL has been used as a proxy for likely travel behaviour from the proposed site. Figure A documents the MSOL used for the analysis. Figure B illustrates the geographic extent of these areas.

Figure A - Mid-Super-Output-Layer (MSOL) where JCS sites are located

JCS Site	MSOL where site is located	Neighbouring MSOL used for analysis
Site A1 – Innsworth and A1 Twigworth	Tewkesbury 008	Tewkesbury 008 Gloucester 001 Gloucester 002 Gloucester 003
A3 – South Churchdown	Tewkesbury 007	Tewkesbury 007
A5 – North West Cheltenham	Tewkesbury 004	Tewkesbury 005 Cheltenham 001 Cheltenham 003 Cheltenham 005
West of Cheltenham	Cheltenham 03 Cheltenham 10	Cheltenham 03 Cheltenham 10
Mitton	Site is located in Worcestershire	Tewkesbury 001 Tewkesbury 002

Figure B - 2011 Census - Mid-Super-Output-Layer (MSOL) in JCS area



APPENDIX A – Travel to work data (2011 Census Outputs)

Mode of transport to work

Using data collected from the in the 2011 Census the Figure C records the mode of transport used when travelling to work as a proportion of trips originating in the neighbouring locality of the proposed JCS residential developments.

The car dominates travel from all sites; and is above the average for the Central Severn Vale (CSV) area. Figure D records the average model a transport used when travelling across the county based on Gloucestershire's Local Transport Plan Connecting Places Strategy areas. The columns shaded yellow highlight the area the proposed JCS sites are located.

Levels of walking and cycling and bus use are greater than the county average, but typically lower when compared to the CSV area as a whole. .

Work place destination

For the purposes of this analysis the following places have been grouped together. The logic behind the destination groupings is the use of strategic transport corridors to access them from the JCS sites– such as the M5, A40 and A417.

- Tewkesbury and surrounding areas
- Cheltenham and surrounding areas
- Gloucester and surrounding areas
- Winchcombe and rural Tewkesbury
- West Midlands
- Forest of Dean, Hereford and Wales
- Cotswolds, Swindon, London and South East
- Stroud, Bristol and South West

Figure E documents the destinations of work based location as a proportion of trips originating in the neighbouring locality of the proposed JCS residential developments. The dominant trips (10%+) have been highlighted yellow to aid understanding. The high proportion of trips travelling to Stroud, Bristol and the South West highlighted by this analysis strengthens the importance and role of the M5 to the JCS area. It also demonstrates that large proportions of work based travel patterns of communities living on the edge of existing urban boundaries are not short distance and are likely to require use of the car.

APPENDIX A – Travel to work data (2011 Census Outputs)

Figure C Typical method of transport used when travelling to work destination from the location of the JCS strategic allocations (2011 Census)

	Site A1 – Innsworth and A1a Twigworth	A3 – South Churchdown	A5 – North West Cheltenham	West of Cheltenham
Driving a car or van	65%	69%	65%	64%
Passenger in a car or van	5%	5%	6%	6%
Motorcycle, scooter or moped	1%	2%	1%	1%
On foot	14%	9%	13%	13%
Bicycle	6%	7%	6%	7%
Bus, minibus or coach	7%	8%	9%	8%
Train	1%	0%	1%	1%

Figure D Typical method of transport used when travelling to work destination (2011 Census)

	Central Severn Vale CPS	Forest of Dean CPS	North Cotswold CPS	South Cotswold CPS	Stroud CPS	Tewkesbury CPS	Gloucestershire
Driving a car or van	63%	77%	74%	71%	76%	70%	69%
Passenger in a car or van	6%	6%	5%	5%	6%	6%	6%
Motorcycle, scooter or moped	1%	2%	1%	1%	1%	1%	1%
On foot	15%	9%	13%	16%	10%	12%	13%
Bicycle	6%	2%	2%	3%	3%	4%	5%
Bus, minibus or coach	7%	3%	2%	2%	3%	5%	5%
Train	1%	1%	3%	2%	2%	1%	1%

Figure E Work based destinations from the location of the JCS strategic allocations (2011 Census)

	Site A1 – Innsworth and A1a Twigworth	A3 – South Churchdown	A5 – North West Cheltenham	A11 West of Cheltenham
Tewkesbury and surrounding areas	6%	1%	4%	3%
Cheltenham and surrounding areas	16%	25%	63%	66%
Gloucester and surrounding areas	46%	52%	13%	17%
Winchcombe and rural Tewkesbury	1%	1%	3%	0%
West Midlands	5%	2%	4%	2%
Forest of Dean, Hereford and Wales	3%	3%	1%	1%
Cotswolds, Swindon, London and South East	4%	5%	5%	6%
Stroud, Bristol and South West	19%	11%	7%	4%

Appendix B – Gloucestershire's Link and Place Spectrum

JCS Transport Strategy Evidence Base

APPENDIX B – Gloucestershire's Link and Place Spectrum

- Gloucestershire's Local Transport Plan (2015 to 2031)
- Policy Document 4 –Highways
- Policy - LTP PD 4.1 –Gloucestershire's highway network - *GCC will maintain a functioning highway network that supports Gloucestershire transport network by ensuring the safe and expeditious movement of highway users.*
- For a full copy of this document please access – www.gloucestershire.gov.uk/ltp

Gloucestershire has approximately 80 miles of motorway/trunk road and approximately 3,300 miles of local authority managed highway. The network is dominated by the M5 motorway which runs north-south through the county and provides good connectivity to Birmingham, the Midlands, the North, Bristol and the South West and the M4 corridor (Wales and London).

Gloucestershire is a rural county which depends on its highway network for the movement of people and goods. A highway network that does not provide for this need will develop a negative reputation which over time may impact the desirability of Gloucestershire as a place to live, work or invest, decisions which assist in securing sustainable economic growth.

A functioning highways network must be provided to maintain a reliable transport network. To deliver this, it is essential to work in partnership with transport operators to identify and minimise vehicle delay pinch points to improving journey time reliability.

To aid the prioritisation of highway investments, the role of individual highway links (roads) has been considered at a strategic level. Gloucestershire's Link and Place Spectrum builds on the approach outlined in the Manual for Streets. Where identified, each link has been designated a role in terms of its function in connecting different places. This designation has not been assigned simply in relation to the type of road but how the road is used and how the road feels when it is being used.

Figure A and Figure B illustrate how this approach has been applied in Gloucestershire.

Figure A – Gloucestershire's Link and Place Spectrum

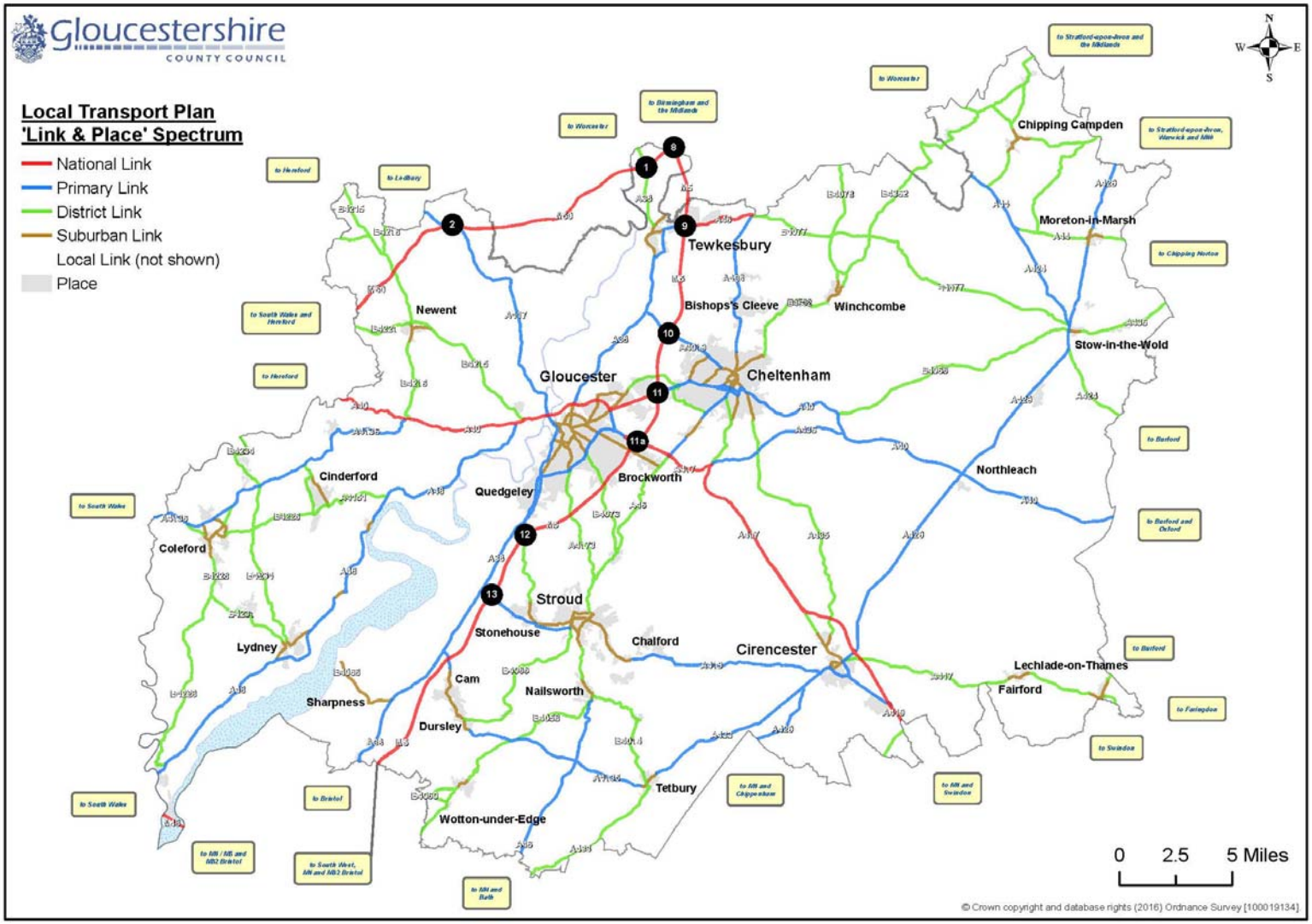


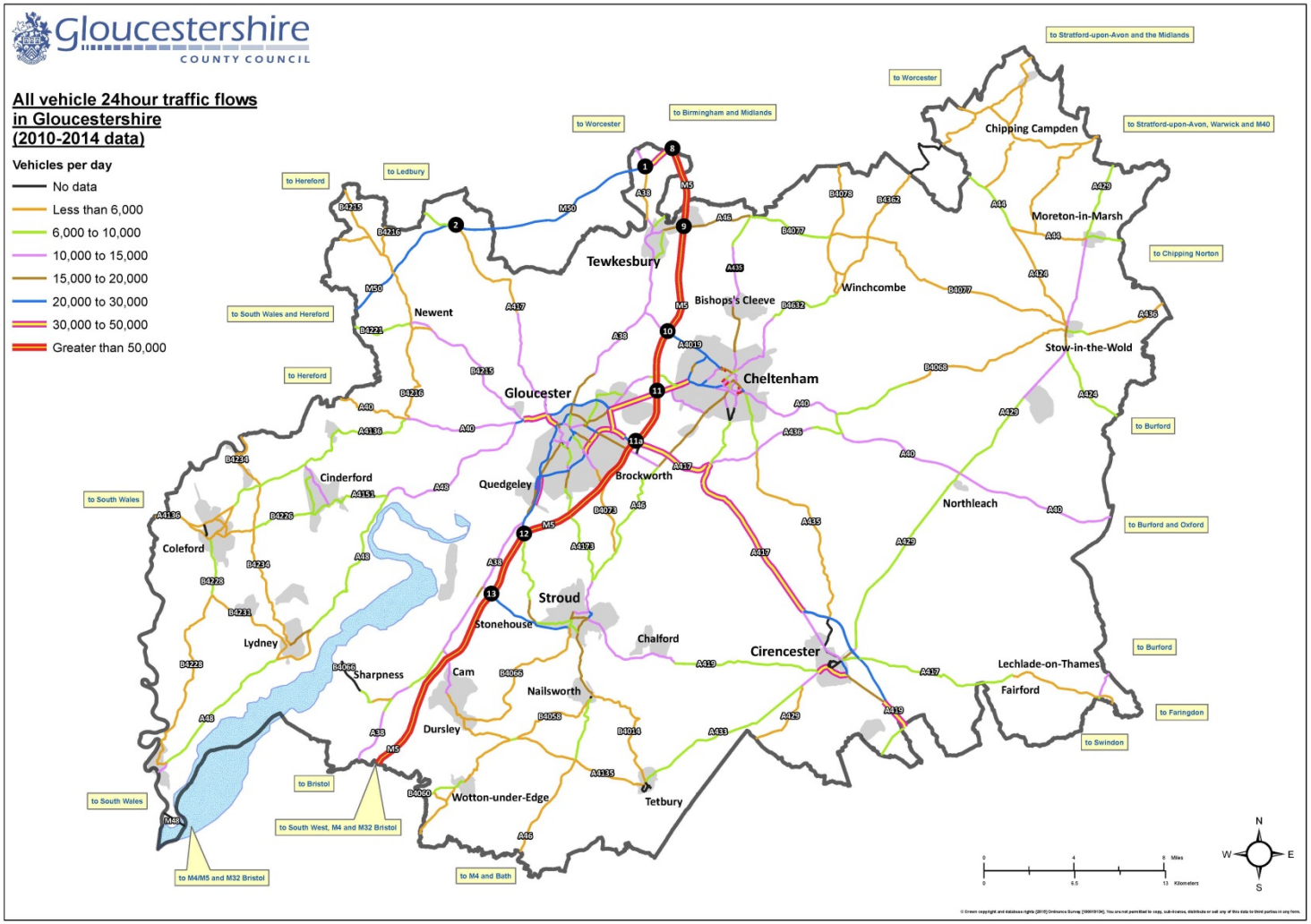
Figure B – Gloucestershire's Link and Place Spectrum – Defining Characteristics

Link Type	Highway Characteristic	Journey time reliability	Road environment	Typical highway speed	Bus network	Streetscape	Ambience and Place	Example
National Link	Strategic Road Network Managed by Highways England High vehicle flows Designated freight route	Critical for national economy	Motorway Dual Carriageway Small section bisects local communities	70-30	Limited bus access	Mainly no community interaction Where this exists results in linear community severance	Function is for traffic only	M5, M50, A417, A46, A40
Primary Link	Strategic route within the county High vehicle flows Designated freight route	Critical for local economy	A roads Dual carriageway Single carriageway	70-30	Strategic bus service High frequency services linking key destinations (places)	Mixed Rural routes with minimal community interaction Urban through routes	Mixed Function is for all highway users vehicles dominate	A38, A48, A4136, A419, A4019, A429, A40
District Link	Distributor link Rural road Some freight traffic	Critical for local access – reliability good	A or B road Single carriageway	60-30	Strategic and non-strategic services	Rural routes where communities are bisected this results in linear severance	Mixed Function is for all highway users vehicles dominate	A46, A417, B4633, B4077, B4088, B4231, B4234
Suburban Link	Residential or commercial areas High level of use Very busy in peak times	Moderate delays to be expected	Dual carriageway Single carriageway	40-20	Destinations for many services	Highway part of built form – significant interactions between highways users and place usually journey end points	Busy with increased pedestrian and cyclist interactions	Town or village centres
Local Link	Residential Rural ink	Access only	Single carriageway Cul-de-sacs	60-20	Limited to non-strategic local services	Highly built up or rural No severance caused by highway	Low vehicle numbers Agricultural vehicles Horse riders High pedestrian or cycle use	Housing estates or quiet rural routes

Appendix C – Countywide Annual Average Daily vehicle flows (2010-2014)

JCS Transport Strategy Evidence Base

APPENDIX C – Countywide Annual Average Daily vehicle flows (2010-2014)



Appendix D – Average vehicle speeds data

JCS Transport Strategy Evidence Base

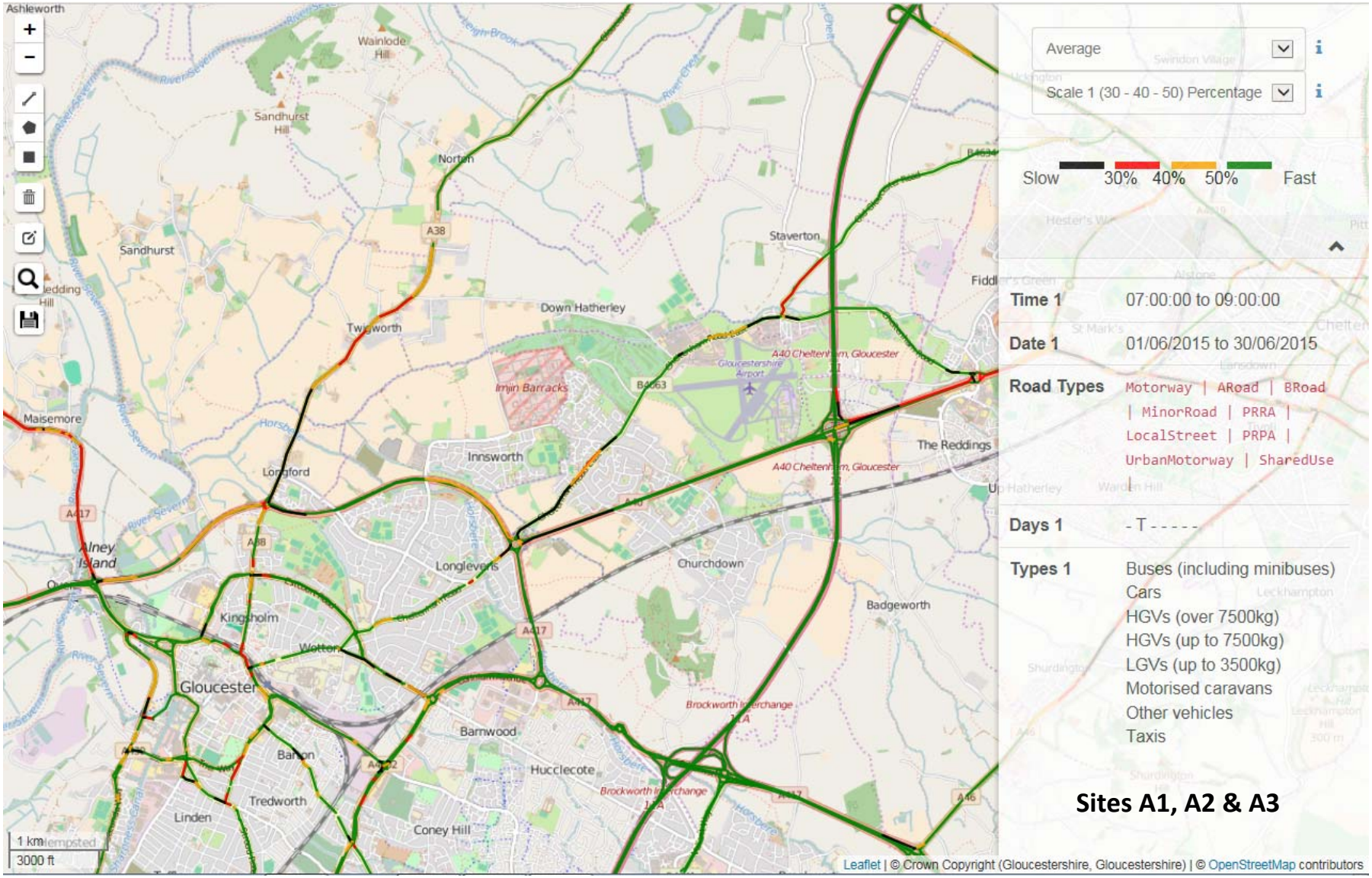
APPENDIX D – Average vehicle speeds data

The information contained within Appendix E was supplied by Gloucestershire County Council in May 2016.

It provides information on average vehicle speed data on Tuesdays for the period 1st June 2015 to 31st June 2015.

Data has been presented from three time periods:

- 07:00 to 09:00
- 09:00 to 16:00
- 16:00 to 18:00


Average
Scale 1 (30 - 40 - 50) Percentage
Slow 30% 40% 50% Fast
Time 1 07:00:00 to 09:00:00
Date 1 01/06/2015 to 30/06/2015
Road Types Motorway | ARoad | BRoad | MinorRoad | PRRA | LocalStreet | PRPA | UrbanMotorway | SharedUse
Days 1 - T - - - - -
Types 1 Buses (including minibuses)
Cars
HGVs (over 7500kg)
HGVs (up to 7500kg)
LGVs (up to 3500kg)
Motorised caravans
Other vehicles
Taxis
Sites A1, A2 & A3
Ashleworth
Wainlode Hill
Sandhurst Hill
Norton
Sandhurst
Staverton
Down Hatherley
Twigworth
Innsworth
Longford
Maisemore
Alney Island
Longlevens
Churchdown
The Reddings
Badgeworth
Kingsholm
Wotton
Gloucester
Barnwood
Hucclecote
Tredworth
Linden
Coney Hill
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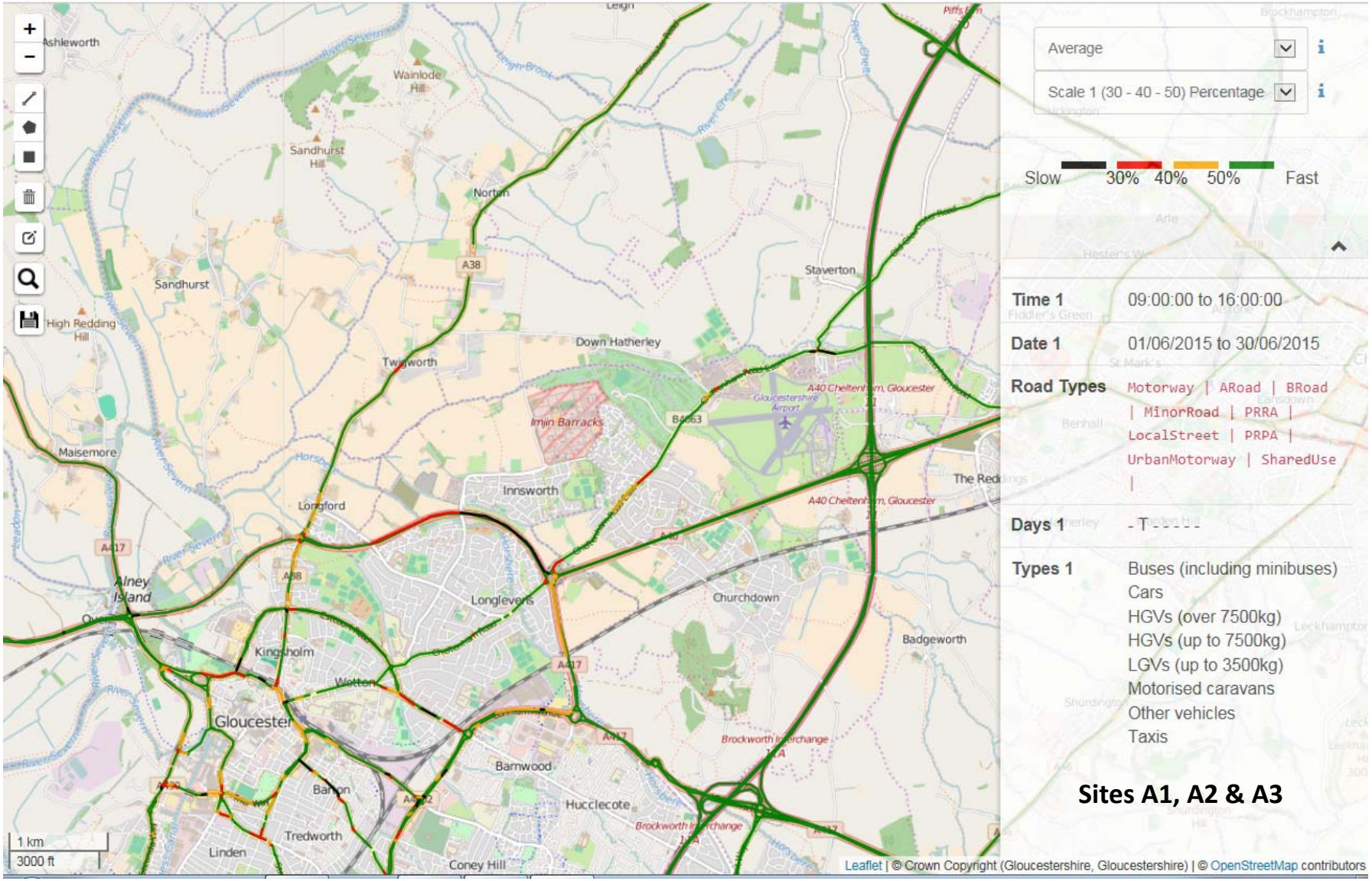
Average
Scale 1 (30 - 40 - 50) Percentage
Slow
30%
40%
50%
Fast
Time 1
09:00:00 to 16:00:00
Date 1
01/06/2015 to 30/06/2015
Road Types
Motorway | ARoad | BRoad | MinorRoad | PRRA | LocalStreet | PRPA | UrbanMotorway | SharedUse |
Days 1
- T - - - - -
Types 1
Buses (including minibuses)
Cars
HGVs (over 7500kg)
HGVs (up to 7500kg)
LGVs (up to 3500kg)
Motorised caravans
Other vehicles
Taxis
Sites A1, A2 & A3
Ashleworth
Wainlode Hill
Sandhurst Hill
Norton
Sandhurst
High Redding Hill
Staverton
Down Hatherley
Twigworth
Maisemore
Innsworth
Longford
Alney Island
Longlevens
Churchdown
Badgeworth
Kingsholm
Gloucester
Barnwood
Hucclecote
Tredworth
Linden
Coney Hill
1 km
3000 ft
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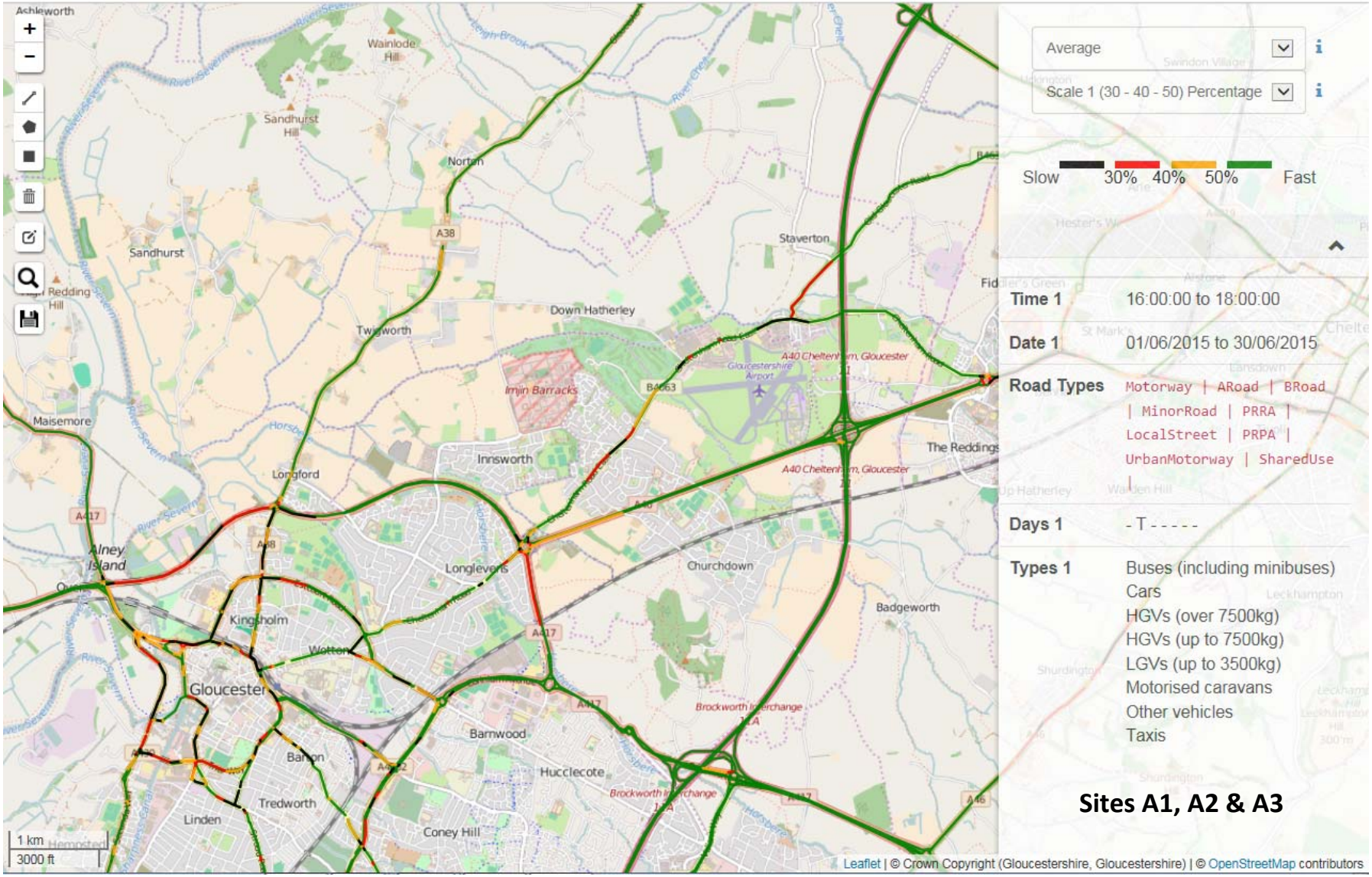
Average
Scale 1 (30 - 40 - 50) Percentage
Slow
30%
40%
50%
Fast
Time 1
16:00:00 to 18:00:00
Date 1
01/06/2015 to 30/06/2015
Road Types
Motorway | ARoad | BRoad | MinorRoad | PRRA | LocalStreet | PRPA | UrbanMotorway | SharedUse |
Days 1
- T - - - - -
Types 1
Buses (including minibuses)
Cars
HGVs (over 7500kg)
HGVs (up to 7500kg)
LGVs (up to 3500kg)
Motorised caravans
Other vehicles
Taxis
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Longford
Maisemore
Alney Island
Longlevens
Churchdown
Badgeworth
Kingsholm
Wotton
Gloucester
Barnwood
Hucclecote
Barton
Tredworth
Linden
Coney Hill
1 km
3000 ft
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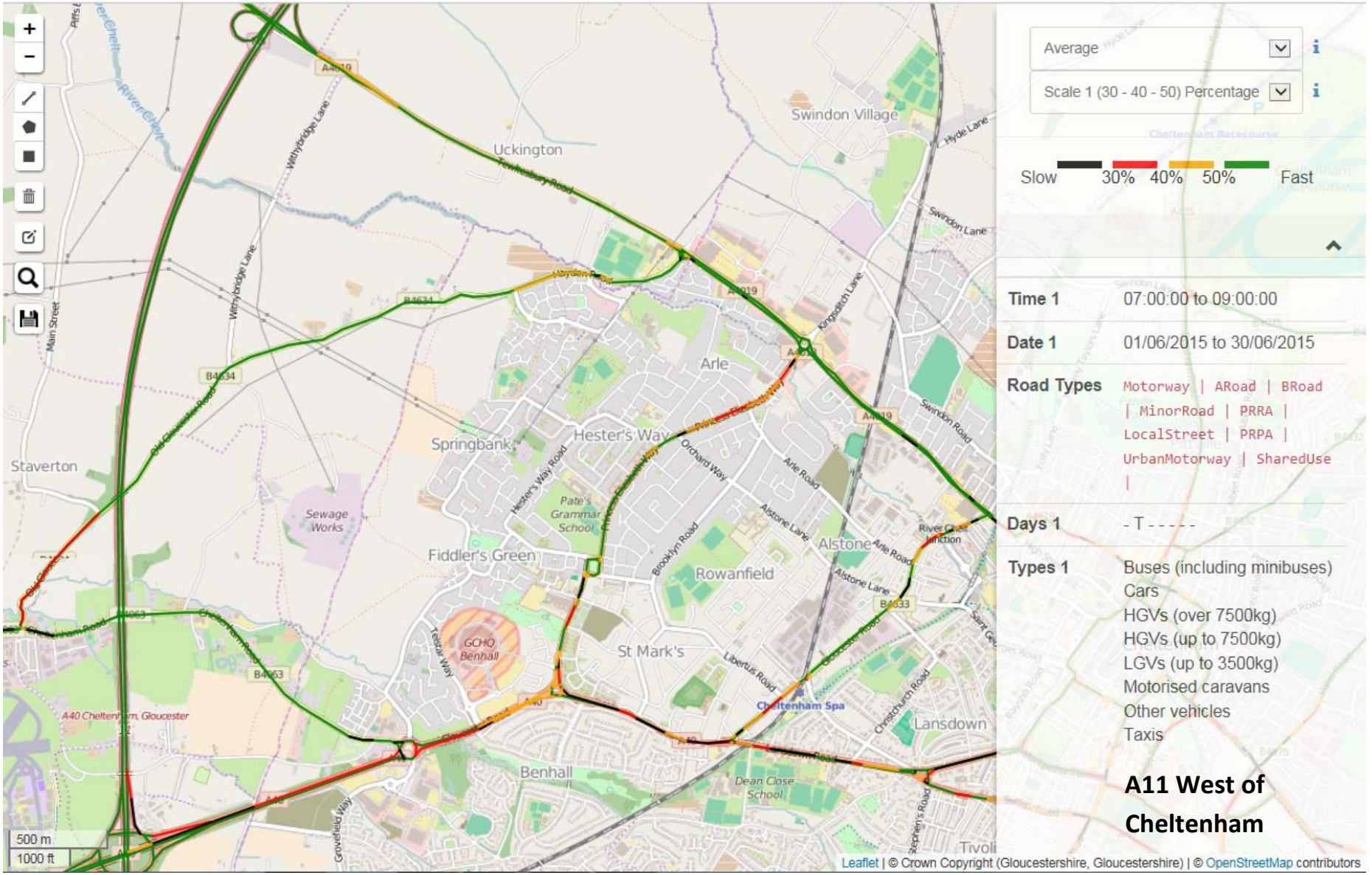
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Scale 1 (30 - 40 - 50) Percentage
Slow
30%
40%
50%
Fast
Time 1
07:00:00 to 09:00:00
Date 1
01/06/2015 to 30/06/2015
Road Types
Motorway | ARoad | BRoad | MinorRoad | PRRA | LocalStreet | PRPA | UrbanMotorway | SharedUse |
Days 1
- T - - - - -
Types 1
Buses (including minibuses)
Cars
HGVs (over 7500kg)
HGVs (up to 7500kg)
LGVs (up to 3500kg)
Motorised caravans
Other vehicles
Taxis
A11 West of Cheltenham
Uckington
Swindon Village
Arle
Springbank
Hester's Way
Staverton
Fiddler's Green
Rowanfield
Alstone
St Mark's
Benhall
Lansdown
Tivoli
Cheltenham Spa
GCHQ Benhall
Sewage Works
Pate's Grammar School
Dean Close School
500 m
1000 ft
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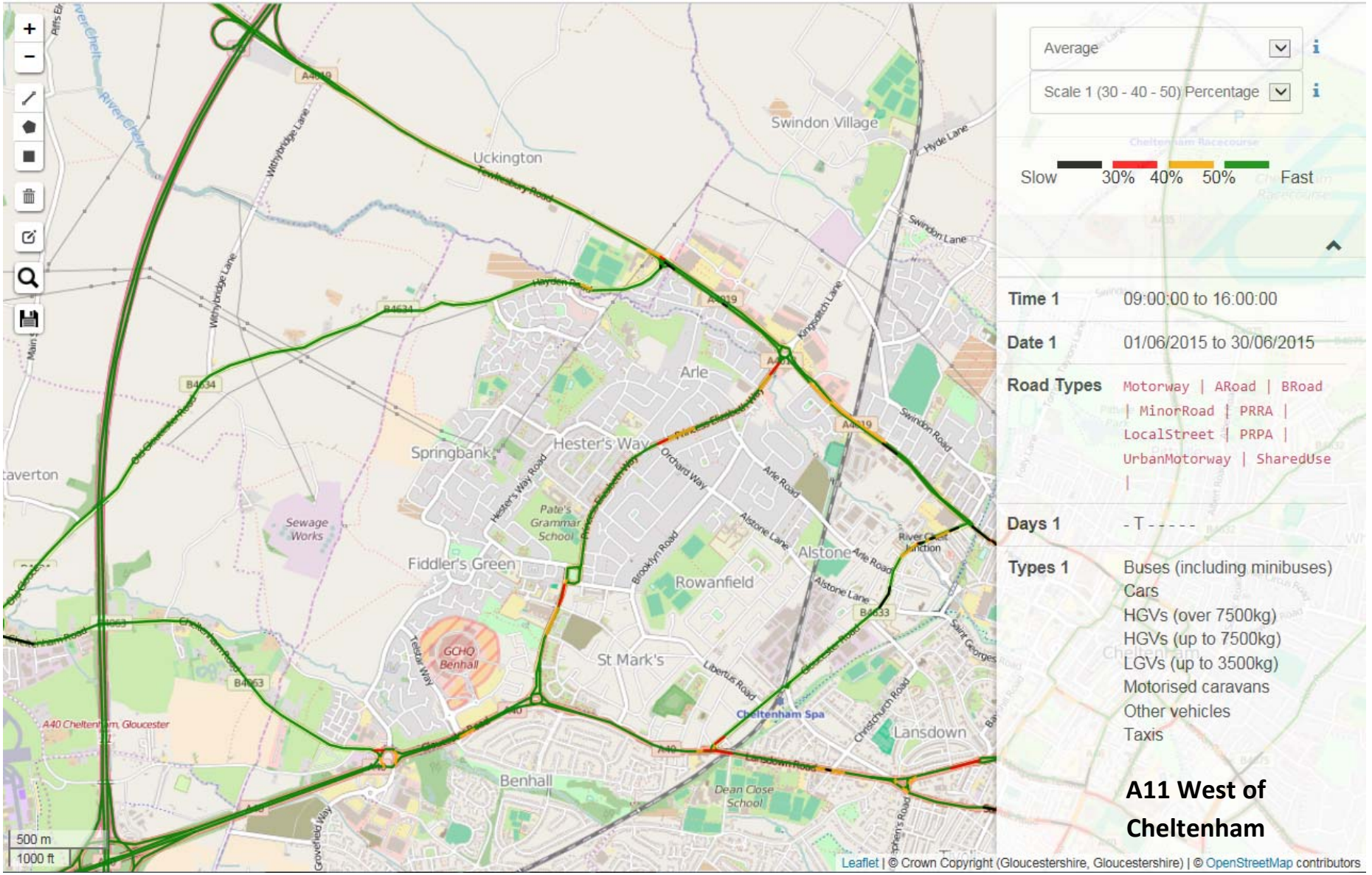
Average
Scale 1 (30 - 40 - 50) Percentage
Slow 30% 40% 50% Fast
Time 1 09:00:00 to 16:00:00
Date 1 01/06/2015 to 30/06/2015
Road Types Motorway | ARoad | BRoad | MinorRoad | PRRA | LocalStreet | PRPA | UrbanMotorway | SharedUse |
Days 1 - T - - - - -
Types 1 Buses (including minibuses)
Cars
HGVs (over 7500kg)
HGVs (up to 7500kg)
LGVs (up to 3500kg)
Motorised caravans
Other vehicles
Taxis
A11 West of Cheltenham
Uckington
Swindon Village
Arle
Springbank
Hester's Way
Fiddler's Green
Rowanfield
Alstone
St Mark's
Benhall
Lansdown
Cheltenham Spa
Sewage Works
Pate's Grammar School
Dean Close School
GCHQ Benhall
500 m
1000 ft
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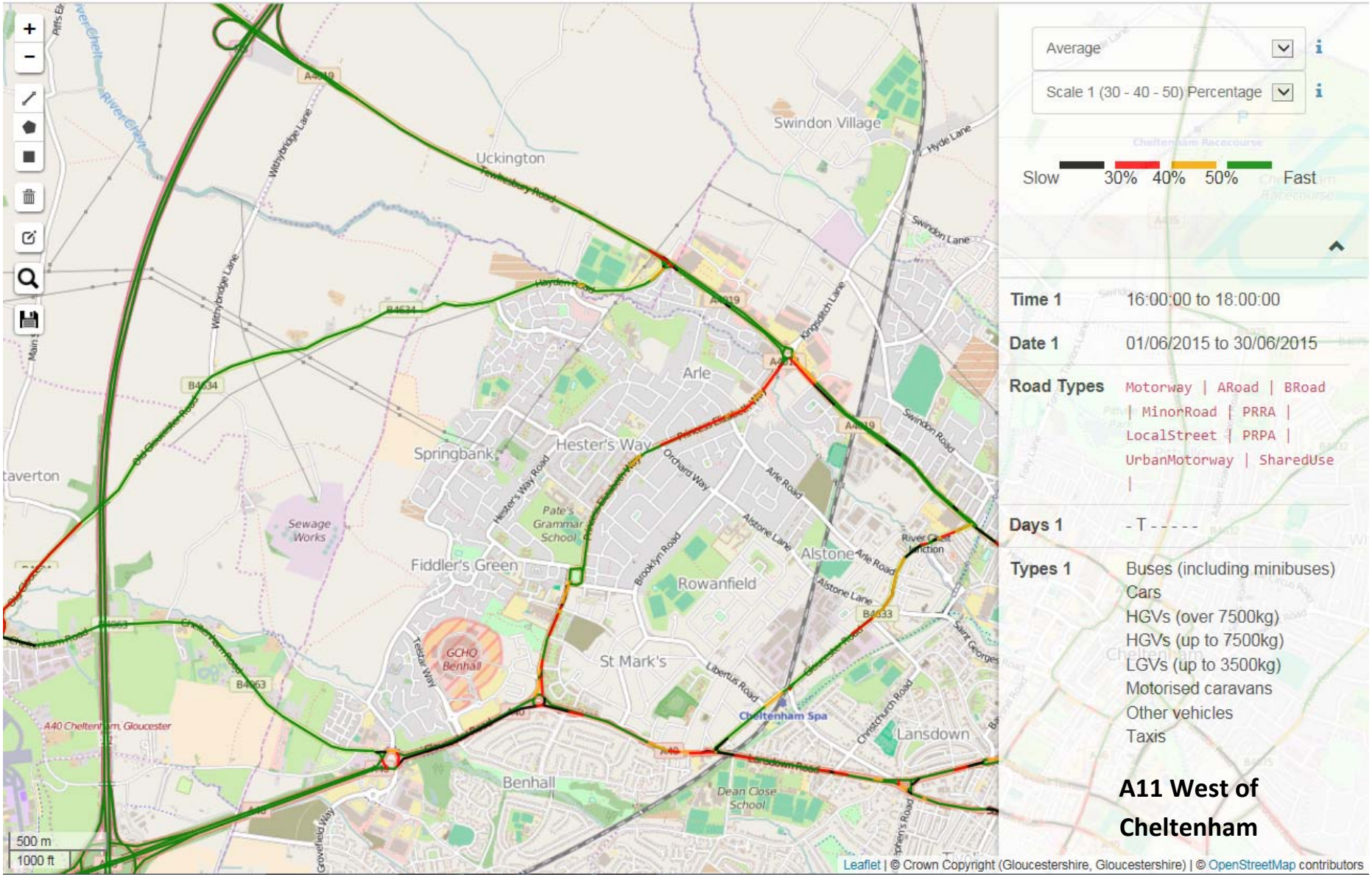
Average
Scale 1 (30 - 40 - 50) Percentage
Slow
30%
40%
50%
Fast
Time 1
16:00:00 to 18:00:00
Date 1
01/06/2015 to 30/06/2015
Road Types
Motorway | ARoad | BRoad | MinorRoad | PRRA | LocalStreet | PRPA | UrbanMotorway | SharedUse |
Days 1
- T - - - - -
Types 1
Buses (including minibuses)
Cars
HGVs (over 7500kg)
HGVs (up to 7500kg)
LGVs (up to 3500kg)
Motorised caravans
Other vehicles
Taxis
A11 West of Cheltenham
Uckington
Swindon Village
Arle
Springbank
Hester's Way
Fiddler's Green
Rowanfield
Alstone
St Mark's
Benhall
Lansdown
Cheltenham Spa
GCHQ Benhall
Pate's Grammar School
Dean Close School
Sewage Works
500 m
1000 ft
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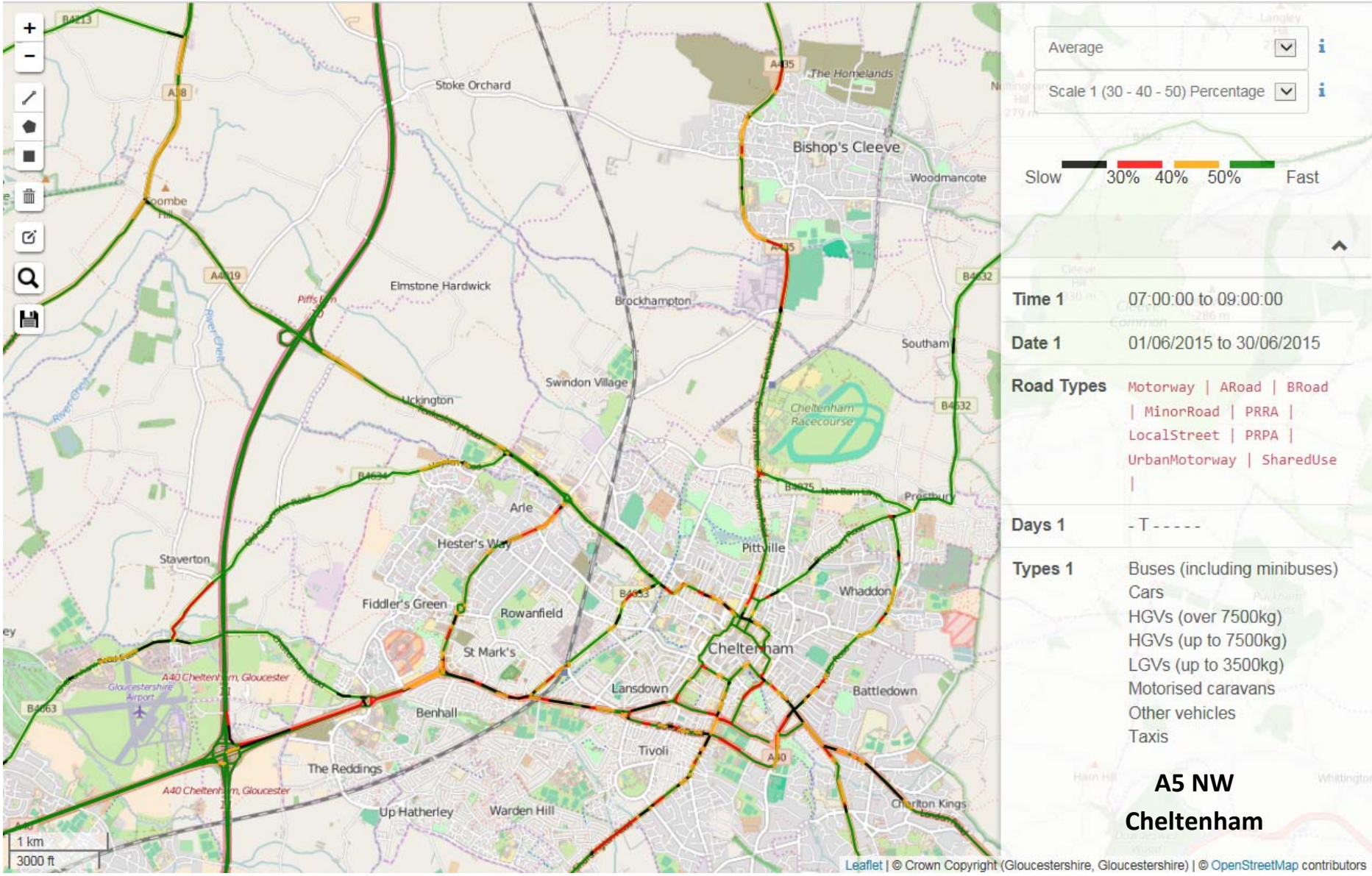
Average
Scale 1 (30 - 40 - 50) Percentage
Slow
30%
40%
50%
Fast
Time 1
07:00:00 to 09:00:00
Date 1
01/06/2015 to 30/06/2015
Road Types
Motorway | ARoad | BRoad | MinorRoad | PRRA | LocalStreet | PRPA | UrbanMotorway | SharedUse |
Days 1
- T - - - - -
Types 1
Buses (including minibuses)
Cars
HGVs (over 7500kg)
HGVs (up to 7500kg)
LGVs (up to 3500kg)
Motorised caravans
Other vehicles
Taxis
A5 NW
Cheltenham
Stoke Orchard
Bishop's Cleeve
Woodmancote
Elmstone Hardwick
Brockhampton
Southam
Swindon Village
Uckington
Cheltenham Racecourse
Arle
Hester's Way
Staverton
Pittville
Whaddon
Fiddler's Green
Rowanfield
St Mark's
Cheltenham
Lansdown
Battledown
Benhall
Tivoli
The Reddings
Up Hatherley
Warden Hill
Charlton Kings
1 km
3000 ft
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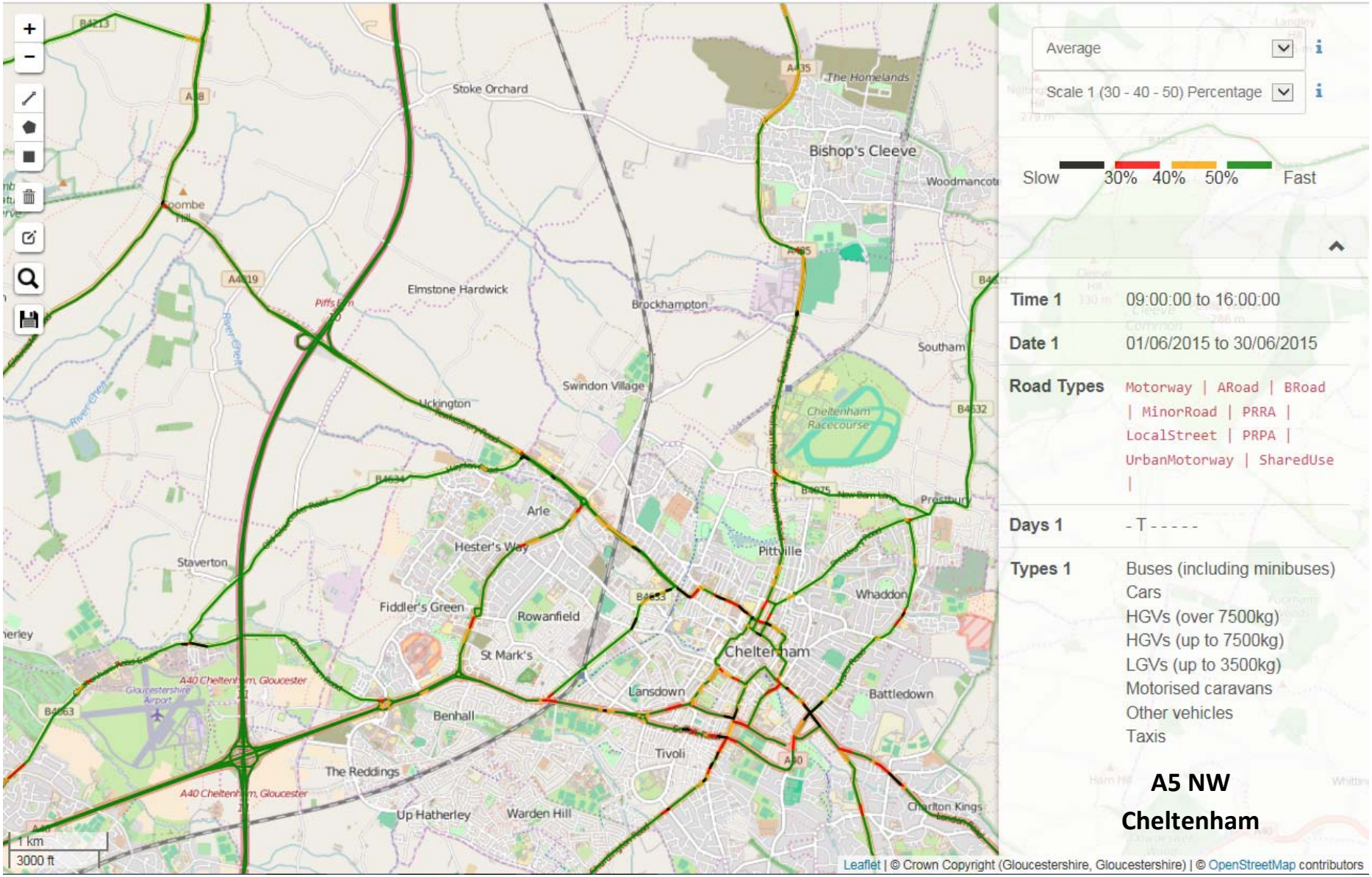
Average
Scale 1 (30 - 40 - 50) Percentage
Slow 30% 40% 50% Fast
Time 1 09:00:00 to 16:00:00
Date 1 01/06/2015 to 30/06/2015
Road Types Motorway | ARoad | BRoad | MinorRoad | PRRA | LocalStreet | PRPA | UrbanMotorway | SharedUse |
Days 1 - T - - - - -
Types 1 Buses (including minibuses)
Cars
HGVs (over 7500kg)
HGVs (up to 7500kg)
LGVs (up to 3500kg)
Motorised caravans
Other vehicles
Taxis
A5 NW
Cheltenham
Stoke Orchard
Bishop's Cleeve
Elmstone Hardwick
Brockhampton
Southam
Swindon Village
Uckington
Arle
Hester's Way
Staverton
Pittville
Whaddon
Fiddler's Green
Rowanfield
St Mark's
Cheltenham
Lansdown
Battledown
Benhall
Tivoli
The Reddings
Up Hatherley
Warden Hill
Charlton Kings
1 km
3000 ft
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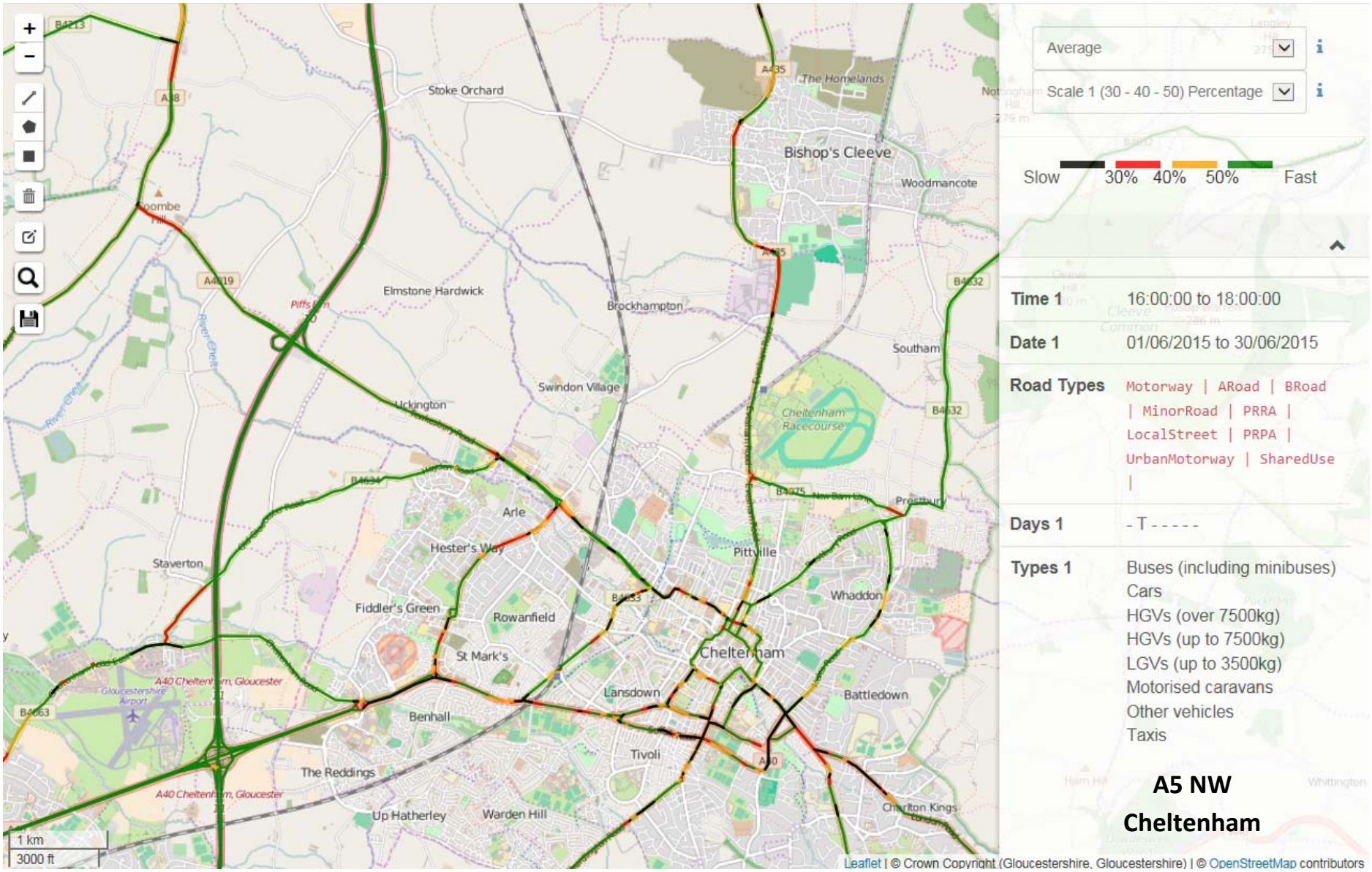
Average
Scale 1 (30 - 40 - 50) Percentage
Slow
30%
40%
50%
Fast
Time 1
16:00:00 to 18:00:00
Date 1
01/06/2015 to 30/06/2015
Road Types
Motorway | ARoad | BRoad | MinorRoad | PRRA | LocalStreet | PRPA | UrbanMotorway | SharedUse |
Days 1
- T - - - - -
Types 1
Buses (including minibuses)
Cars
HGVs (over 7500kg)
HGVs (up to 7500kg)
LGVs (up to 3500kg)
Motorised caravans
Other vehicles
Taxis
A5 NW
Cheltenham
Stoke Orchard
Bishop's Cleeve
Woodmancote
Elmstone Hardwick
Brockhampton
Southam
Swindon Village
Uckington
Cheltenham Racecourse
Arle
Hester's Way
Staverton
Pittville
Whaddon
Fiddler's Green
Rowanfield
St Mark's
Cheltenham
Lansdown
Battledown
Benhall
Tivoli
The Reddings
Up Hatherley
Warden Hill
Charlton Kings
1 km
3000 ft
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Appendix E – Highways Collision Data

JCS Transport Strategy Evidence Base

APPENDIX F – Highways Collision Data

The information contained within Appendix E was supplied by Gloucestershire Road Safety partnership in May 2016.

It provides information on highway collisions for the period 1st January 2011 to 31st December 2015.

For each of the JCS allocations there is a collision plan illustrating the location and severity of all highway collisions which occurred within the vicinity of the JCS strategic allocations. This plan is supported by a Detailed Collision Report.

This information is provided by Gloucestershire County Council (the "Council") in good faith. The Council does not make any representations or warranties of any kind, express or implied, in relation to all or any part of the information and all warranties and representations are hereby excluded to the fullest extent permitted by law. The information does not constitute advice and should not be relied upon in making or refraining from making any decision.

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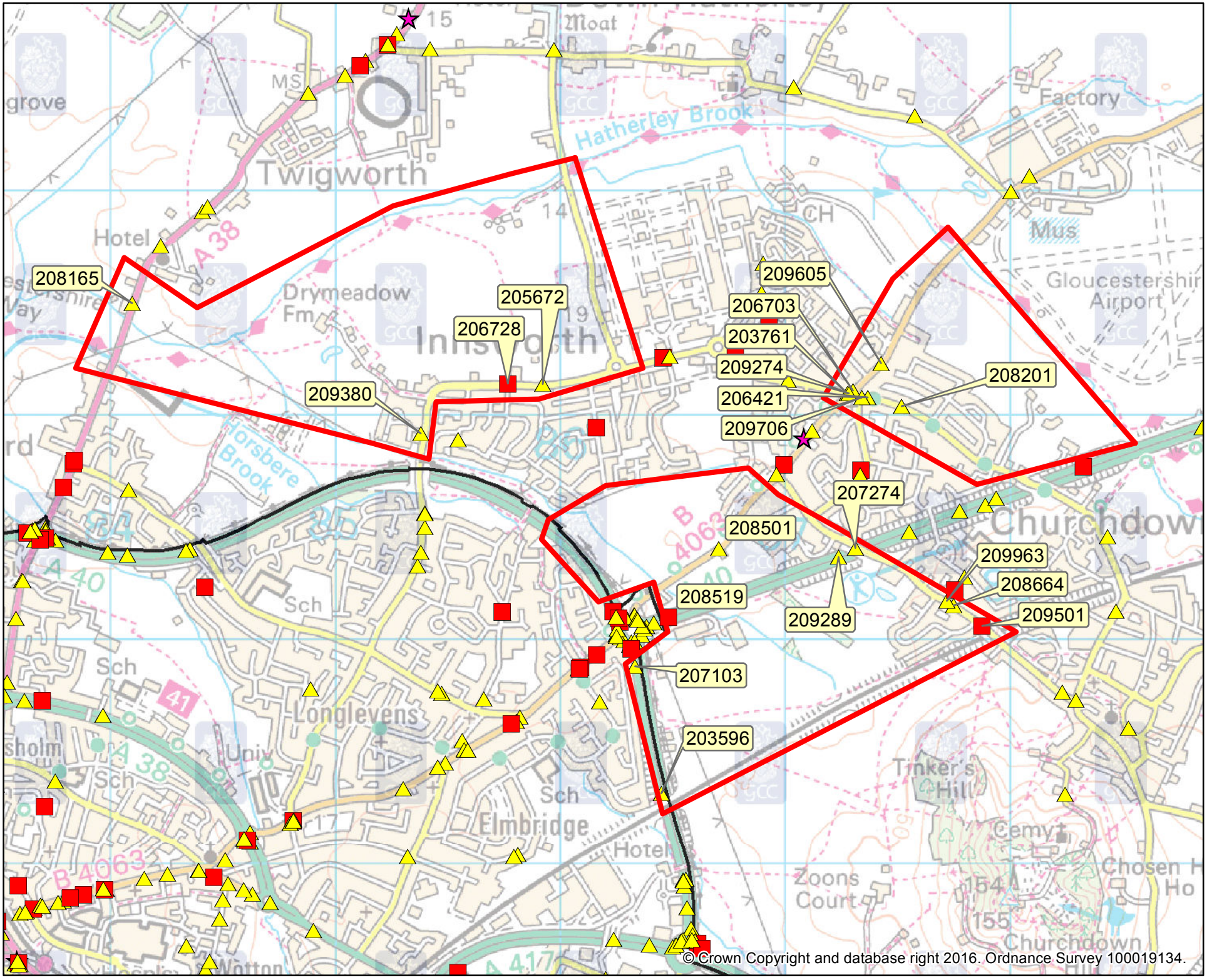
This information is compiled from data held in the Council's live database as at the date of production. The data is subject to change at any point in the future, as a result of more accurate information becoming available.



Collision Plan Site:

JCS Proposals
Sites A1, A2, A3

Data Range:
January 2011 - December 2015

Date Produced:
26.05.2016

Collision Plan Key

- Fatal
- Serious
- Slight

Drawn by: J Neininger
Team: AIP
Scale: 1:21,095

www.roadsafety-gloucestershire.org.uk

RoadSafety
Gloucestershire

RTA2480 Detailed Collision Report

Compiled from an original report by Gloucestershire County Council

Accident Investigation and Prevention Section

Database as at 26-MAY-16

Collisions within GLOUCESTERSHIRE

For period 01-JAN-2011 TO 31-DEC-2015

AREA A1, A2, A3

DETAILED COLLISION REPORT

Ref	203596	Severity	SLIGHT		
Day	THURSDAY	Date	13 JAN 2011	Time	0730
Light	DARKNESS	Weather	FINE	Surface	WET
Grid ref	386451 219313	Major rd	A 417	Minor rd	
Control		Junction	NOT WITHIN 20M	Speed lim	70
Lighting	NO LIGHTS	Condition	NONE	C'way	DUAL CWAY
UNIFI Ref	B/000350/11	Type	Q	Hazard	NONE

LOCATION

A40, ELMBRIDGE COURT ROUNDABOUT, LONGLEVENS, GLOUCESTER GLOUCESTERSHIRE

DESCRIPTION

ALL VEHICLES TRAVELLING FROM ELMBRIDGE COURT ROUNDABOUT TOWARDS C&G ROUNDABOUT. V1 IN OUTSIDE LANE MOVES TO NEARSIDE LANE COLLIDING WITH REAR OFFSIDE OF V2. V2 CAREERS ACROSS BOTH CARRIAGEWAYS INTO CENTRAL RESERVATION AND REBOUNDS INTO CARR

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Goods veh over 7.5 T mgw	CHG LANE TO LEFT	N S	64
2	Car	GO AHEAD OTHER	N S	42
3	Car	GO AHEAD OTHER	N S	23
4	Car	GO AHEAD OTHER	N S	68
5	Car	GO AHEAD OTHER	N S	64

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	23	3	DRIVER

DETAILED COLLISION REPORT

Ref	203761	Severity	SLIGHT		
Day	FRIDAY	Date	28 JAN 2011	Time	2244
Light	DARKNESS	Weather	FINE	Surface	WET
Grid ref	387279 221093	Major rd	B 4063	Minor rd	3 80
Control	AUTO SIGNALS	Junction	CROSS ROAD	Speed lim	30
Lighting	LIGHTS LIT	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/000691/11	Type	Q	Hazard	NONE

LOCATION

INNSWORTH LANE, INNSWORTH, GLOUCESTER, GLOUCESTERSHIRE(AT JUNCTION WITH CHELTENHAM ROAD EAST)

DESCRIPTION

V1 ON JUNC OF INNSWORTH LN WITH CHELTENHAM RD EAST WAITING TO TURN RIGHT ONTO CRE TWDS GLOUCESTER ON GREEN LIGHT ALL CLEAR SO MOVES OFF AS COMPLETING THE TURN V2 HAS COME FROM PARTON RD ON GREEN LIGHT AND DRIVEN STRAIGHT THROUGH THE J

VEHICLE DETAILS

No	Type	Manoeuvre	From-to		Driver Age
1	Car	WAIT TURN RHT	W	S	18
2	Car	GO AHEAD OTHER	E	W	40

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	18	1	PASSENGER
2	SLIGHT	18	1	DRIVER

DETAILED COLLISION REPORT

Ref	205672	Severity	SLIGHT		
Day	THURSDAY	Date	08 SEP 2011	Time	1346
Light	DAYLIGHT	Weather	RAIN	Surface	WET
Grid ref	385923 221135	Major rd	3 80	Minor rd	4 3141
Control	G WAY/UNCONTROLLED	Junction	T/STAG/Y JUNC	Speed lim	40
Lighting	LIGHTS	Condition	TRF SIG OUT	C'way	SINGLE CWAY
UNIFI Ref	A/003674/11	Type	QF	Hazard	NONE

LOCATION

INNSWORTH LANE, INNSWORTH, GLOUCESTER, GLOUCESTERSHIRE (O/S NO 238)

DESCRIPTION

DRIVER OF V1 HAS NOT SEEN THREE STATIONARY VEHICLES IN HIS LANE (FIRST WAITING TO TURN RIGHT) AND COLLIDED WITH THE BACK OF THEM CAUSING DOMINO EFFECT

VEHICLE DETAILS

No	Type	Manoeuvre	From-to		Driver Age
1	Van up to 3.5 T mgw	GO AHEAD OTHER	W	E	42
2	Car	WAIT GO AHEAD	W	E	56
3	Car	WAIT GO AHEAD	W	E	39
4	Car	WAIT TURN RHT	W	E	31

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	39	3	DRIVER

DETAILED COLLISION REPORT

Ref	206703	Severity	SLIGHT		
Day	TUESDAY	Date	29 NOV 2011	Time	0806
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	387303 221106	Major rd	B 4063	Minor rd	3 80
Control	AUTO SIGNALS	Junction	CROSS ROAD	Speed lim	30
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/001005/12	Type	CL	Hazard	NONE

LOCATION

CHELTENHAM ROAD EAST GLOUCESTER GLOUCESTERSHIRE(AT JUNCTION WITH INNSWORTH LANE)

DESCRIPTION

V1 AND V2 TRAVELLING IN THE SAME DIRECTION. AS THEY APPROACHED THE TRAFFIC LIGHTS, THE REAR OF V1 HAS COLLIDED WITH THE HANDLEBARS OF V2

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	STOPPING	S N	65
2	Pedal Cycle	STOPPING	S N	29

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	29	2	DRIVER

DETAILED COLLISION REPORT

Ref	206421	Severity	SLIGHT		
Day	THURSDAY	Date	29 DEC 2011	Time	0255
Light	DARKNESS	Weather	FINE	Surface	DRY
Grid ref	387369 221075	Major rd	3 80	Minor rd	4 2588
Control	G WAY/UNCONTROLLED	Junction	T/STAG/Y JUNC	Speed lim	30
Lighting	LIGHTS LIT	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/000033/12	Type	I	Hazard	NONE

LOCATION

PARTON ROAD CHURCHDOWN, GLOUCESTER GLOUCESTERSHIRE

DESCRIPTION

V1 HAS COLLIDED WITH BRICK WALL AROUND THE FRONT GARDEN OF 7 PARTON ROAD NEAR JUNCTION WITH ST JOHNS AVENUE TRAVELLING FROM DIRECTION OF STATION ROAD

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	GO AHEAD OTHER	S N	28

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	28	1	DRIVER

DETAILED COLLISION REPORT

Ref	206728	Severity	SERIOUS		
Day	THURSDAY	Date	10 MAY 2012	Time	0740
Light	DAYLIGHT	Weather	FINE	Surface	WET
Grid ref	385767 221137	Major rd	3 80	Minor rd	4 479
Control	G WAY/UNCONTROLLED	Junction	T/STAG/Y JUNC	Speed lim	40
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/001715/12	Type	ZF	Hazard	NONE

LOCATION

INNSWORTH LANE, INNSWORTH, GLOUCESTER, GLOUCESTERSHIRE (JUNCTION WITH ROOKERY ROAD)

DESCRIPTION

V2 WAITING AT JUNC TO TURN RIGHT INTO MOTTERSHEAD DRIVE V1 TRAV BEHIND HAS NOT STOPPED IN TIME AND HIT REAR OF V2

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	M'cycle over 50cc up to 125cc	GO AHEAD OTHER	W E	27
2	Car	WAIT TURN RHT	W S	26

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SERIOUS	27	1	DRIVER

DETAILED COLLISION REPORT

Ref	207103	Severity	SLIGHT		
Day	THURSDAY	Date	26 JUL 2012	Time	1245
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	386332 219879	Major rd	A 40	Minor rd	
Control		Junction	NOT WITHIN 20M	Speed lim	70
Lighting	LIGHTS	Condition	NONE	C'way	DUAL CWAY
UNIFI Ref	B/003389/12	Type	Q	Hazard	NONE

LOCATION

BARNWOOD LINK, LONGLEVENS, GLOUCESTER, GLOUCESTERSHIRE

DESCRIPTION

V1 COLLIDED WITH STATIONARY V2 IN LANE 1 APPROACHING ELMBRIDGE COURT ROUNDABOUT FROM C&G ROUNDABOUT. V2 COLLIDED WITH STATIONARY V3

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	STOPPING	S N	47
2	Car	WAIT GO AHEAD	S N	63
3	Car	WAIT GO AHEAD	S N	43

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	12	2	PASSENGER
2	SLIGHT	35	2	PASSENGER
3	SLIGHT	63	2	DRIVER

DETAILED COLLISION REPORT

Ref	207274	Severity	SLIGHT		
Day	MONDAY	Date	24 SEP 2012	Time	0747
Light	DAYLIGHT	Weather	RAIN	Surface	WET
Grid ref	387314 220405	Major rd	A 40	Minor rd	
Control		Junction	NOT WITHIN 20M	Speed lim	70
Lighting	LIGHTS	Condition	NONE	C'way	DUAL CWAY
UNIFI Ref	A/003505/12	Type	WL	Hazard	NONE

LOCATION

GOLDEN VALLEY BYPASS, CHELTENHAM, GLOUCESTERSHIRE (AT JUNCTION WITH PIRTON LANE OVERBRIDGE)

DESCRIPTION

V2 HAS BROKEN DOWN IN LANE 1 CHELTENHAM BOUND WHEN V1 HAS COLLIDED WITH ITS REAR AND THEN V1 HAS COLLIDED WITH V3 WHICH WAS IN LANE 2

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	GO AHEAD OTHER	W E	29
2	Car	PARKED	W E	38
3	Car	GO AHEAD OTHER	W E	51

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	29	1	DRIVER

DETAILED COLLISION REPORT

Ref	208165	Severity	SLIGHT		
Day	MONDAY	Date	16 SEP 2013	Time	1520
Light	DAYLIGHT	Weather	FINE	Surface	WET
Grid ref	384095 221494	Major rd	A 38	Minor rd	
Control		Junction	PRIVATE	Speed lim	40
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	B/003185/13	Type	Q	Hazard	NONE

LOCATION

TEWKESBURY ROAD, TWIGWORTH, GLOUCESTER, GLOUCESTERSHIRE

DESCRIPTION

V2 STOPPED TO ALLOW V3 TO TURN RIGHT INTO A PRIVATE DRIVE. V1 HAS NOW REALISED
V2 HAS STOPPED AND COLLIDES WITH THE REAR

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Bus/coach (17+ pass seats)	GO AHEAD OTHER	S N	47
2	Car	STOPPING	S N	66
3	Car	TURNING RIGHT	N W	29

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	66	2	DRIVER

DETAILED COLLISION REPORT

Ref	208201	Severity	SLIGHT		
Day	TUESDAY	Date	08 OCT 2013	Time	0810
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	387519 221037	Major rd	3 80	Minor rd	
Control		Junction	NOT WITHIN 20M	Speed lim	30
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/003067/13	Type	CE	Hazard	NONE

LOCATION

PARTON ROAD, CHURCHDOWN, GLOUCESTER ,GLOUCESTERSHIRE

DESCRIPTION

CYCLIST TRAVELLING TOWARDS CHELTENHAM ON PARTON ROAD DECIDES TO OVERTAKE A LINE OF TRAFFIC, SUDDENLY A MINIBUS DECIDES TO TURN RIGHT BY THE CO-OP THERE WERE NO INDICATORS ON AND IT HAS HIT THE CYCLIST IN DOING SO

VEHICLE DETAILS

No	Type	Manoeuvre	From-to		Driver Age
1	Minibus (8-16 pass seats)	TURNING RIGHT	E	N	21
2	Pedal Cycle	O TAKE STA VH ON O/S	W	E	33

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	33	2	DRIVER

DETAILED COLLISION REPORT

Ref	208501	Severity	SLIGHT		
Day	THURSDAY	Date	13 FEB 2014	Time	0920
Light	DAYLIGHT	Weather	RAIN	Surface	WET
Grid ref	386705 220403	Major rd	B 4063	Minor rd	
Control		Junction	PRIVATE	Speed lim	40
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	B/002258/14	Type	G	Hazard	NONE

LOCATION

CHELTENHAM ROAD EAST GLOUCESTER GLOUCESTERSHIRE

DESCRIPTION

V2 TRAVELLING STRAIGHT AHEAD WHEN V1 HAS PULLED OUT OF DRIVEWAY AND COLLIDED WITH THE FRONT OF V2.

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	STARTING	SE NW	33
2	Car	GO AHEAD OTHER	NE SW	32

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	32	2	DRIVER

DETAILED COLLISION REPORT

Ref	208519	Severity	SERIOUS		
Day	WEDNESDAY	Date	26 FEB 2014	Time	1654
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	386483 220098	Major rd	A 40	Minor rd	
Control		Junction	NOT WITHIN 20M	Speed lim	70
Lighting	LIGHTS	Condition	NONE	C'way	DUAL CWAY
UNIFI Ref	B/000787/14	Type	Q	Hazard	NONE

LOCATION

A40 GOLDEN VALLEY NEAR ELMBRIDGE COURT ROUNDABOUT LONGLEVENS, GLOUCESTER GLOUCESTERSHIRE

DESCRIPTION

V1 WAS STATIONARY DUE TO HEAVY TRAFFIC AHEAD AND V2 HAS NOT REALISED TRAFFIC HAD STOPPED AND HAS GONE INTO THE REAR OF HIM.

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	WAIT GO AHEAD	NE SW	63
2	Car	GO AHEAD OTHER	NE SW	23

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SERIOUS	23	2	DRIVER

DETAILED COLLISION REPORT

Ref	208664	Severity	SLIGHT		
Day	SATURDAY	Date	03 MAY 2014	Time	1748
Light	DAYLIGHT	Weather	FINE	Surface	WET
Grid ref	387752 220149	Major rd	3 364	Minor rd	
Control		Junction	NOT WITHIN 20M	Speed lim	30
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/001339/14	Type	ZW	Hazard	NONE

LOCATION

PIRTON LANE, CHURCHDOWN, GLOUCESTER, GLOUCESTERSHIRE

DESCRIPTION

MOTOR CYCLIST DRIVING UP PIRTON LANE AND APPROACHES PARKED VAN A CAR DRIVING DOWN TOWARDS CRE HE STOPS TO LET CYCLIST THROUGH BUT BIKE HESITATES AND BRAKES TO THE NEARSIDE CAUSING HIM TO FALL OFF BIKE AND SLIDES INTO THE CAR CAUSING SLI

VEHICLE DETAILS

No	Type	Manoeuvre	From-to		Driver Age
1	Car	O TAKE STA VH ON O/S	E	W	34
2	M'cycle over 500cc	STOPPING	W	E	46

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	46	2	DRIVER

DETAILED COLLISION REPORT

Ref	209274	Severity	SLIGHT		
Day	SATURDAY	Date	21 FEB 2015	Time	1730
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	387285 221094	Major rd	3 80	Minor rd	B 4063
Control	AUTO SIGNALS	Junction	CROSS ROAD	Speed lim	30
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/000544/15	Type	D	Hazard	NONE

LOCATION

PARTON ROAD, CHURCHDOWN, GLOUCESTER, GLOUCESTERSHIRE (WITH INNSWORTH LANE)

DESCRIPTION

V2 TRAVELS ALONG PARTON RD AND ENTERS THE FOURWAY TRAFFIC LIGHT JUNCTION AT CHELTENHAM RD EAST AND INNSWORTH LANE LIGHTS ARE GREEN SO V2 CONTINUES TO CROSS JUNCTION TWDS INNSWORTH. V1 PULLS OUT FROM THE OPP DIREC AND STARTS TO TURN RIGH

VEHICLE DETAILS

No	Type	Manoeuvre	From-to		Driver Age
1	Car	TURNING RIGHT	W	S	21
2	Car	GO AHEAD OTHER	E	W	42

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	42	2	DRIVER

DETAILED COLLISION REPORT

Ref	209289	Severity	SLIGHT		
Day	TUESDAY	Date	03 MAR 2015	Time	0755
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	387240 220366	Major rd	A 40	Minor rd	
Control		Junction	NOT WITHIN 20M	Speed lim	70
Lighting	LIGHTS	Condition	NONE	C'way	DUAL CWAY
UNIFI Ref	A/000786/15	Type	Q	Hazard	NONE

LOCATION

GOLDEN VALLEY BYPASS, CHURCHDOWN, GLOUCESTER, GLOUCESTERSHIRE

DESCRIPTION

V2,V1 & V3 HAVE BEEN TRAVELLING BEHIND ONE ANOTHER IN LANE 2 OF THE A40 GOLDEN VALLEY TOWARDS GLOUCESTER. A SEPARATE RTC HAS OCCURRED AHEAD AND V2 HAS BRAKED HEAVILY TO AVOID STATIONARY TRAFFIC AND V1 HAS COLLIDED WITH V2 AND V3 HAS COLLI

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	STOPPING	E W	51
2	Car	STOPPING	E W	40
3	Car	STOPPING	E W	24

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	24	3	DRIVER
2	SLIGHT	40	2	DRIVER
3	SLIGHT	51	1	DRIVER

DETAILED COLLISION REPORT

Ref	209380	Severity	SLIGHT		
Day	WEDNESDAY	Date	18 MAR 2015	Time	0830
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	385380 220915	Major rd	3 80	Minor rd	3 80
Control	G WAY/UNCONTROLLED	Junction	T/STAG/Y JUNC	Speed lim	30
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/1058/15	Type	Q	Hazard	NONE

LOCATION

INNSWORTH LANE, GLOUCESTER (JUNCTION GUESSED)

DESCRIPTION

V2 DRIVING ALONG INNSWORTH LANE AND STOPPED AT STATIONARY TRAFFIC AHEAD WHEN V1 BEHIND HAS FAILED TO DO SO AND DROVE INTO THE BACK OF V2

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	GO AHEAD OTHER	S N	19
2	Car	WAIT GO AHEAD	S N	34

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	34	2	DRIVER

DETAILED COLLISION REPORT

Ref	209501	Severity	SERIOUS		
Day	TUESDAY	Date	19 MAY 2015	Time	1550
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	387877 220058	Major rd	3 364	Minor rd	
Control		Junction	NOT WITHIN 20M	Speed lim	30
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	B/1741/15	Type	P	Hazard	NONE

LOCATION

PIRTON LANE CHURCHDOWN CLOSE TO RAILWAY BRIDGE GLOUCESTER

DESCRIPTION

INJURED PEDESTRIAN CROSSING THE ROAD CLIPPED BY A VAN WHOSE DRIVER WAS LOOKING IN THE MIRROR

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Van up to 3.5 T mgw	GO AHEAD OTHER	SW NE	45

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SERIOUS	71	1	PEDESTRIAN

DETAILED COLLISION REPORT

Ref	209605	Severity	SLIGHT		
Day	FRIDAY	Date	26 JUN 2015	Time	0025
Light	DARKNESS	Weather	FINE	Surface	DRY
Grid ref	387429 221228	Major rd	B 4063	Minor rd	
Control		Junction	NOT WITHIN 20M	Speed lim	30
Lighting	LIGHTS LIT	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/1844/15	Type	IT	Hazard	NONE

LOCATION

B4063 CHELTENHAM ROAD EAST GLOUCESTER

DESCRIPTION

V1 DRIVING ERRATICALLY FROM CHELTENHAM TOWARDS HARE AND HOUNDS PUB, IT SWERVED INTO ON COMING TRAFFIC BEFORE COLLIDING WITH THE NEARSIDE OF V2 . V2 ROLLED ONTO ITS SIDE. V1 HAS CONTINUED BEFORE COLLIDING WITH A HEDGE

VEHICLE DETAILS

No	Type	Manoeuvre	From-to		Driver Age
1	Car	GO AHEAD OTHER	NE	SW	31
2	Van up to 3.5 T mgw	GO AHEAD OTHER	SW	NE	33

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	33	2	DRIVER
2	SLIGHT	31	1	DRIVER

DETAILED COLLISION REPORT

Ref	209706	Severity	SLIGHT		
Day	SATURDAY	Date	25 JUL 2015	Time	1145
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	387343 221075	Major rd	3 80	Minor rd	4 2588
Control	G WAY/UNCONTROLLED	Junction	T/STAG/Y JUNC	Speed lim	30
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	a/2221/15	Type	IH	Hazard	NONE

LOCATION

PARTON ROAD WITH ST JOHNS AVENUE, CHURCHDOWN

DESCRIPTION

V1 PULLING OUT OF ST JOHN'S AVENUE, RIGHT ONTO PARTON ROAD, TRAFFIC QUEING TO THE LEFT, GAP FOR V1 TO COME OUT HE HAS CREPT FORWARD LOOKED LEFT AND NOT SEEN ANY ONCOMING VEHICLES, COMPLETED HIS TURN. V2 HAS COME FROM CRE JUCTION NOT SEEN

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	TURNING RIGHT	SW SE	74
2	Car	GO AHEAD OTHER	NW SE	37

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	37	2	DRIVER

DETAILED COLLISION REPORT

Ref	209963	Severity	SLIGHT		
Day	WEDNESDAY	Date	04 NOV 2015	Time	1530
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	387720 220169	Major rd	3 364	Minor rd	4 2416
Control	G WAY/UNCONTROLLED	Junction	MINI R ABOUT	Speed lim	30
Lighting	LIGHTS	Condition	NONE	C'way	ROUNDABOUT
UNIFI Ref	A/3148/15	Type	CG	Hazard	NONE

LOCATION

PIRTON LANE / WINSTON ROAD CHURCHDOWN

DESCRIPTION

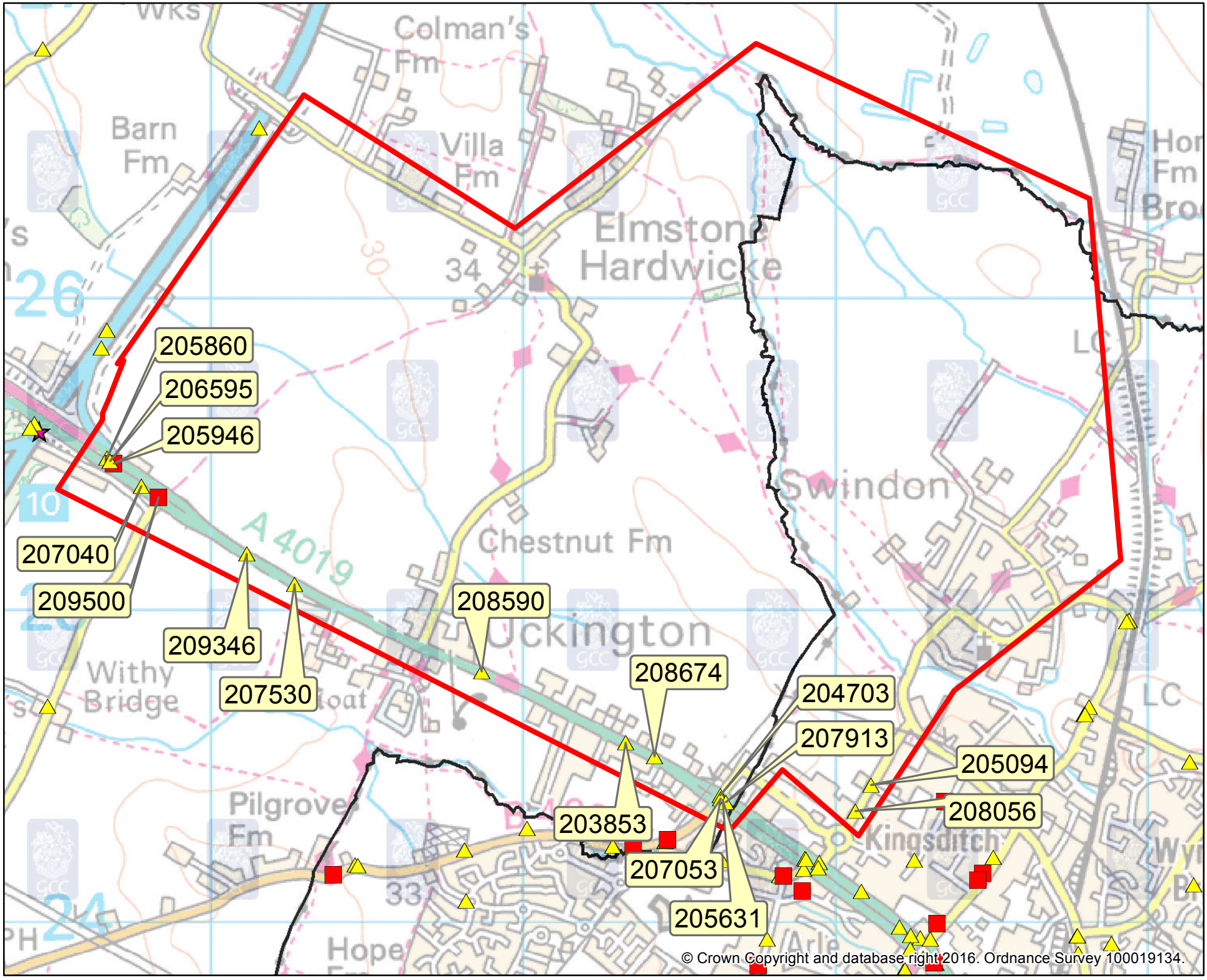
V1 HAS GONE OVER A MINI ROUNDABOUT AND HAS RIGHT OF WAY, BUT V2 (CYCLIST) HAS COME FROM LEFT AND FAILED TO STOP TO GIVE WAY AS SHOULD HAVE DONE, V2 HAD MINOR INJURY AS HIT NEARSIDE AREA OF V1

VEHICLE DETAILS

No	Type	Manoeuvre	From-to		Driver Age
1	Car	GO AHEAD OTHER	NW	SE	54
2	Pedal Cycle	STARTING	NE	SW	11

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	11	2	DRIVER



Collision Plan Site:

JCS Proposal Site A5

Data Range:
January 2011 - December 2015

Date Produced:
26.05.2016

Collision Plan Key

- Fatal
- Serious
- Slight

Drawn by: J Neininger
Team: AIP
Scale: 1:15,193

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RoadSafety
Gloucestershire

RTA2480 Detailed Collision Report

Compiled from an original report by Gloucestershire County Council

Accident Investigation and Prevention Section

Database as at 26-MAY-16

Collisions within GLOUCESTERSHIRE

For period 01-JAN-2011 TO 31-DEC-2015

DETAILED COLLISION REPORT

Ref	203853	Severity	SLIGHT		
Day	FRIDAY	Date	14 JAN 2011	Time	1736
Light	DARKNESS	Weather	FINE	Surface	DRY
Grid ref	392330 224575	Major rd	A 4019	Minor rd	
Control		Junction	NOT WITHIN 20M	Speed lim	50
Lighting	NO LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/000313/11	Type	Q	Hazard	NONE

LOCATION

TEWKESBURY ROAD, UCKINGTON, CHELTENHAM, GLOUCESTERSHIRE (FROM NORTHLEACH JUST PAST SAINSBURYS)

DESCRIPTION

VEHICLE 1 WAS TRAVELING IN A ROW OF TRAFFIC AND DID NOT SEE THE VEHICLES IN FRONT OF IT STOPPING AND COLLIDED WITH THE REAR OF VEHICLE 3. VEHICLE 2 THEN COLLIDED ITH REAR OF VEHICLE 3 AND VEHICLE 3 WITH REAR OF 4

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	GO AHEAD OTHER	SE NW	54
2	Car	GO AHEAD OTHER	SE NW	46
3	Car	GO AHEAD OTHER	SE NW	28
4	Car	GO AHEAD OTHER	SE NW	45

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	28	3	DRIVER
2	SLIGHT	54	1	DRIVER

DETAILED COLLISION REPORT

Ref	204703	Severity	SLIGHT		
Day	TUESDAY	Date	10 MAY 2011	Time	2156
Light	DARKNESS	Weather	FINE	Surface	DRY
Grid ref	392633 224405	Major rd	A 4019	Minor rd	A 4019
Control	AUTO SIGNALS	Junction	CROSS ROAD	Speed lim	40
Lighting	LIGHTS LIT	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/002563/11	Type	D	Hazard	NONE

LOCATION

TEWKESBURY ROAD, CHELTENHAM, GLOUCESTERSHIRE (AT JUNCTION WITH HAYDEN ROAD)

DESCRIPTION

V1 TRAVELLING ALONG TEWKESBURY ROAD FROM CHELTENHAM TOWARDS COOMBE HILL AND V2 TRAVELLING IN OPPOSITE DIRECTION. V2 TURNING RIGHT INTO HAYDEN ROAD AND V1 HAS COLLIDED WITH THE NEARSIDE OF V2

VEHICLE DETAILS

No	Type	Manoeuvre	From-to		Driver Age
1	Car	GO AHEAD OTHER	SW	NE	46
2	Car	TURNING RIGHT	NW	SW	21

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	23	2	PASSENGER
2	SLIGHT	46	1	DRIVER

DETAILED COLLISION REPORT

Ref	205631	Severity	SLIGHT		
Day	SATURDAY	Date	10 SEP 2011	Time	1020
Light	DAYLIGHT	Weather	RAIN	Surface	WET
Grid ref	392641 224391	Major rd	A 4019	Minor rd	B 4634
Control	AUTO SIGNALS	Junction	CROSS ROAD	Speed lim	40
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/003679/11	Type	H	Hazard	NONE

LOCATION

TEWKESBURY ROAD, CHELTENHAM, GLOUCESTERSHIRE (AT JUNCTION WITH B4634 HAYDEN ROAD)

DESCRIPTION

V1 HAS FAILED TO GIVE WAY AT JUNCTION AND COLLIDED WITH V2

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	GO AHEAD OTHER	E W	27
2	Car	GO AHEAD OTHER	S N	75

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	69	2	PASSENGER

DETAILED COLLISION REPORT

Ref	205094	Severity	SLIGHT		
Day	FRIDAY	Date	07 OCT 2011	Time	1333
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	393116 224439	Major rd	3 85	Minor rd	7 9059
Control	G WAY/UNCONTROLLED	Junction	T/STAG/Y JUNC	Speed lim	30
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/004154/11	Type	F	Hazard	NONE

LOCATION

MANOR ROAD, SWINDON, CHELTENHAM, GLOUCESTERSHIRE (AT JUNCTION WITH MACKENZIE ROAD)

DESCRIPTION

V2 STATIONARY IN MANOR ROAD INDICATING TO TURN RIGHT INTO MACKENZIE WAY. V1 HAS COLLIDED WITH THE REAR OF V2

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	GO AHEAD OTHER	SW NE	77
2	Car	WAIT TURN RHT	SW SE	37

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	71	1	PASSENGER
2	SLIGHT	37	2	DRIVER
3	SLIGHT	77	1	DRIVER

DETAILED COLLISION REPORT

Ref	205860	Severity	SLIGHT		
Day	TUESDAY	Date	22 NOV 2011	Time	0720
Light	DAYLIGHT	Weather	RAIN	Surface	WET
Grid ref	390667 225487	Major rd	M 5	Minor rd	A 4019
Control	G WAY/UNCONTROLLED	Junction	SLIP ROAD	Speed lim	50
				C'way	SLIP ROAD
Lighting	LIGHTS	Condition	NONE		
UNIFI Ref	A/004638/11	Type	Q	Hazard	NONE

LOCATION

A4019, TEWKESBURY ROAD, CHELTENHAM, GLOUCESTERSHIRE (ON SLIP ROAD AT JUNCTION WITH THE M5)

DESCRIPTION

V3 STOPPED IN HEAVY TRAFFIC ON SLIP ROAD FROM THE M5 JOINING THE A4019. V2 STOPPED BEHIND V3. V1 HAS HIT THE REAR OF V2 SHUNTING IT INTO THE REAR OF V3

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	WAIT GO AHEAD	NW SE	60
2	Car	WAIT GO AHEAD	NW SE	46
3	Car	WAIT GO AHEAD	NW SE	50

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	57	3	PASSENGER

DETAILED COLLISION REPORT

Ref	205946	Severity	SERIOUS		
Day	FRIDAY	Date	27 JAN 2012	Time	0900
Light	DAYLIGHT	Weather	FINE	Surface	WET
Grid ref	390689 225469	Major rd	M 5	Minor rd	A 4019
Control	G WAY/UNCONTROLLED	Junction	SLIP ROAD	Speed lim	60
Lighting	LIGHTS	Condition	NONE	C'way	SLIP ROAD
UNIFI Ref	A/000479/12	Type	Q	Hazard	NONE

LOCATION

TEWKESBURY ROAD, CHELTENHAM, GLOUCESTERSHIRE (AT JUNCTION 10 EXIT)

DESCRIPTION

V2 WAS HELD AT JUNCTION WAITING TO JOIN A4019 FROM M5 MOTORWAY. V1 EXITED THE MOTORWAY AND DUE TO LOW SUN DID NOT SEE V2 WAITING, RESULTING IN A REAR END SHUNT

VEHICLE DETAILS

No	Type	Manoeuvre	From-to		Driver Age
1	Car	STOPPING	NW	SE	29
2	Car	WAIT TURN LEFT	NW	SE	34

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	34	2	DRIVER
2	SERIOUS	29	1	DRIVER

DETAILED COLLISION REPORT

Ref	206595	Severity	SLIGHT		
Day	WEDNESDAY	Date	01 FEB 2012	Time	1600
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	390678 225477	Major rd	M 5	Minor rd	A 4019
Control	G WAY/UNCONTROLLED	Junction	SLIP ROAD	Speed lim	60
Lighting	LIGHTS	Condition	NONE	C'way	SLIP ROAD
UNIFI Ref	A/000756/12	Type	Q	Hazard	NONE

LOCATION

M5 JUNCTION 10 MOTORWAY, GLOUCESTERSHIRE (SLIP ROAD SOUTHBOUND)

DESCRIPTION

V2 STOPPED WAITING TO JOIN A4019, WHEN V1 HIT REAR

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	GO AHEAD OTHER	NW E	22
2	Car	STOPPING	NW E	35

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	24	2	PASSENGER
2	SLIGHT	56	2	PASSENGER
3	SLIGHT	28	2	PASSENGER
4	SLIGHT	24	2	PASSENGER
5	SLIGHT	16	2	PASSENGER
6	SLIGHT	35	2	DRIVER

DETAILED COLLISION REPORT

Ref	207040	Severity	SLIGHT		
Day	THURSDAY	Date	02 AUG 2012	Time	2225
Light	DARKNESS	Weather	FINE	Surface	DRY
Grid ref	390777 225397	Major rd	A 4019	Minor rd	
Control		Junction	PRIVATE	Speed lim	50
Lighting	NO LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/002741/12	Type	U	Hazard	NONE

LOCATION

TEWKESBURY ROAD ELMSTONE HARDWICKE, CHELTENHAM GLOUCESTERSHIRE(AT JUNCTION WITH THE GREEN OUTSIDE LABURNUM)

DESCRIPTION

V1 TRAVELLING A4019 CHELTENHAM TOWARDS COOMBE HILL COLLIDED WITH V2 PERFORMING THREE POINT TURN USING ENTRANCE/EXIT TO LAYBY

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	GO AHEAD OTHER	E W	28
2	Car	TURNING RIGHT	N W	45

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	43	2	PASSENGER
2	SLIGHT	17	2	PASSENGER

DETAILED COLLISION REPORT

Ref	207053	Severity	SLIGHT		
Day	TUESDAY	Date	14 AUG 2012	Time	2120
Light	DARKNESS	Weather	RAIN	Surface	WET
Grid ref	392634 224395	Major rd	A 4019	Minor rd	B 4634
Control	AUTO SIGNALS	Junction	CROSS ROAD	Speed lim	40
Lighting	LIGHTS LIT	Condition	NONE	C'way	DUAL CWAY
UNIFI Ref	A/002944/12	Type	D	Hazard	NONE

LOCATION

TEWKESBURY ROAD CHELTENHAM GLOUCESTERSHIRE (AT JUNCTION WITH B4634 HAYDEN ROAD)

DESCRIPTION

V1 TRAVELLING A4019 FROM CHELTENHAM FAILED TO NOTICE RED TRAFFIC LIGHT, COLLIDED WITH V2 TURNING RIGHT INTO HAYDEN ROAD

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	GO AHEAD OTHER	SE NW	53
2	Car	TURNING RIGHT	NW SW	26

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	53	1	DRIVER

DETAILED COLLISION REPORT

Ref	207530	Severity	SLIGHT		
Day	THURSDAY	Date	20 DEC 2012	Time	1330
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	391268 225083	Major rd	A 4019	Minor rd	A 4019
Control	G WAY/UNCONTROLLED	Junction	OTHER JUNC	Speed lim	50
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/000122/13	Type	FQ	Hazard	NONE

LOCATION

TEWKESBURY ROAD, CHELTENHAM, GLOUCESTERSHIRE LAYBY BY DISTINCTIVE IRONWORKS

DESCRIPTION

V3 WAS STATIONARY SIGNALLING RIGHT WAITING TO TURN OFF THE CARRIAGEWAY INTO A LAYBY. V2 CAME TO A HALT BEHIND V3. V1 WAS TRAVELLING IN THE SAME DIRECTION AS V3 AND V2 BUT FAILED TO STOP COLLIDING WITH THE REAR NEARSIDE OF V2 SHUNTING THA

VEHICLE DETAILS

No	Type	Manoeuvre	From-to		Driver Age
1	Car	STOPPING	NW	SE	64
2	Car	WAIT GO AHEAD	NW	SE	56
3	Car	WAIT TURN RHT	NW	SE	

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	64	1	DRIVER

DETAILED COLLISION REPORT

Ref	207913	Severity	SLIGHT		
Day	FRIDAY	Date	05 JUL 2013	Time	1645
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	392651 224384	Major rd	A 4019	Minor rd	B 4634
Control	AUTO SIGNALS	Junction	CROSS ROAD	Speed lim	40
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/002119/13	Type	Q	Hazard	NONE

LOCATION

TEWKESBURY ROAD, CHELTENHAM, GLOUCESTERSHIRE (AT JUNCTION WITH HAYDEN ROAD)

DESCRIPTION

V1 HAS APPLIED CLUTCH INSTEAD OF BRAKE AND GONE UP THE REAR OF THE VEHICLE IN FRONT OF HER

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	STOPPING	SE NW	33
2	Car	WAIT GO AHEAD	SE NW	40

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	33	2	PASSENGER
2	SLIGHT	37	2	PASSENGER
3	SLIGHT	39	2	PASSENGER
4	SLIGHT	34	2	PASSENGER
5	SLIGHT	52	2	PASSENGER
6	SLIGHT	19	2	PASSENGER
7	SLIGHT	5	1	PASSENGER
8	SLIGHT	7	1	PASSENGER

DETAILED COLLISION REPORT

Ref	208056	Severity	SLIGHT		
Day	THURSDAY	Date	22 AUG 2013	Time	1740
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	393066 224356	Major rd	3 85	Minor rd	
Control		Junction	NOT WITHIN 20M	Speed lim	30
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/002635/13	Type	Q	Hazard	NONE

LOCATION

MANOR ROAD, SWINDON, CHELTENHAM, GLOUCESTERSHIRE (OUTSIDE CARPET RIGHT)

DESCRIPTION

V2 HAS SLOWED DOWN DUE TO SLOW MOVING TRAFFIC AHEAD AND V1 HAS FAILED TO NOTICE AND HAS COLLIDED WITH THE REAR THIS HAS CAUSING V2 TO BE SHUNTED INTO V3 AS WELL

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	GO AHEAD OTHER	NE SW	48
2	Car	STOPPING	NE SW	52
3	Car	WAIT GO AHEAD	NE SW	39

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	52	2	DRIVER

DETAILED COLLISION REPORT

Ref	208590	Severity	SLIGHT		
Day	FRIDAY	Date	21 FEB 2014	Time	0447
Light	DARKNESS	Weather	FINE	Surface	DRY
Grid ref	391869 224803	Major rd	A 4019	Minor rd	
Control		Junction	NOT WITHIN 20M	Speed lim	50
Lighting	NO LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/001140/14	Type	IB	Hazard	NONE

LOCATION

TEWKESBURY ROAD CHELTENHAM GLOUCESTERSHIRE

DESCRIPTION

VEHICLE TAKEN WITHOUT OWNERS CONSENT AND FOUND CRASHED ON THE TEWKESBURY ROAD, DRIVER SUFFERED INJURIES TO SHOULDER FOLLOWING CRASH

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	GO AHEAD OTHER	NW SE	44

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	44	1	DRIVER

DETAILED COLLISION REPORT

Ref	208674	Severity	SLIGHT		
Day	SATURDAY	Date	10 MAY 2014	Time	1137
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	392422 224530	Major rd	A 4019	Minor rd	
Control		Junction	NOT WITHIN 20M	Speed lim	50
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/001521/14	Type	T	Hazard	NONE

LOCATION

TEWKESBURY ROAD, CHELTENHAM, GLOUCESTERSHIRE, A4019

DESCRIPTION

V1 HAS COME OVER INTO THE OPPOSITE CARRIAGEWAY SLIGHTLY KNOCKING V2'S WING MIRROR OFF WHICH HAS CAUSED THE DRIVERS SIDE WINDOW TO SMASH

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	GO AHEAD RH BEND	E W	28
2	Car	GO AHEAD LH BEND	W E	37

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	37	2	DRIVER

DETAILED COLLISION REPORT

Ref	209346	Severity	SLIGHT		
Day	MONDAY	Date	01 SEP 2014	Time	1507
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	391116 225180	Major rd	A 4019	Minor rd	A 4019
Control	G WAY/UNCONTROLLED	Junction	OTHER JUNC	Speed lim	50
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/002556/14	Type	HT	Hazard	NONE

LOCATION

A4019 TEWKESBURY ROAD, UCKINGTON, CHELTENHAM, GLOS AT LAYBY IN 50MPH LIMIT

DESCRIPTION

V2 TRAVELLING FROM M5 TOWARDS CHELTENHAM. V1 PULLS OUT A LAYBY ON THE OPPOSITE SIDE OF THE ROAD. V1 INTENDS TO TURN LEFT BUT DOES NOT STEER ENOUGH AND DRIVES INTO CAB OF V1

VEHICLE DETAILS

No	Type	Manoeuvre	From-to		Driver Age
1	Car	TURNING LEFT	S	NW	78
2	Goods veh over 7.5 T mgw	GO AHEAD OTHER	NW	SE	62

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	78	1	DRIVER
2	SLIGHT	62	2	DRIVER

DETAILED COLLISION REPORT

Ref	209500	Severity	SERIOUS		
Day	THURSDAY	Date	21 MAY 2015	Time	1925
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	390833 225361	Major rd	A 4019	Minor rd	4 421
Control	G WAY/UNCONTROLLED	Junction	T/STAG/Y JUNC	Speed lim	50
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/1887/15	Type	G	Hazard	NONE

LOCATION

A4019 (JUNCTION GUESSED)

DESCRIPTION

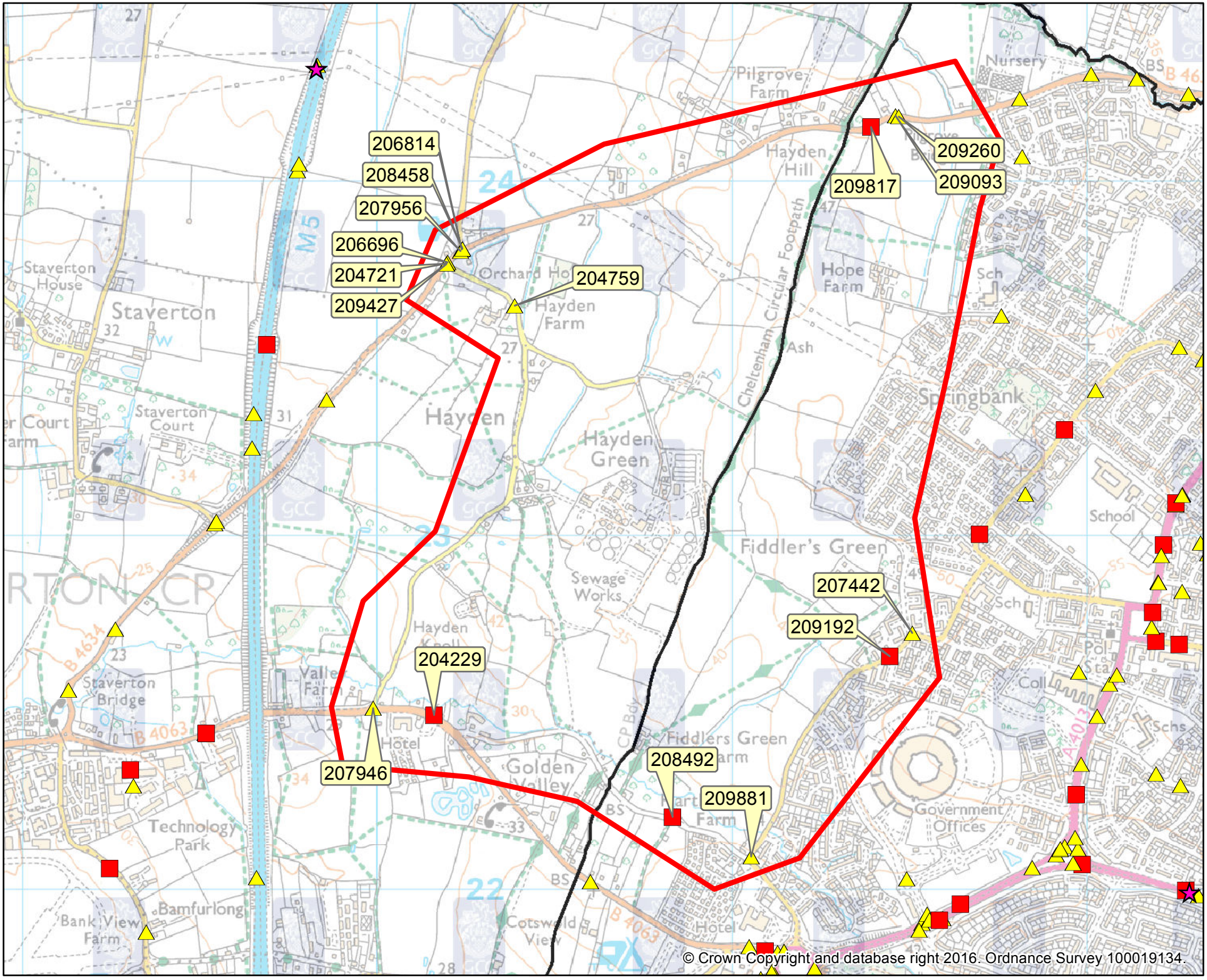
V1 PULLED OUT OF A JUNCTION ONTO MAIN ROAD INTO THE PATH OF V2

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	TURNING RIGHT	S E	44
2	Car	GO AHEAD OTHER	E W	25

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SERIOUS	25	2	DRIVER



Collision Plan Site:

JCS Proposals
Site
West of Cheltenham

Data Range:
January 2011 -
December 2015

Date Produced:
26.05.2016

Collision Plan Key

- Fatal
- Serious
- Slight

Drawn by: J Neininger
Team: AIP
Scale: 1:13,369

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RoadSafety
Gloucestershire

RTA2480 Detailed Collision Report

Compiled from an original report by Gloucestershire County Council

Accident Investigation and Prevention Section

Database as at 26-MAY-16

Collisions within GLOUCESTERSHIRE

For period 01-JAN-2011 TO 31-DEC-2015

AREA West of Cheltenham

DETAILED COLLISION REPORT

Ref	204229	Severity	SERIOUS		
Day	SUNDAY	Date	20 MAR 2011	Time	1012
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	390161 222491	Major rd	B 4063	Minor rd	
Control		Junction	NOT WITHIN 20M	Speed lim	50
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/001591/11	Type	ZI	Hazard	NONE

LOCATION

OLD GLOUCESTER ROAD, STAVERTON, CHELTENHAM, GLOUCESTERSHIRE OUTSIDE KNOLL COTTAGES

DESCRIPTION

V1 HAD ONLY TRAVELLED A SHORT DISTANCE TOWARDS CHELTENHAM AND LOST CONTROL CAUSING THE BIKE TO GO FROM UNDER THEM AND SKID UP ONTO THE PAVEMENT.

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	M'cycle over 500cc	GO AHEAD RH BEND	W E	38

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SERIOUS	38	1	DRIVER

DETAILED COLLISION REPORT

Ref	204721	Severity	SLIGHT		
Day	TUESDAY	Date	28 JUN 2011	Time	0815
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	390196 223766	Major rd	B 4634	Minor rd	4 427
Control	G WAY/UNCONTROLLED	Junction	T/STAG/Y JUNC	Speed lim	50
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/003516/11	Type	TH	Hazard	NONE

LOCATION

OLD GLOUCESTER ROAD, HAYDEN, CHELTENHAM, GLOUCESTERSHIRE (AT JUNCTION WITH HAYDEN LANE)

DESCRIPTION

V2 PULLING OFF THE MAIN ROAD INTO THE JUNCTION TURNING RIGHT AND V1 STOPPED AT OR APPROACHING JUNCTION ON MINOR ROAD. V1 HIT THE REAR OFFSIDE OF V2. BOTH DRIVERS BLAMED THE OTHER

VEHICLE DETAILS

No	Type	Manoeuvre	From-to		Driver Age
1	Car	WAIT TURN LEFT	SE	NE	32
2	Goods veh over 7.5 T mgw	TURNING RIGHT	SW	SE	43

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	32	1	DRIVER

DETAILED COLLISION REPORT

Ref	204759	Severity	SLIGHT		
Day	FRIDAY	Date	22 JUL 2011	Time	2300
Light	DARKNESS	Weather	FINE	Surface	DRY
Grid ref	390388 223647	Major rd	4 427	Minor rd	
Control		Junction	NOT WITHIN 20M	Speed lim	30
Lighting	NO LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/003723/11	Type	I	Hazard	NONE

LOCATION

HAYDEN LANE, HAYDEN, CHELTENHAM, GLOUCESTERSHIRE (EXACT LOCATION UNKNOWN)

DESCRIPTION

V1 HAS MISJUDGED SPEED INTO LEFT HAND BEND AND LEFT THE ROAD TO THE OFFSIDE AND ENDED UP IN THE HEDGE

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	GO AHEAD LH BEND	NW SE	18

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	16	1	PASSENGER
2	SLIGHT	17	1	PASSENGER
3	SLIGHT	18	1	DRIVER

DETAILED COLLISION REPORT

Ref	206696	Severity	SLIGHT		
Day	WEDNESDAY	Date	25 APR 2012	Time	2216
Light	DARKNESS	Weather	RAIN/WIND	Surface	WET
Grid ref	390199 223769	Major rd	B 4634	Minor rd	4 427
Control	G WAY/UNCONTROLLED	Junction	T/STAG/Y JUNC	Speed lim	50
Lighting	UNKNOWN	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/001694/12	Type	H	Hazard	NONE

LOCATION

B4634 JUNCTION WITH HAYDEN LANE, HAYDEN, CHELTENHAM, GLOUCESTERSHIRE (NEAR HOUSE IN THE TREE JUNCTION)

DESCRIPTION

V1 WENT TO TURN RIGHT INTO OLD GLOUCESTER ROAD AND COLLIDED WITH V2 TRAVELLING FROM CHELTENHAM

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	TURNING RIGHT	SE NE	55
2	Car	GO AHEAD LH BEND	NE SW	21

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	21	2	DRIVER
2	SLIGHT	55	1	DRIVER

DETAILED COLLISION REPORT

Ref	206814	Severity	SLIGHT		
Day	SUNDAY	Date	27 MAY 2012	Time	1727
Light	DAYLIGHT	Weather	FINE	Surface	WET
Grid ref	390239 223805	Major rd	B 4634	Minor rd	4 421
Control	G WAY/UNCONTROLLED	Junction	T/STAG/Y JUNC	Speed lim	50
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/001961/12	Type	G	Hazard	NONE

LOCATION

OLD GLOUCESTER ROAD, HAYDEN, CHELTENHAM, GLOUCESTERSHIRE (AT JUNCTION WITH WITHYBRIDGE LANE)

DESCRIPTION

V2 HAS TURNED RIGHT OUT OF WITHYBRIDGE LANE INTO PATH OF V1 TRAVELLING TOWARDS CHELTENHAM. V2 SPAN INTO PUB SIGN AND V1 WAS LEFT THE ROAD ON THE OFFSIDE. V2 DRIVER WAS BLINDED BY BRIGHT SUNLIGHT

VEHICLE DETAILS

No	Type	Manoeuvre	From-to		Driver Age
1	Car	TURNING RIGHT	NW	SW	19
2	Car	GO AHEAD RH BEND	SW	NE	36

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	16	2	PASSENGER
2	SLIGHT	21	1	PASSENGER
3	SLIGHT	36	2	DRIVER
4	SLIGHT	19	1	DRIVER

DETAILED COLLISION REPORT

Ref	207442	Severity	SLIGHT		
Day	FRIDAY	Date	28 DEC 2012	Time	0300
Light	DARKNESS	Weather	RAIN	Surface	WET
Grid ref	391510 222723	Major rd	4 90959	Minor rd	4 90959
Control	G WAY/UNCONTROLLED	Junction	MINI R ABOUT	Speed lim	30
				C'way	ROUNDABOUT
Lighting	LIGHTS LIT	Condition	NONE		
UNIFI Ref	A/000237/13	Type	P	Hazard	NONE

LOCATION

FIDDLERS GREEN LANE, CHELTENHAM, GLOUCESTERSHIRE

DESCRIPTION

A DRUNK PEDESTRIAN HAS STEPPED OUT IN FRONT OF THE CAR

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Van up to 3.5 T mgw	GO AHEAD OTHER	S N	49

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	57	1	PEDESTRIAN

DETAILED COLLISION REPORT

Ref	207956	Severity	SLIGHT		
Day	THURSDAY	Date	02 MAY 2013	Time	0740
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	390235 223801	Major rd	B 4634	Minor rd	4 421
Control	G WAY/UNCONTROLLED	Junction	T/STAG/Y JUNC	Speed lim	50
Lighting	LIGHTS	Condition	TRF SIG OUT	C'way	SINGLE CWAY
UNIFI Ref	A/001341/13	Type	G	Hazard	NONE

LOCATION

WITHYBRIDGE LANE, CHELTENHAM, GLOUCESTERSHIRE (WITH OLD GLOUCESTER ROAD)

DESCRIPTION

V1 HAS PULLED OUT INT0 THE PATH OF V2

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	TURNING RIGHT	N W	49
2	Car	GO AHEAD OTHER	W E	49

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	49	2	DRIVER
2	SLIGHT	49	1	DRIVER

DETAILED COLLISION REPORT

Ref	207946	Severity	SLIGHT		
Day	FRIDAY	Date	19 JUL 2013	Time	0825
Light	DAYLIGHT	Weather	FINE	Surface	WET
Grid ref	389989 222512	Major rd	B 4063	Minor rd	4 427
Control	G WAY/UNCONTROLLED	Junction	CROSS ROAD	Speed lim	50
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/002320/13	Type	ZF	Hazard	NONE

LOCATION

GLOUCESTER ROAD, STAVERTON, CHELTENHAM, GLOUCESTERSHIRE (WITH HAYDEN LANE)

DESCRIPTION

V2 WAS STATIONARY WHEN V1 HAS BEEN COMING AROUND THE BEND AND HAS COLLIDED WHITH REAR AS IT WAS WAITING TO MAKE A TURN

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	M'cycle over 500cc	GO AHEAD OTHER	E W	30
2	Car	TURNING RIGHT	E N	27

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	27	2	DRIVER
2	SLIGHT	30	1	DRIVER

DETAILED COLLISION REPORT

Ref	208458	Severity	SLIGHT		
Day	TUESDAY	Date	28 JAN 2014	Time	0805
Light	DAYLIGHT	Weather	RAIN	Surface	WET
Grid ref	390241 223807	Major rd	B 4634	Minor rd	4 421
Control	G WAY/UNCONTROLLED	Junction	T/STAG/Y JUNC	Speed lim	50
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/000361/14	Type	H	Hazard	NONE

LOCATION

OLD GLOUCESTER ROAD HAYDEN, CHELTENHAM GLOUCESTERSHIRE (NEAR THE HOUSE IN THE TREE PUBLIC HOUSE)

DESCRIPTION

V1 HAS PULLED OUT INTO THE PATH OF V2

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	TURNING RIGHT	N W	43
2	Car	GO AHEAD OTHER	E W	28

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	28	2	DRIVER
2	SLIGHT	43	1	DRIVER

DETAILED COLLISION REPORT

Ref	208492	Severity	SERIOUS		
Day	MONDAY	Date	10 FEB 2014	Time	1813
Light	DARKNESS	Weather	FINE	Surface	WET
Grid ref	390833 222204	Major rd	4 382	Minor rd	
Control		Junction	NOT WITHIN 20M	Speed lim	40
Lighting	LIGHTS LIT	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/000678/14	Type	ZW	Hazard	NONE

LOCATION

PHEASANT LANE CHELTENHAM GLOUCESTERSHIRE

DESCRIPTION

V2 HAS BROKEN DOWN AND HAD NO LIGHTS AT ALL. SOME CARS HAVE PASSED FINE AND SEEN VEHICLE BUT V1 HAS NOT AND COLLIDED WITH THE REAR.

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	M'cycle over 500cc	GO AHEAD OTHER	SE NW	30
2	Car	PARKED	PAR	21

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	19	1	PASSENGER
2	SERIOUS	30	1	DRIVER

DETAILED COLLISION REPORT

Ref	209093	Severity	SLIGHT		
Day	WEDNESDAY	Date	05 NOV 2014	Time	0810
Light	DAYLIGHT	Weather	FINE	Surface	WET
Grid ref	391462 224183	Major rd	B 4634	Minor rd	
Control		Junction	NOT WITHIN 20M	Speed lim	40
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/003248/14	Type	T	Hazard	NONE

LOCATION

B4634, OLD GLOUCESTER ROAD, STAVERTON, CHELTENHAM, GLOUCESTERSHIRE

DESCRIPTION

V1 TRAV OLD GLOS RD TWDS CHELTENHAM WHILST NEGOTIATING A SERIES OF DOWNHILL BENDS THE DRIVER HAS LOST CONTROL OF HIS VEHICLE AND LEFT THE ROAD TO THE N/SIDE DAMAGING SOME PLASTIC WARNING MARKINGS. V1 HAS THEN REBOUNDED BACK INTO THE RD A

VEHICLE DETAILS

No	Type	Manoeuvre	From-to		Driver Age
1	Car	GO AHEAD RH BEND	W	E	17
2	Car	GO AHEAD OTHER	E	W	29

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	16	1	PASSENGER
2	SLIGHT	29	2	DRIVER

DETAILED COLLISION REPORT

Ref	209192	Severity	SERIOUS		
Day	SATURDAY	Date	20 DEC 2014	Time	0431
Light	DARKNESS	Weather	FINE	Surface	DRY
Grid ref	391446 222657	Major rd	4 90959	Minor rd	4 90961
Control	G WAY/UNCONTROLLED	Junction	T/STAG/Y JUNC	Speed lim	30
Lighting	LIGHTS LIT	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/000027/15	Type	I	Hazard	NONE

LOCATION

FIDDLERS GREEN LANE, CHELTENHAM, GLOUCESTERSHIRE (WITH KEMPTON GROVE)

DESCRIPTION

V1 WAS TRAVELLING AT SPEED ALONG FIDDLERS GREEN LANE TOWARDS CHELTENHAM, LOST CONTROL AND LEFT CARRIAGEWAY ON THE OFFSIDE AND COLLIDED WITH A TREE

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	GO AHEAD LH BEND	SW NE	22

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	18	1	PASSENGER
2	SERIOUS	24	1	PASSENGER
3	SLIGHT	19	1	PASSENGER
4	SERIOUS	22	1	DRIVER

DETAILED COLLISION REPORT

Ref	209260	Severity	SLIGHT		
Day	TUESDAY	Date	10 FEB 2015	Time	2105
Light	DARKNESS	Weather	OTHER	Surface	WET
Grid ref	391471 224181	Major rd	B 4634	Minor rd	
Control		Junction	NOT WITHIN 20M	Speed lim	40
Lighting	NO LIGHTS	Condition	MUD	C'way	SINGLE CWAY
UNIFI Ref	A/000635/15	Type	I	Hazard	NONE

LOCATION

B4634, OLD GLOUCESTER ROAD, HAYDEN, CHELTENHAM, GLOUCESTERSHIRE (300 M WEST OF JUNCTION WITH PILGROVE WAY)

DESCRIPTION

V1 TRAV FROM DIREC OF B4063 TWDS TEWKS RD ON THE B4063. ROAD SURFACE WAS DAMP AND THERE WERE MUD DEPOSITS ON THERE ALSO. DRIVER LOST CONTROL TRAV AROUND GRADUAL LEFT HAND BEND AND COLLIDED WITH VERGE ON OFFSIDE CAUSING VEHICLE TO ROL

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	GO AHEAD LH BEND	E W	22

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	22	1	DRIVER

DETAILED COLLISION REPORT

Ref	209427	Severity	SLIGHT		
Day	FRIDAY	Date	17 APR 2015	Time	1815
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	390196 223764	Major rd	B 4634	Minor rd	4 427
Control	G WAY/UNCONTROLLED	Junction	T/STAG/Y JUNC	Speed lim	50
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/1124/15	Type	G	Hazard	NONE

LOCATION

B4634 OLD GLOUCESTER ROAD AT J/W HAYDEN LANE

DESCRIPTION

V1 AT HAYDEN LANE JUNC TURNING RIGHT ONTO OLD GLOS RD. V1 PULLED OUT INTO THE PATH OF V2 WHO WAS TRAV FROM CHELT TWDS CHURCHDOWN. V2 ATTEMPTED TO SWERVE TO AVOID COLLISION BUT WAS CLIPPED BY V1 AND LEFT THE RD AND HIT FENCE

VEHICLE DETAILS

No	Type	Manoeuvre	From-to		Driver Age
1	Car	TURNING RIGHT	N	NE	64
2	Goods veh over 3.5T up to 7.5T mgw	GO AHEAD OTHER	NE	SW	24

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	64	1	DRIVER
2	SLIGHT	60	1	PASSENGER
3	SLIGHT	24	2	DRIVER

DETAILED COLLISION REPORT

Ref	209817	Severity	SERIOUS		
Day	SATURDAY	Date	22 AUG 2015	Time	1855
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	391393 224151	Major rd	B 4634	Minor rd	
Control		Junction	NOT WITHIN 20M	Speed lim	40
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	a/2452/15	Type	I	Hazard	NONE

LOCATION

THE B4634 HAYDEN ROAD, CHELTENHAM

DESCRIPTION

V1 TRAVELLING IN EXCESS OF 40MPH LOST CONTROL WHEN IT HIT THE KERB, REBOUNDED TO OFFSIDE VERGE AND HIT A TREE

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	GO AHEAD OTHER	NE SW	27

CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SERIOUS	27	1	DRIVER

DETAILED COLLISION REPORT

Ref	209881	Severity	SLIGHT		
Day	SATURDAY	Date	03 OCT 2015	Time	1751
Light	DAYLIGHT	Weather	FINE	Surface	DRY
Grid ref	391055 222092	Major rd	4 90959	Minor rd	4 90959
Control	G WAY/UNCONTROLLED	Junction	T/STAG/Y JUNC	Speed lim	30
Lighting	LIGHTS	Condition	NONE	C'way	SINGLE CWAY
UNIFI Ref	A/2922/15	Type	K	Hazard	NONE

LOCATION

FIDDLERS GREEN LANE CHELTENHAM

DESCRIPTION

V1 HAS BEEN OVERTAKING ON A BEND AND COLLIDED WITH V2 WHICH WAS TRAVELLING IN THE OPPOSITE DIRECTION

VEHICLE DETAILS

No	Type	Manoeuvre	From-to	Driver Age
1	Car	O TAKE MOV VH O/S	E W	
2	Car	GO AHEAD RH BEND	W E	51

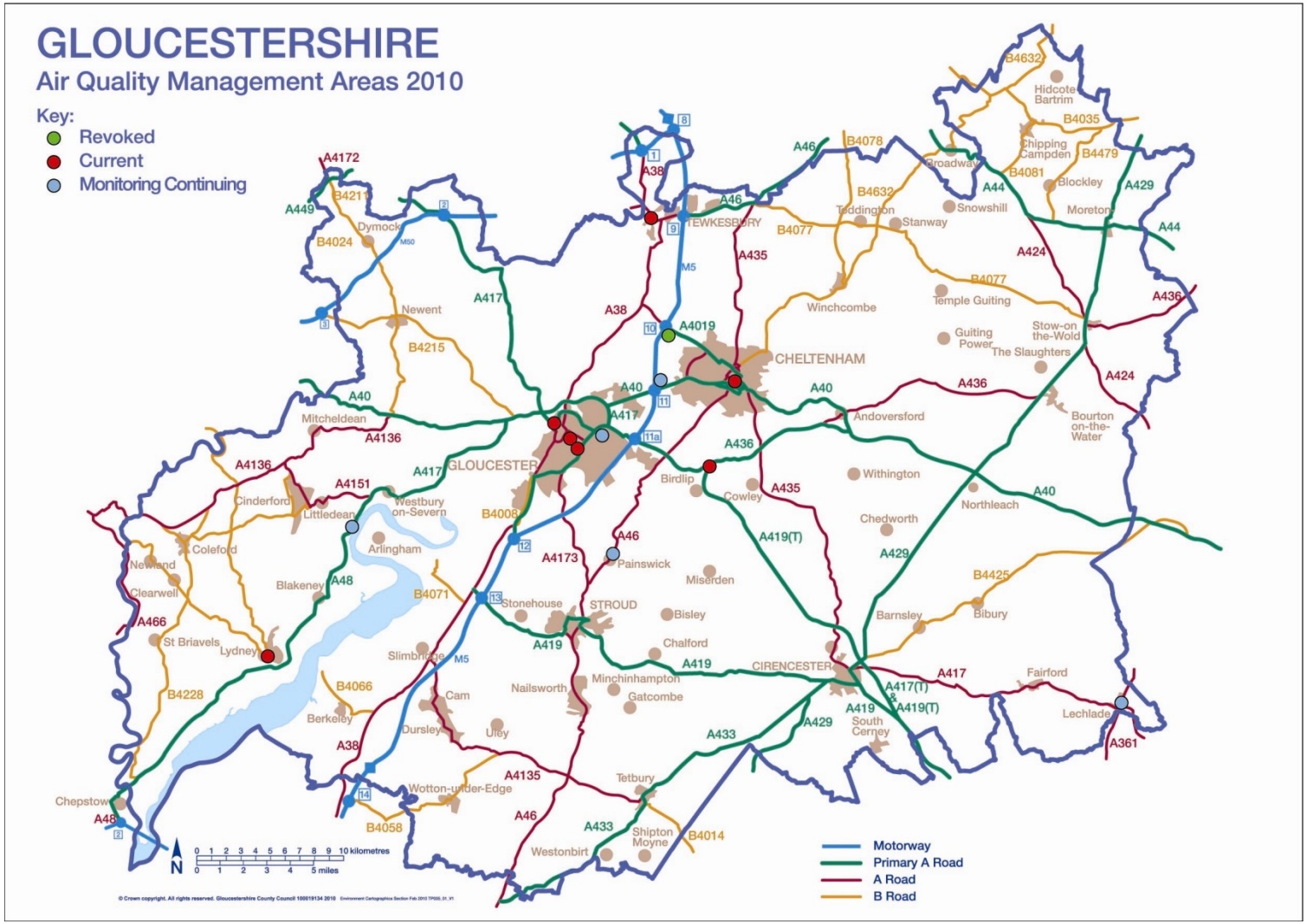
CASUALTY DETAILS

No	Severity	Casualty Age	Veh	Further Details
1	SLIGHT	51	2	DRIVER

Appendix F – Location of Air Quality Management Areas in Gloucestershire

JCS Transport Strategy Evidence Base

APPENDIX F – Location of Air Quality Management Areas in Gloucestershire



Appendix G – Important noise areas in Gloucestershire

JCS Transport Strategy Evidence Base

APPENDIX G – Important noise areas in Gloucestershire

The information contained within this appendix represents the outputs from round 2 assessments of noise hotspots within Gloucestershire. To access the database use the following link:

https://data.gov.uk/dataset/noise-action-planning-important-areas-round-2-england

The Department for Environment, Food and Rural Affairs (Defra) helps manage environmental noise (mainly noise from transport) through the implementation of the Environmental Noise Directive (END) (Directive 2002/49/EC). The END has been transposed by the Environmental Noise (England) Regulations 2006, as amended.

The END requires that the Action Plans apply in particular to 'Important Areas' (or noise 'hotspots') where those worst affected by road and railway noise are located. These Important Areas are identified by Defra and should then be prioritised for investigation and, where appropriate, action taken by the relevant transport authority, in liaison with the relevant local authority.

Noise action plans provide a framework to manage environmental noise and its effects. They do not impose any additional material costs on the highway authorities or local authorities. Instead it enables the relevant highway authorities to target action to the worst affected areas and to develop proposals for assisting the management of noise as appropriate including taking account of budgetary and other considerations. Any specific action identified will be based on local decisions - taking into account costs and benefits.

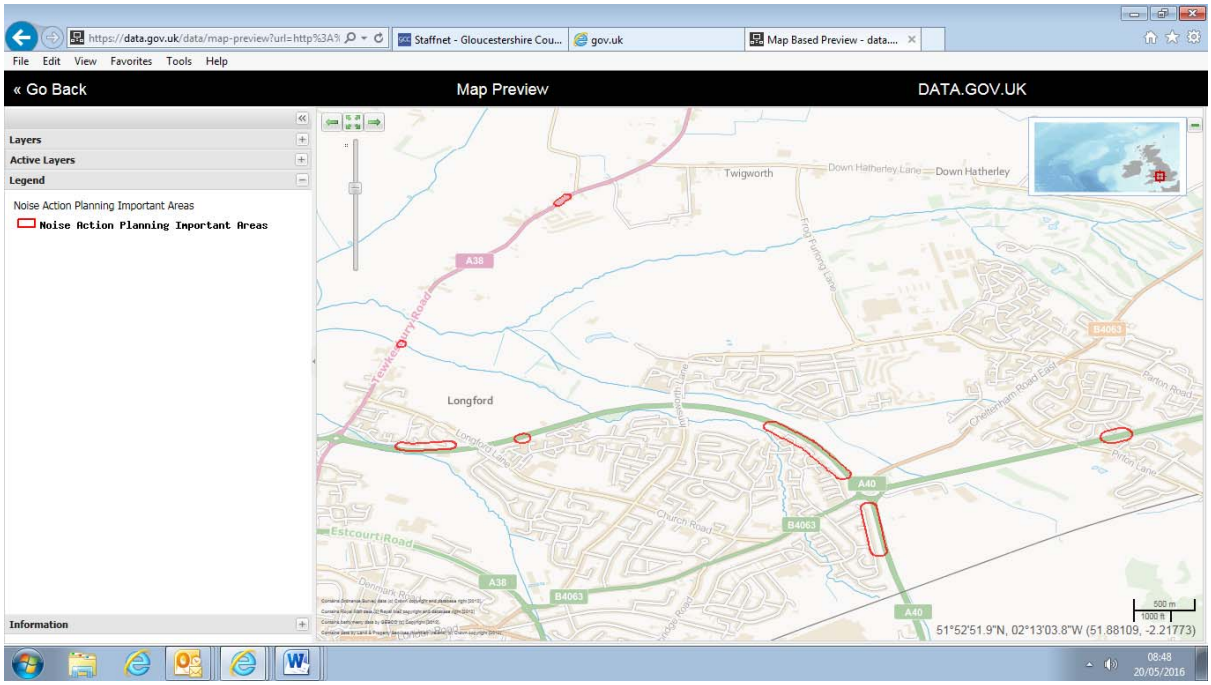
There are currently several approaches taken to control the impact of noise from road traffic, including:

- control of noise at source (including vehicle emission limit values);
- planning controls – through the operation of the national, regional and local transport and land use planning system;
- compensation and insulation - in the case of new or improved highway;
- maintenance; and
- specific initiatives including previously identified actions under the END.

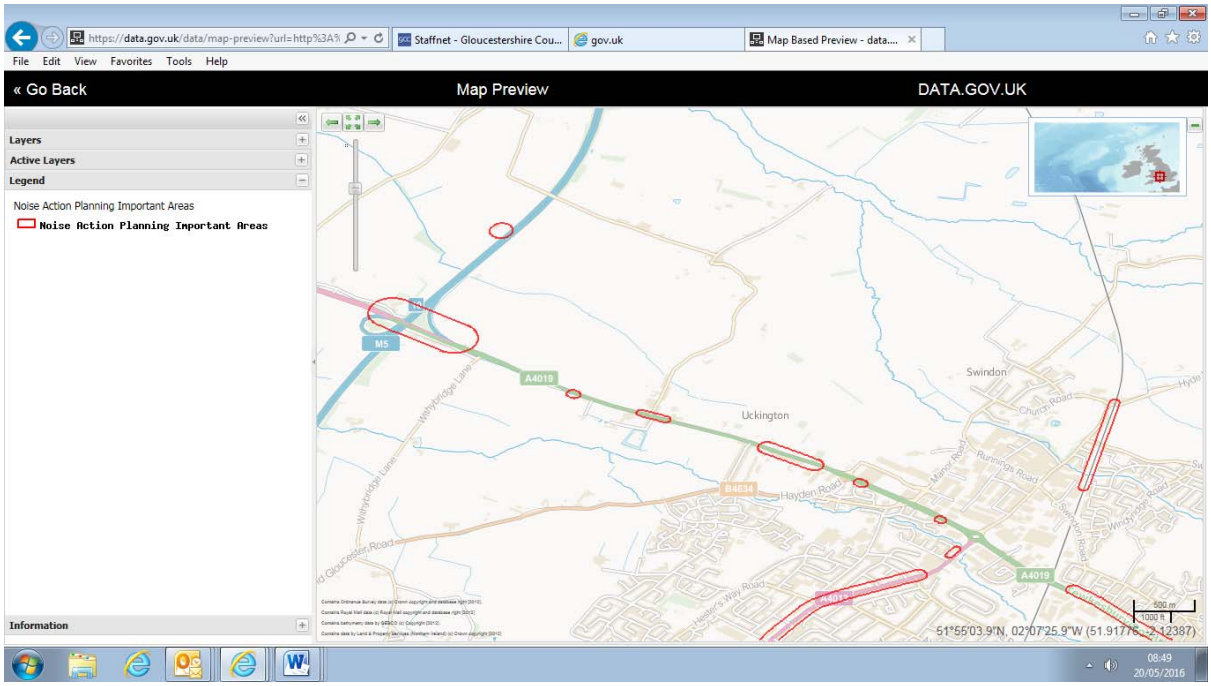
The next round of strategic noise mapping is due to take place in 2017.

APPENDIX G – Important noise areas in Gloucestershire

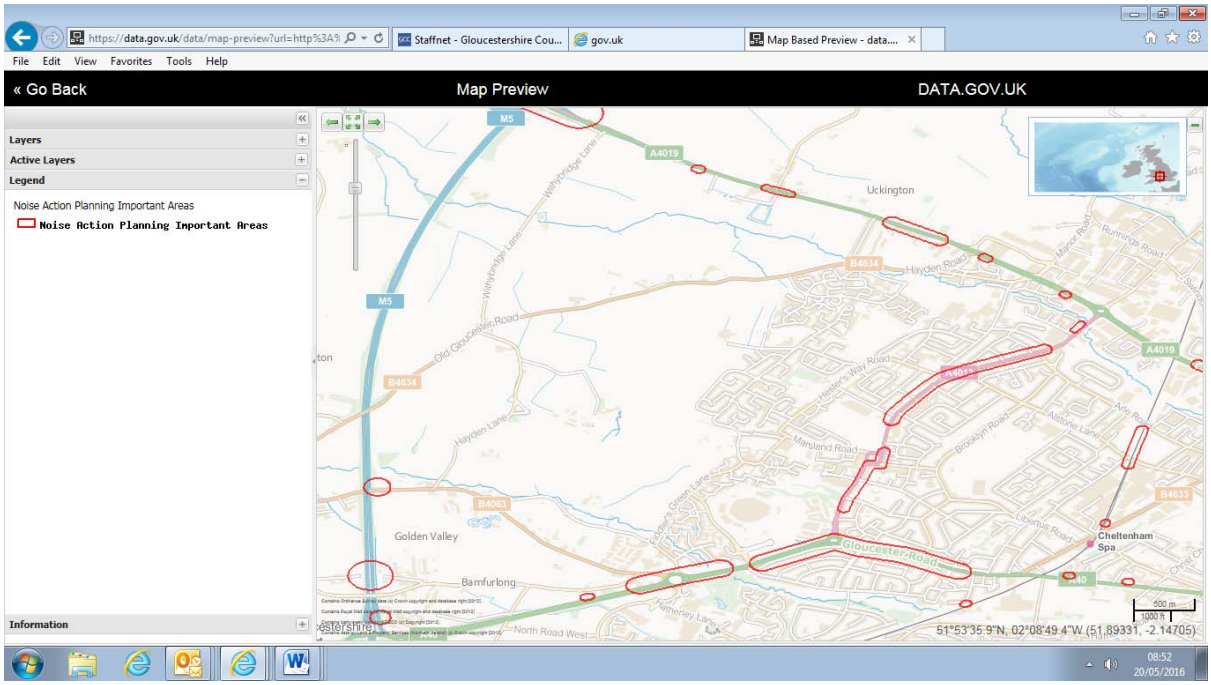
Site A1 – Innsworth and Twigworth and A3 – South Churchdown



A5 – North West Cheltenham



A11 West of Cheltenham



Appendix H – Types of walking and cycling mitigation measures that may be considered

JCS Transport Strategy Evidence Base

APPENDIX H – Types of walking and cycling mitigation measures that may be considered

The information contained within this appendix represents an interpretation of a high level assessment of types of layout, design and measures that may be considered as part of the JCS Transport Strategy to maintain and improve walking and cycling levels. In relation to each of the 5 sites a template or scenario is presented which may be a useful platform but which will be affected by detailed matters yet to be decided through local plan processes, design and deliverability. There may be more effective ways of achieving pedestrian and cycling-friendly environments within and in association with JCS developments.

Sites A1 – Innsworth and A1a Twigworth

Consider the following types of measures or propose other measures to achieve the objectives of permeable, quietly trafficked layouts to allow direct trips on foot or by bike

- Ensure internal layout enables motorised traffic free linkage to correspond with the public footpaths (7A and 9) where path crosses Horsbere Brook and adjoins Longford Lane via a well surfaced path. This allows simple traffic free connectivity with the City and Innsworth Lane. It also establishes link with local pedestrian and cycle network between the A40 and the City and achieves longitudinal and lateral permeability;
- Enforce two pedestrian and cycle routes from the site, across Innsworth Lane, along Motteshead Drive and bifurcating south west along pedestrian bridge across A40 and south east along Luke Lane to link with north A3 site at Parkside Close and NCN route 41. These reflect key pedestrian and cycle desire lines between the site, Gloucester City and Churchdown, using very quiet streets connecting across the A40 via a foot - and potentially cycle – bridge;
- Incorporate 'point closures' or control motorised traffic access at juncture(s) between new streets on the site and consider at Motteshead Drive which is an existing quietly trafficked street in Innsworth. This can enable easy movement of people without highly engineered new layouts and without impairing the residential qualities of existing streets in Innsworth;
- Provide Toucan or chicaned crossing point on Innsworth Lane to serve this desire line;
- Inbetween access arrangement on Frogfurlong Lane and access arrangements on Innsworth Lane implement significant shared space arrangement to deter unnecessary motorised trips at this point and create slow movement settlement 'core' between existing and new street layouts;
- Contribute to measures to upgrade the pedestrian bridge over the A40 to carry higher pedestrian flows and cyclists;
- Provide footways on Innsworth Lane and Frog Furlong Lane and appropriate cycle infrastructure when motorised traffic flows and carriageway widths are understood
- Ensure that optimal connections are created or enabled with the quiet lanes north-east of the site and with the new development at site through rural traffic calming measures and, or traffic restraint.
- Install new street lighting and signage where desire lines will form or where flows will increase.
- Improve footway on eastern side of A38. It will be difficult to address cycling conditions on the A38 south towards Gloucester. The provision of a parallel route through and south of the site onto Longford Lane/ Fircroft Road, using PRoW, upgrades may be the focus of provision for this desire line.

APPENDIX H – Types of walking and cycling mitigation measures that may be considered

A3 – South Churchdown (i) northern lobe

- Soft linkages with existing street layouts and informal paths will achieve more cost effective walk and cycle routes on this currently land use locked site and should be planned for at masterplan conception; establish pedestrian and cycle link through from Luke Lane at that north of the site to the B4063 shared use cycle path to optimise walk and cycle connectivity with the quiet streets and school on the north and eastern site edges;
- Upgrade the pedestrian bridge to carry higher pedestrian flows and cyclists – audit to assess parapet modifications;
- Provide easy connectivity with the shared use walk and cycle facility on the B4063, ensuring logical expression of pedestrian and cycle desire lines i.e. access at Elmbridge Roundabout cycle underpass and at Parkside Drive/ Close;
- Ensure that the two proposed general access arrangements onto the B4063 do not deter or endanger cycle movements on this key strategic cycle route, through incorporating speed control measures and cycle priority crossing points. Consider road arrangements which advantage pedestrians and cyclists to maintain and increase use of active travel modes on this corridor for local trips. Current street alignment and spatial arrangements lends itself to providing separate bespoke non-motorised connections onto NCN.
- Incorporate 'point closures' at junctures between new streets and existing quietly trafficked ones in Churchdown and Innsworth at links with e.g. Luke Street in Innsworth.. This allows high volumes of pedestrians and cyclists to flow between the new development and existing land uses without encouraging motorised vehicles and without impairing the residential qualities of these streets;
- Create pedestrian and cycle only linkages onto the B4063 shared use cycle track;
- Ensure pedestrian and cycle only access points at each 'corner' of the development site halves onto the B4063 shared use cycle track;
- Ensure that optimal connections are created or enabled with the quiet streets north of the site and with the new development at site (A1);
- Liaise with Sustrans to secure route improvements to NCN which may include realignment through the development site

A3 – South Churchdown (ii) central lobe

- Optimise non-motorised connectivity with Churchdown through strong links into quiet residential streets at Yew Tree Way;
- Install pedestrian crossing facility on Pirton Lane to meet pedestrian desire line needs of trip flows to Parton Manor Schools;
- Install pedestrian and cycle path from the development to adjoin the B4063 at its southern most point.
- Ensure that if the site layout is to include a 'green' undeveloped area where its land adjoins Elmbridge, that a bespoke pedestrian and cycle link running between here and the development's western edge is installed.

APPENDIX H – Types of walking and cycling mitigation measures that may be considered

A3 – South Churchdown (iii) southern lobe

- Mitigation will rely heavily on site layout to ameliorate some of the significant barriers.
- Where main access onto A40 is provided, deliver a segregated cycle facility between it and the Elmbridge roundabout as the ONLY means for pedestrians and cyclists to reasonably access the City OR provide separate linkage point out of the development site to the area of the roundabout where it can connect with the Gloucester/ Churchdown cycle network (in association with Government offices?).

The key measures should include

- Upgrade Pirton Lane to safeguard and enhance it as a pedestrian and cycle environment. Carriageway does not have capacity for widening and is too narrow to accommodate cycle lanes (which would normally be advisory where traffic flows are projected to increase). Provide shared use footway on Pirton Lane between John Daniels Way and a point of site access adjacent/ south of the Pirton Lane Bridge over the A40;
- Ensure that site layout of A3 (ii) middle lobe facilitates walking and cycling through it to offset barrier effects of A3 (iii) southern lobe;
- Easy, direct access to the Elmbridge Court Roundabout from this development will be of overriding importance as there are so few opportunities to utilise or create any other linkages with the city.
- Upgrade existing pedestrian and cycling linkages around Elmbridge roundabout to ameliorate traffic impacts, create pedestrian and cycle link point where there is otherwise extremely poor provision; and confer as much benefit to non-motorised travellers in this area as is possible;
- Development design and layout should incorporate 'point closure' at junctures between new streets and existing quietly trafficked ones in Churchdown, especially to facilitate school trips to Churchdown School;
- Ensure that optimal connections are created or enabled with the quiet streets north east of the site which, in terms of movement framework, forms part of the same development;
- Install pedestrian and cycle bridge over A417 between site and Elmbridge; if a bridge is too costly use internal site development layout to bring pedestrians and cyclists directly to the Elmbridge Roundabout via both the B4063 and a new internal route.

Then consider 3 options:

- **Option 1** Provide a direct pedestrian and cycle route (greenway) that is not on a footway across residential or business accesses and which traverses the length of the development in parallel with, but not abutting, the A40. This will connect with the pedestrian and cycle underpass at Elmbridge Court roundabout. Consider building this of a quality to carry emergency vehicles if a need should arise
- **Option 2** Upgrade the route between site and B4063 which will include measures such as chicanes on Pirton Lane Bridge, routing through A (ii)3 middle lobe onto B4063 and pedestrian and cycle crossing point on B4063 to allow cyclists who do not wish to mix with traffic to use the shared us facility on western edge.

APPENDIX H – Types of walking and cycling mitigation measures that may be considered

- **Option 3** Create a series of radial quiet direct routes through the development between Pirton Lane and Elmbridge Court roundabout.

A5 – North West Cheltenham

- The scale of NW Cheltenham, its transport impacts and the need to connect with Cheltenham in particular, may enable more complex solutions to be applied such as pedestrian and cycle bridges, and whole new pedestrian and cycling corridors, mainly to the north of Cheltenham and southwards to West Cheltenham, as well as significantly upgraded public rights of ways.
- The internal layout of the development should clearly reflect a local walking and cycling strategy with targets for mode use on-site and in the vicinity of the development.
- Mitigation should thus deliver innovative measures to address the barriers to walking and cycling between the development and neighbouring land uses .

The development itself will need to:

    - exhibit layouts which offer higher non-motorised permeability than motorised. It should also provide attractive multi directional walk and cycle routes from the site;
    - include 'Green corridors' through the development serving both trip flows between Cheltenham town and the site and providing for radial flows to north east to Bishops Cleeve and south west to west Cheltenham (proposed development site).
- Provide crossing points on the A4019 and provision of shared use cycle footway where it can be installed to a high spec.;
- Install shared use facility in association with Hyde Lane or another solution which provides soft links to Bishops Cleeve and the Honeybourne cycle track north of Cheltenham;
- Implement measure to enable active travel movement through into Cheltenham town. Where the extent of penetration is limited, for example, by the railway line, propose alternatives;
- Implement measures to create pedestrian and cycling corridors across and in association with Tewkesbury Road and Hyde Lane which will be more heavily trafficked.
- Improve conditions for local non-motorised trips on these corridors into Cheltenham town– possibly on a parallel network
- Desire lines will be in all directions from a development of this scale. Measures cannot be prescribed here but the need for bespoke coherent cycle routes to Cheltenham as an overriding priority and also Bishop's Cleeve and West Cheltenham is paramount.

West of Cheltenham

- Optimise opportunities to fit the new development to west Cheltenham with soft street connections; use 'point closures' to make best use of existing quiet street network;
- Identify key walking and cycling corridors and desire lines and ensure that these are reinforced, signed and unimpeded. Destinations include Cheltenham Rail Station, key employment sites, key shopping facilities;
- Identify quiet connections on or in association with Hayden Lane;
- The access arrangement at SW point for all traffic occupies a significant cycle desire line which has particular propensity to accommodate higher cycle flows. Ensure the junction arrangement favours vulnerable road uses and does not introduce obstruction or delay;

APPENDIX H – Types of walking and cycling mitigation measures that may be considered

- Assess all linkages and including the local transport relationship with land uses the other side of the Tewkesbury Road (A4019) to the north, and to the extensive development at North West Cheltenham (A5). The A4019 will require enhanced crossing points and improvements for pedestrians and cyclists either on it or parallel to it;
- Old Gloucester Road (B4634) and Pheasant Lane route/ corridors should retain or improve their cycle route qualities;
- Identify and implement measures to reduce the impact of increased motorised traffic on the local network including Hester's Way, Fiddlers Green and Springbank where roads are quietly trafficked and where pedestrian and cycle conditions are currently good.
- Implement measures to reduce barriers to cycling movement in the vicinities of Benhall and the Tewkesbury Road. Both of these sites serve key employment locations.
- Barriers on the Cheltenham and Gloucester in the A40 corridor have historically been cited. New development will reduce some of the travel distances making them more proximal to cyclists, but increased traffic flows may further exacerbate these barriers to movement and need to be identified and ameliorated.
- Establish a strong link for pedestrians and cyclists between the West Cheltenham site and the North-west Cheltenham site i.e. clear radial links as well as edge to centre
- Identify and Protect the branch of quiet lane network which favours active travel movement in this area.
- Ensure new junction arrangements at south east access – especially if they include new roundabouts – do not create new barriers to walking and cycling movement;
- Deliver improvements which enable pedestrian and cycling access onto Pheasant Lane and the Old Cheltenham Road. This road provides tolerable cycling conditions but increased traffic levels and bus service improvements will detract from this;
- Improve connectivity between Arle Court Roundabout and the site; note role of Pheasant Lane as a quiet link.
- Development design and layout should incorporate 'point closures' at junctures between new streets and existing quietly trafficked ones. This allow high volumes of pedestrians and cyclists to flow between the new development and existing land uses without encouraging motorised vehicles and without impairing the residential qualities of these streets.

Appendix I – Do something 3a scenario scheme package

JCS Transport Strategy Evidence Base

APPENDIX I – Do something 3a scenario scheme package

The following list of schemes is based on information discussed through the JCS transport evidence base working group and used to inform the published JCS Transport Evidence Base.

To aid understanding the schemes have been grouped into packages and outlined under strategic travel corridors within the JCS area. A full list of schemes has been provided including those included in the Do minimum scenario.

The strategic travel corridors used to describe this package include:

a) Corridor A - M5 – Junctions 12, 11a, 11, 10 and 9 (SRN)
b) Corridor B - A40 from Highnam to M5 junction 11 (SRN)
c) Corridor C - A38 from Cross Keys roundabout to Longford (A40 / A38)Roundabout
d) Corridor D - A430 from junction with Cole Avenue to Over (A40)Roundabout (South West bypass)
e) Corridor E - B4063 from Elmbridge Court roundabout to Arle Court (A40) Roundabout
f) Corridor F - A40 from M5 junction 11 through Cheltenham Town Centre to Charlton Kings;
g) Corridor G- A4019 from M5 junction 10 to Cheltenham Town Centre
h) Corridor H- A46 from Shurdington Road (A417 junction) to Cheltenham Town Centre
i) Corridor I - A435 from Cheltenham Town Centre through Bishops Cleeve to Teddington Hands (A46)roundabout
j) Corridor J - A46 from M5 Junction 9 to Teddington Hands (A435) roundabout (SRN)
k) Corridor K - A438 from M5 junction 9 through Tewkesbury Town Centre to Mythe Road junction
l) Corridor L- A417 from Junction 11a to Air Balloon roundabout at Crickley Hill (SRN)
m) Non-strategic routes
n) JCS wide

Schemes assumed to be in place by 2031:

- A419 Stonehouse to M5 route improvements*
- A40 Over Roundabout and Linton Lodge improvements*
- Staverton Bridge Junction*
- Staverton Bridge Junction*
- A40 Corridor Bus Priority*
- Metz Way*, Gloucester bus priority scheme
- Gloucester Transport Hub/Kings Quarter Bus Station*
- Cheltenham Spa Railway Station *
- A40 Elmbridge Transport Scheme*
- St Barnabas Roundabout*
- Gloucester SW Bypass (Llanthony Rd Section) road widening

APPENDIX I – Do something 3a scenario scheme package

DS3a schemes

Corridor	Scheme
A	M5 J9 - Widen existing motorway slip roads together with associated alterations to merges and diverges, assuming land requirement in ownership of HA
A	M5 J9 - Widen existing junction structure to accommodate 3 lanes on the circulatory sections
A	M5 J9 - Provision of a 'free flow left turn slip' from A46 (west) to M5 south, and signalising and optimising A46 / Roundabout circulatory approaches.
A	M5 J9 - New pedestrian and cyclist bridge crossing over M5, linking Industrial Estates either side
A	M5 J10 - Signalising the junction of the M5 Southbound off-slip with the A4019, allowing M5 exiting traffic to turn in both directions along the A4019.
A	M5 J11 -Signalising the junction of the M5 Southbound off-slip with the roundabout circulatory section, and widening the M5 Northbound off-slip and optimising the existing traffic signals.
B	Upgrade Elmbridge Park and Ride access to serve Strategic Allocation Site A3 (South Churchdown) Employment site traffic,
B	A40 Longford Roundabout – signalise junction – full signalisation prioritising A40 through traffic,
B	A40 Over Roundabout full signalisation – prioritising A40 through traffic
B	The provision of a new access onto the A40, between Elmbridge Roundabout and A38 Longford Roundabout, to serve as the primary access to/from Strategic Allocation Site 1 (Innsworth).
B	Elmbridge Roundabout - Signalise B4063 WB approach to Elmbridge Roundabout *Despite being part of DS3a this scheme was not included within the strategy cost estimates
C	C&G roundabout - Capacity Augmentation - Improvement on Pinch Point Scheme: Provision of a 'free left turn lane' from the A417 Barnwood Link and from the A417 Corinium Ave approach arms
C	Junction of A38 Tewkesbury Road/ Kingsholm Road and A417 – Increased roundabout capacity
D	Southgate Street to St Ann's Way (Gloucester) – MOVA signals with bus priority – signal improvements along corridor
E	B4063 / B4634 Staverton Crossroads - Provision of three lane approach on B4063 Cheltenham Road East from Gloucester (Left Turn, Straight Ahead, Right Turn), with Optimisation of Signal Timings.
E	B4063 / New Access Junction - The Employment development to access the B4063 Cheltenham Rd East via a new link to the south of B4063, with this junction becoming a 4-arm T/S Junction, with access to housing site to the north.
E	B4063 / Innsworth Lane T/S Junction (Hare & Hounds) - Minimum Right Turn Flare Length of 50 metres on Innsworth lane and B4063 Cheltenham Road East (to Cheltenham) approaches, with provision of three lane approach on B4063 Cheltenham Road East from Gloucester.
E	B4063 / Pirton Lane T/S Junction - Improve Right Turn Flare (75m) on Cheltenham Road East Approach from Gloucester.
E	Piton Lane (East of B4063 TS Junction), as far as Churchdown Village - Traffic management – Traffic Management Measure – Link Speeds to be reduced on the network (Both directions).
E	Parton Road (East of B4063 Hare & Hounds TS Junction) to St. Johns Avenue - Traffic management – Traffic Management Measure – Link Speeds to be reduced on the

	network (Both directions).
E	Improved bus service frequency on Gloucester – Cheltenham Service Route 97/ 98 via Churchdown – to improve modal shift
E	Park and Ride expansion – Arle Court – , based on assumption that the number of parking bays can only be increased by remaining within the existing site boundaries and therefore by construction of two levels of car parking
F	A40 Arle Court to Westall Green (Cheltenham) – MOVA signals and bus priority – signals improvement along corridor
G	A4019 MOVA traffic signal upgrades providing bus priority
G	Lower High Street (Cheltenham) – bus only routes inbound, reallocation of existing highway space for inbound bus lane
G	Stoke Orchard Road (Off A4019 Uckington) -Traffic Management Measure – Link Speeds to be reduced on the network (Both directions).
G	Elmstone & Hardwicke (Off A4019 Uckington) - Traffic Management Measure – Link Speeds to be reduced on the network (Both directions).
G	Village Road (linking Hayden Road to Princess Elizabeth Way, Cheltenham) - Traffic Management Measure – Link Speeds to be reduced on the network (Both directions).
G	Improved bus service frequency along the A4019 Tewkesbury Road corridor
G	Park and Ride – New site at Uckington – near to Strategic Allocation Site A5 (NW Cheltenham)
H	A46 (northbound) (Shurdington Village N/B adjacent The Bell PH, Leckhampton Lane) Additional highway space for right turning traffic into Leckhampton Lane – providing longer stacking lane
H	A46 Shurdington Road northbound approach to Moorend Park Road and Leckhampton Road – additional highway space for right turning traffic by providing a longer stacking lane accessing Moorend Park Road
H	A46 / Badgeworth Lane Junction Signalisation – Improved access to/from Badgeworth Lane
H	The Park (Off A46 Moorend Park Road) - Traffic Management Measure – Link Speeds to be reduced on the network (Both directions).
H	Woodlands Road (Off A46 Shurdington Road - Traffic Management Measure – Link Speeds to be reduced on the network (Both directions).
I	Park and Ride expansion – Cheltenham Race Course – expansion of existing P&R facility, based on assumption that the number of parking bays can only be increased by remaining within the existing site boundaries and therefore by construction of two levels of car parking
I	Cheltenham to Bishops Cleeve Cycle Path – a package of cycle improvements along a strategic corridor
J	A46 - MOVA traffic signal improvements with bus priority – signal improvements along corridor, no reallocation of existing road space.
J	Ramped footbridge over railway (Grange Road) – Retaining existing level crossing with Grange Road as a key Bus Route.
J	New pedestrian/cycle/bus only route through MOD Ashchurch Strategic Allocation Site A8, utilising existing road infrastructure on Grange Road and linking with existing railway level crossing
J	A46 – dual carriageway from Alexandra Way to Aston Cross – upgrade of existing highway, removal of existing railway bridge
J	The Grange (North of MOD / Ashchurch Site) - Traffic Management Measure – Link Speeds to be reduced on the network (Both directions).
J	B4079 Pamington Lane (between A46 and A435) - Traffic Management Measure – Link Speeds to be reduced on the network (Both directions).

J	A46 Teddington Hands Roundabout - Increase Roundabout capacity, particularly on the A435 northbound approach to A46 west.
J	Improved rail service frequency / stopping pattern for passenger services at Ashchurch railway station – ensuring an hourly service,
K	A438 - MOVA traffic signal improvements with bus priority – no re-designation of existing road space,
K	A438 – Improvements to Shannon Way junction – junction widening to provide longer dedicated left hand lane onto A438,
K	A438 – widening of A438 from Shannon Way to junction 9, linked to Shannon Way improvements
K	Minor Road off A38 (Odessa Pub), towards Fiddington) – Traffic Management Measure – Link Speeds to be reduced on the network (Both directions).
L	Zoons Roundabout - Changed to Signalised split circulatory - Junction Improvement: Removing the left turn slip from Brockworth (Delta Way to C&G Roundabout) and signalising the A417 approach (from Cirencester) and the opposing circulatory movement.
L	Brockworth Bypass - Signalising westbound and eastbound A417 Brockworth Bypass 'Off-slips'.
NS	Down Hatherley Lane – highway improvements to accommodate increased traffic from development sites – providing increased flow capacity and highway safety
NS	Frog Furlong Lane – highway improvements on lower section to accommodate increased traffic – widening scheme to increase flow capacity and highway safety
NS	Innsworth Lane (south of SA1), Brooklands Park, Paygrove Lane and Oxstalls Lane (south to B4063 Cheltenham Rd) - Traffic management – Traffic Management Measures – Link Speeds to be reduced on the network (Both directions)
NS	Innsworth Lane, as far as B4063 Hare & Hounds TS Junction - Traffic management – Traffic Management Measure – Link Speeds to be reduced on the network (Both directions)
NS	Brockworth Road / Hucclecote Lane (South-East of Churchdown Village) - Traffic management – Traffic Management Measure – Link Speeds to be reduced on the network (Both directions).
NS	Innsworth Lane and Oxstalls Lane – provide bus priority measures – signal improvements along corridor
JCS	Countywide branding of travel information and travel awareness
JCS	School Travel Planning – Support for schools to encourage modal shift
JCS	Personalised Travel Planning – For new developments – tailored support to inform travel choices before established travel behaviour is established
JCS	Business Travel Planning – Support for employers to encourage modal shift
JCS	Bike training for children and adults through the travel plan process
JCS	Real Time Passenger Information on Main Corridor Bus Routes – upgrade of main routes to include RTPI,
JCS	Improved bus infrastructure (RTPI, shelters, Flags and information availability) – upgrade of existing infrastructure across JCS area,
JCS	Public transport SMART Card technology roll-out – Multi-operator bus ticket
JCS	Mode Shift Point – built into local centres across the JCS area to provide park and ride (including cycle park) facilities. Enhanced public transport facilities – upgraded bus stop at local community destinations which provide bike parking / RTPI / car parking – encouraging modal shift onto bus for part of the journey
JCS	Improved cycle information / route finding – Improved signage and promotional materials within the JCS area,
JCS	Improved cycle parking – at key destinations

JCS	Completing gaps in existing cycle networks within the Cheltenham and Gloucester urban areas and ensuring linkages into new strategic development sites – comprising a package of small cycle improvements designed to complete any gaps in the existing network

Appendix J – Do Something 5 Scenario Scheme package

JCS Transport Strategy Evidence Base

Appendix J – Do Something 5 Scenario Scheme package

The following list of schemes is based on information discussed through the JCS transport evidence base working group and used to inform the published JCS Transport Evidence Base.

To aid understanding the schemes have been grouped into packages and outlined under strategic travel corridors within the JCS area. A full list of schemes has been provided including those included in the Do minimum scenario.

The strategic travel corridors used to describe this package include:

- Corridor A - M5 – Junctions 12, 11a, 11, 10 and 9 (SRN)
- Corridor B - A40 from Highnam to M5 junction 11 (SRN)
- Corridor C - A38 from Cross Keys roundabout to Longford (A40 / A38)Roundabout
- Corridor D - A430 from junction with Cole Avenue to Over (A40)Roundabout (South West bypass)
- Corridor E - B4063 from Elmbridge Court roundabout to Arle Court (A40) Roundabout
- Corridor F - A40 from M5 junction 11 through Cheltenham Town Centre to Charlton Kings;
- Corridor G- A4019 from M5 junction 10 to Cheltenham Town Centre
- Corridor H- A46 from Shurdington Road (A417 junction) to Cheltenham Town Centre
- Corridor I - A435 from Cheltenham Town Centre through Bishops Cleeve to Teddington Hands (A46)roundabout
- Corridor J - A46 from M5 Junction 9 to Teddington Hands (A435) roundabout (SRN)
- Corridor K - A438 from M5 junction 9 through Tewkesbury Town Centre to Mythe Road junction
- Corridor L- A417 from Junction 11a to Air Balloon roundabout at Crickley Hill (SRN)
- Corridor M -Non-strategic routes
- Corridor N - JCS wide

Schemes assumed to be in place by 2031:

- A419 Stonehouse to M5 route improvements*
- A40 Over Roundabout and Linton Lodge improvements*
- Staverton Bridge Junction*
- A417 Missing Link scheme*
- M5 Junction 10 all movements*
- Staverton Bridge Junction*
- A40 Corridor Bus Priority*
- Metz Way*, Gloucester bus priority scheme
- Gloucester Transport Hub/Kings Quarter Bus Station*
- Cheltenham Spa Railway Station *
- A40 Elmbridge Transport Scheme*
- St Barnabas Roundabout*
- Gloucester SW Bypass (Llanthony Rd Section) road widening

Appendix J – Do Something 5 Scenario Scheme package

DS5 schemes

Corridor	Scheme
A	M5 J9 - Widen existing motorway slip roads together with associated alterations to merges and diverges, assuming land requirement in ownership of HA
A	M5 J9 - Widen existing junction structure to accommodate 3 lanes on the circulatory sections
A	M5 J9 - Provision of a 'free flow left turn slip' from A46 (west) to M5 south, and signalising and optimising A46 / Roundabout circulatory approaches.
A	M5 J9 - New pedestrian and cyclist bridge crossing over M5, linking Industrial Estates either side
A	M5 J10 - Signalising the junction of the M5 Southbound off-slip with the A4019, allowing M5 exiting traffic to turn in both directions along the A4019.
A	M5 J11 -Signalising the junction of the M5 Southbound off-slip with the roundabout circulatory section, and widening the M5 Northbound off-slip and optimising the existing traffic signals.
A	M5 – Junction 12 – junction improvement
B	Upgrade Elmbridge Park and Ride access to serve Strategic Allocation Site A3 (South Churchdown) Employment site traffic,
B	A40 Longford Roundabout – signalise junction – full signalisation prioritising A40 through traffic,
B	A40 Over Roundabout full signalisation – prioritising A40 through traffic
B	The provision of a new access onto the A40, between Elmbridge Roundabout and A38 Longford Roundabout, to serve as the primary access to/from Strategic Allocation Site 1 (Innsworth).
B	Elmbridge Roundabout - Signalise B4063 WB approach to Elmbridge Roundabout
C	C&G roundabout - Capacity Augmentation - Improvement on Pinch Point Scheme: Provision of a 'free left turn lane' from the A417 Barnwood Link and from the A417 Corinium Ave approach arms
C	Junction of A38 Tewkesbury Road/ Kingsholm Road and A417 – Increased roundabout capacity
C	New link road linking new Access road from A40 to A38 Tewkesbury Road
C	New link road linking new Access road from A40 to Innsworth Lane
C	Full signalisation of A38 Cross Keys roundabout
C	Upgrade of A38 St. Barnabas roundabout
D	Southgate Street to St Ann's Way (Gloucester) – MOVA signals with bus priority – signal improvements along corridor
E	B4063 / B4634 Staverton Crossroads - Provision of three lane approach on B4063 Cheltenham Road East from Gloucester (Left Turn, Straight Ahead, Right Turn), with Optimisation of Signal Timings.
E	B4063 / New Access Junction - The Employment development to access the B4063 Cheltenham Rd East via a new link to the south of B4063, with this junction becoming a 4-arm T/S Junction, with access to housing site to the north.
E	B4063 / Innsworth Lane T/S Junction (Hare & Hounds) - Minimum Right Turn Flare Length of 50 metres on Innsworth lane and B4063 Cheltenham Road East (to Cheltenham) approaches, with provision of three lane approach on B4063 Cheltenham Road East from Gloucester.
E	B4063 / Pirton Lane T/S Junction - Improve Right Turn Flare (75m) on Cheltenham Road East Approach from Gloucester.
E	Piton Lane (East of B4063 TS Junction), as far as Churchdown Village - Traffic management – Traffic Management Measure – Link Speeds to be reduced on the network (Both directions).
E	Parton Road (East of B4063 Hare & Hounds TS Junction) to St. Johns Avenue - Traffic management – Traffic Management Measure – Link Speeds to be reduced on the network (Both directions).
E	Improved bus service frequency on Gloucester – Cheltenham Service Route 97/ 98 via Churchdown – to improve modal shift
E	Park and Ride expansion – Arle Court – , based on assumption that the number of parking bays can only be increased by remaining within the existing site boundaries and therefore by construction of two levels of car parking
E	A40 – Gloucester Road / Lansdown Road and B4063 – Cheltenham Road (signal priorities, RTPI, bus stop upgrade) –aiding route 94
E	New radial bus service in Cheltenham
F	A40 Arle Court to Westall Green (Cheltenham) – MOVA signals and bus priority – signals improvement along corridor

F	New grade separated junction on A40 to the west of Arle Court
F	New dual carriageway linking A40 to A4019 – new access to West of Cheltenham development
F	New link road from new grade separated junction on A40 to Grovefield Way
G	A4019 MOVA traffic signal upgrades providing bus priority
G	Lower High Street (Cheltenham) – bus only routes inbound, reallocation of existing highway space for inbound bus lane
G	Stoke Orchard Road (Off A4019 Uckington) -Traffic Management Measure – Link Speeds to be reduced on the network (Both directions).
G	Elmstone & Hardwicke (Off A4019 Uckington) - Traffic Management Measure – Link Speeds to be reduced on the network (Both directions).
G	Village Road (linking Hayden Road to Princess Elizabeth Way, Cheltenham) - Traffic Management Measure – Link Speeds to be reduced on the network (Both directions).
G	Improved bus service frequency along the A4019 Tewkesbury Road corridor
G	Park and Ride – New site at Uckington – near to Strategic Allocation Site A5 (NW Cheltenham)
G	A4019 – Tewkesbury Road (signal priorities, RTPI, bus stop upgrade)– aiding route 41 / 42
G	New grade separated junction on A4019 to the west of Homecroft Drive
H	A46 (northbound) (Shurdington Village N/B adjacent The Bell PH, Leckhampton Lane) Additional highway space for right turning traffic into Leckhampton Lane – providing longer stacking lane
H	A46 Shurdington Road northbound approach to Moorend Park Road and Leckhampton Road – additional highway space for right turning traffic by providing a longer stacking lane accessing Moorend Park Road
H	A46 / Badgeworth Lane Junction Signalisation – Improved access to/from Badgeworth Lane
H	The Park (Off A46 Moorend Park Road) - Traffic Management Measure – Link Speeds to be reduced on the network (Both directions).
H	Woodlands Road (Off A46 Shurdington Road - Traffic Management Measure – Link Speeds to be reduced on the network (Both directions).
H	A46 – Shurdington Road and A38 – Barnwood Road / Hucclecote Way – (signal priorities, RTPI, bus stop upgrade) aiding route 10
H	Upgrade of Grovefield Way and Up Hatherley Way
H	Upgraded junction on A46 Shurdington Road
I	Park and Ride expansion – Cheltenham Race Course – expansion of existing P&R facility, based on assumption that the number of parking bays can only be increased by remaining within the existing site boundaries and therefore by construction of two levels of car parking
I	Cheltenham to Bishops Cleeve Cycle Path – a package of cycle improvements along a strategic corridor
I	A435 – Evesham Road (signal priorities, RTPI, bus stop upgrade) aiding route D
I	New link road linking A4019 to Hyde Lane – upgrade of existing route to A435 Evesham Road
I	Upgrade junction on Hyde Lane
J	A46 - MOVA traffic signal improvements with bus priority – signal improvements along corridor, no reallocation of existing road space.
J	Ramped footbridge over railway (Grange Road) – Retaining existing level crossing with Grange Road as a key Bus Route.
J	New pedestrian/cycle/bus only route through MOD Ashchurch Strategic Allocation Site A8, utilising existing road infrastructure on Grange Road and linking with existing railway level crossing
J	A46 – dual carriageway from Alexandra Way to Aston Cross – upgrade of existing highway, removal of existing railway bridge
J	The Grange (North of MOD / Ashchurch Site) - Traffic Management Measure – Link Speeds to be reduced on the network (Both directions).
J	B4079 Pamington Lane (between A46 and A435) - Traffic Management Measure – Link Speeds to be reduced on the network (Both directions).
J	A46 Teddington Hands Roundabout - Increase Roundabout capacity, particularly on the A435 northbound approach to A46 west.
J	Improved rail service frequency / stopping pattern for passenger services at Ashchurch railway station – ensuring an hourly service,

J	New A46 link road linking Teddington Hands roundabout to M5 J9 – 1993 Department of Transport proposed alignment
J	New estate feeder road linking site with A46 via existing access arrangements
J	Extended junction 9 on M5 linked to new A46 link road
K	A438 - MOVA traffic signal improvements with bus priority – no re-designation of existing road space,
K	A438 – Improvements to Shannon Way junction – junction widening to provide longer dedicated left hand lane onto A438,
K	A438 – widening of A438 from Shannon Way to junction 9, linked to Shannon Way improvements
K	Minor Road off A38 (Odessa Pub), towards Fiddington) – Traffic Management Measure – Link Speeds to be reduced on the network (Both directions).
K	Northern Tewkesbury Bypass
K	New feeder route linking Mitton site with Shannon Way
L	Zoons Roundabout - Changed to Signalised split circulatory - Junction Improvement: Removing the left turn slip from Brockworth (Delta Way to C&G Roundabout) and signalising the A417 approach (from Cirencester) and the opposing circulatory movement.
L	Brockworth Bypass - Signalising westbound and eastbound A417 Brockworth Bypass 'Off-slips'.
NS	Down Hatherley Lane – highway improvements to accommodate increased traffic from development sites – providing increased flow capacity and highway safety
NS	Frog Furlong Lane – highway improvements on lower section to accommodate increased traffic – widening scheme to increase flow capacity and highway safety
NS	Innsworth Lane (south of SA1), Brooklands Park, Paygrove Lane and Oxstalls Lane (south to B4063 Cheltenham Rd) - Traffic management – Traffic Management Measures – Link Speeds to be reduced on the network (Both directions)
NS	Innsworth Lane, as far as B4063 Hare & Hounds TS Junction - Traffic management – Traffic Management Measure – Link Speeds to be reduced on the network (Both directions)
NS	Brockworth Road / Hucclecote Lane (South-East of Churchdown Village) - Traffic management – Traffic Management Measure – Link Speeds to be reduced on the network (Both directions).
NS	Innsworth Lane and Oxstalls Lane – provide bus priority measures – signal improvements along corridor
M	Junction improvement at Barrow Hill and Brockworth Road
JCS	Countywide branding of travel information and travel awareness
JCS	School Travel Planning – Support for schools to encourage modal shift
JCS	Personalised Travel Planning – For new developments – tailored support to inform travel choices before established travel behaviour is established
JCS	Business Travel Planning – Support for employers to encourage modal shift
JCS	Bike training for children and adults through the travel plan process
JCS	Real Time Passenger Information on Main Corridor Bus Routes – upgrade of main routes to include RTPI,
JCS	Improved bus infrastructure (RTPI, shelters, Flags and information availability) – upgrade of existing infrastructure across JCS area,
JCS	Public transport SMART Card technology roll-out – Multi-operator bus ticket
JCS	Mode Shift Point – built into local centres across the JCS area to provide park and ride (including cycle park) facilities. Enhanced public transport facilities – upgraded bus stop at local community destinations which provide bike parking / RTPI / car parking – encouraging modal shift onto bus for part of the journey
JCS	Improved cycle information / route finding – Improved signage and promotional materials within the JCS area,
JCS	Improved cycle parking – at key destinations
JCS	Completing gaps in existing cycle networks within the Cheltenham and Gloucester urban areas and ensuring linkages into new strategic development sites – comprising a package of small cycle improvements designed to complete any gaps in the existing network

Appendix J – Do Something 5 Scenario Scheme package

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Appendix K – Do Something 7 Scenario Scheme package

JCS Transport Strategy Evidence Base

Appendix K – Do Something 7 Scenario Scheme package

The following list of schemes is based on information discussed through the JCS transport evidence base working group and used to inform the published JCS Transport Evidence Base.

To aid understanding the schemes have been grouped into packages and outlined under strategic travel corridors within the JCS area. A full list of schemes has been provided including those included in the Do minimum scenario.

The strategic travel corridors used to describe this package differ from the ones used to describe the scenarios outlined in Appendices I and J. For Do Something 7 they include:

National Link (Strategic Road Network)

- Corridor 1 - M5 – between (and including) M5 Junction 9 and Junction 13
- Corridor 2 - A46 – M5 Junction 9 to county boundary (east of Teddington Hands)
- Corridor 3 - A40 –M5 Junction 11 to county boundary (east of Ross on Wye)
- Corridor 4 - A417 – M5 Junction 11a to Nettleton roundabout

Primary Link (Local Road Network)

- Corridor 5 - A438 / A38 – M5 Junction 9 to A38 Coombe Hill
- Corridor 6 - A4019 – Coombe Hill to A46 Albion Street / St Johns Avenue
- Corridor 7 - A435 – Teddington Hands (A46) to A46 St. Margaret's Road / Fairview Road
- Corridor 8 - A40 – M5 Junction 11 to A435 London Road
- Corridor 9 - A46 – Bath Road (central Cheltenham) to A417 junction
- Corridor 10 - A40 / A417 / A38 – Elmbridge Court Roundabout to A430 Cole Avenue junction
- Corridor 11 - A40 / A430 / A38 – Over Roundabout to Cross Keys Roundabout

Schemes included in the Do Nothing scenario

- A40 Elmbridge roundabout improvement scheme (currently under construction – projected opening date – August 2017)
- A40 Over roundabout improvement Phase 2 – Growth Fund Scheme;
- A40 Cheltenham Westbound Corridor Bus Priority scheme - Arle Court to Benhall section;
- Gloucester Central Transport Hub (Bus Station); Abbeymead/Metz Way bus priority scheme;
- Cheltenham Transport Plan (CTP) phases 1 to 3 only (Boot's Corner Closure - Trial Scheme excluded).

Schemes included in the Do Minimum scenario

- A417 Missing Link (previously coded for DS5 Scenario);
- St Barnabas Roundabout;
- Gloucester South West Bypass, Llanthony Road Section widening

Appendix K – Do Something 7 Scenario Scheme package

DS7 schemes

Corridor 1 - M5 – M5 Junction 13 to county boundary

Scheme ref	Junction / Corridor	Scheme description
1	M5 J9 to M6 J11a	Upgrade motorway to a smart motorway increasing capacity during peak times and controlling vehicle flows
2	M5 J9	Extended junction to accommodate new off-line A46 (Scheme ref 7).
3	M5 J10	High capacity upgrade of M5 J10 junction providing an 'All Movements' junction including three lanes on slip roads and circulatory lanes on the roundabout to accommodate the associated Cyber Park access road / A4019 junction (Scheme ref 28). This will be a high capacity signal controlled junction, with a separate left turn slip road from M5J10 northbound off-slip onto Cyber Park link road (southbound). New signals on A4019 westbound entry to upgrade motorway junction
4	M5 J11	Signalise South Bound off-slip. North Bound off slip extra lane
5	M5 11a	Optimise junction operation with improved signing and lining and area wide reassignment
6	M5 J12	Upgrade to junction to include 2 lane wide off and on slips

Corridor 2: A46 – M5 Junction 9 to county boundary

Scheme ref	Junction / Corridor	Scheme description
7	A46 Ashchurch	New dual carriageway bypass linking Teddington Hands roundabout with M5 Junction 9 and associated changes to junctions. Based on the Department for Transport's 1993 alignment.
8	Grange Road / Hardwicke Bank Road	Close Railway Level Crossing, and replace with new bridge linking Grange Road with Hardwicke Bank Road
9	Alexandra Way / A46	Upgrade signals to MOVA or SCOOT operation to optimise signal timings
10	Fiddington Lane / A46	Upgrade signals to MOVA or SCOOT operation to optimise signal timings
11	Northway Lane / A46	Upgrade signals to MOVA or SCOOT operation to optimise signal timings

Corridor 3: A40 –M5 Junction 11 to county boundary

Scheme ref	Junction / Corridor	Scheme description
12	A40/A48 Highnam Roundabout	Signalise roundabout – MOVA signals
13	A40 Over Roundabout	Add a dedicated left slip from A40 east to the south towards Gloucester
14	A40 Longford Roundabout	Existing A40 / A38 Longford junction changed from a roundabout to a signalised crossroads. Junction arrangement designed to complement the introduction of Longford Bypass. Turn from A40 east to A38 north not allowed. Bus priority – traffic signals will be used to facilitate north / south movements.
15	New junction on A40	New signalised junction on A40 between Longford and Elmbridge Court roundabouts
16	New junction on A38	New priority junction on A38 giving priority to new highway link accessing to new junction on A40 (scheme 17)

17	New section of highway	New 50 mph highway link, joining upgraded junctions on A40 and A38 through development site
18	A38 Tewkesbury Road	A38 Tewkesbury Road to be downgraded between A40/A38 Longford signalised crossroads and new A38/Twigworth junction to 20mph, and encourage as a sustainable travel corridor. Access from A38 north is restricted to one lane entry to crossroads, A40 west to A38 north - right hand turn banned with alternative route via A40 / A38 Link Road.
19	A38 Tewkesbury Road	Upgrade A38 Tewkesbury Rd / Down Hatherley Lane junction, to include a dedicated right turn from A38 south.
20	A40 Elmbridge Court Roundabout	Remove B4063 Cheltenham Rd East approach arm from the junction and remove Business Park arm. . New junction east of Elmbridge – four way signals with turning restrictions. New link road from B4063 and access to Business Park. Both roads would access the new junction. New free flow left turn link from A40 East to A40 Barnwood Link and a free flow left turn link from A40 North to A40 East

Corridor 4 – A417 – M5 Junction 11a to Nettleton roundabout

Scheme ref	Junction / Corridor	Scheme description
21	A417 / Delta Way 'Zoons' Roundabout	Junction Improvement: Removing the existing left turn slip from Delta Way (Brockworth) to C&G Roundabout, and signalising the A417 approach (from Cirencester) and the opposing roundabout circulatory movement.
22	A417 Brockworth Bypass	Signalising the westbound and eastbound 'Off-slips'.

Corridor 5: A438 / A38 – M5 Junction 9 to A4019 Coombe Hill

Scheme ref	Junction / Corridor	Scheme description
24	Shannon Way	Improvement to the A438/Shannon Way traffic signal junction to provide an additional eastbound exit lane from the junction to M5J9; separate left turn lane from A438 (west) to Shannon Way, with two straight ahead lanes eastbound. Upgrade signals to MOVA or SCOOT operation to optimise signal timings
26	A438/A38 Tewkesbury Bypass	Upgrade signals to MOVA to optimise signal timings
27	A38 Coombe Hill	Optimise signals

Corridor 6: A4019 – Coombe Hill to A435 Portland Street, Cheltenham

Scheme ref	Junction / Corridor	Scheme description
28	New junction west of M5 J10	New 50 mph dual carriageway two-lane link road, providing free-flow access from A4019 / M5J10 to West of Cheltenham site only.
29	West of M5 J10	Major/Minor Priority Junction on new 50 mph dual carriageway two-lane link road, with Minor junction arm for West of Cheltenham residential site access only.
30	West of M5 J10	Change to highway priorities west of M5J10, with a new Major/Minor Priority Junction, with A4019 (West) as Minor junction arm.

31	A4019 / A4013 Kingsditch	A4019 / A4013 Kingsditch (Centrum Park) Roundabout – replacing existing roundabout with traffic signals,
32	West of B4634 Old Gloucester Road	New A4019 traffic signals site access junction, west of B4634 Old Gloucester Rd
33	A4019 / B4634 Gallagher Retail Park	Revised A4019 traffic signals site access junction at B4634 Old Gloucester Rd / Gallagher Retail Park
34	A4019 Tewkesbury Road	Upgrade signals to SCOOT operation to optimise signal timings with bus priority along A4019 corridor junctions including: o B4634 Old Gloucester Rd/A4019 Junction o Hayden Road/A4019/Manor Road Junction o A4019 / Elm Street Junction o B4633 Gloucester Rd / A4019 /Townsend Street
35	Withybridge Lane	Close access onto A4019

Corridor 7: A435 – Teddington Hands (A46) to A46 St. Margaret's Road / Fairview Road

Scheme ref	Junction / Corridor	Scheme description
36	A435 / Hyde Lane / Southam Lane Signalised Junction	Signalised Junction -Upgraded to provide additional straight ahead lanes on all junction approaches
37	A435/ Stoke Road and A435 / Finlay Way Roundabouts	Capacity Improvements by approach arm widening
38	A435/GE Aviation Roundabout	Capacity Improvements by increasing the number of circulatory lanes to 2, and the A435 south bound exit to two lanes
39	A435 / Racecourse Roundabout	Capacity Improvements by approach arm widening

Corridor 8: A40 – M5 Junction 11 to A435 London Road

Scheme ref	Junction / Corridor	Scheme description
40	Arle Court Park and Ride	Expansion of existing Arle Court P&R parking facilities (100% Increase in Capacity), and new walking and cycling improvements to link P&R site with the new West of Cheltenham Employment site
41	Arle Court Park and Ride / A40 Arle Court Roundabout	New signalised junction on the A40 to the west of Arle Court roundabout to provide access into Park and Ride site only. With left turn out and right turn in only. This will not allow through traffic into Hatherley Lane.

Corridor 9: A46 – Bath Road (central Cheltenham) to A417 junction

Scheme ref	Junction / Corridor	Scheme description
42	Leckhampton Lane	Upgrade A46 / Leckhampton Lane priority junction, to include a dedicated right turn from A46 south into Leckhampton Lane.
43	Moorend Park Road	A46 Shurdington Road northbound approach to Moorend Park Road – additional highway space for right turning traffic by providing a longer stacking lane.
44	Badgeworth Lane	A46 / Badgeworth Lane priority Junction – Signalisation of junction to provide improved access to/from Badgeworth.

Corridor 10: A40 / A417 / A38 – Elmbridge Court Roundabout to A430 Cole Avenue junction, Gloucester

Scheme ref	Junction / Corridor	Scheme description
45	A40 / A417 C&G roundabout	A40 / A417 C&G roundabout –Capacity Improvement on 2014 Pinch Point Scheme, by provision of a 'free left turn lane' from the A40 Barnwood Link approach arm to A417 Barnwood Bypass, and from A417 Corinium Avenue approach arm to A40 Barnwood Link.
46	A38 / Walls roundabout	Capacity Improvement on 2014 Pinch Point Scheme, by providing 3 lane circulatory on the roundabout between Barnwood Rd / A38 Eastern Avenue approaches.
47	A38 / A4173 St. Barnabas roundabout	Remove roundabout and signalising junction(with removal of Reservoir Rd approach arm
49	A38 / A430 / B4008 Cole Avenue	A38 / A430 / B4008 Cole Avenue Junction - Grade separation to allow straight through movement of north / south traffic on A38 Southern Connector/A430 corridor

Corridor 11: A40 / A430 / A38 – Over Roundabout to Cross Keys Roundabout, Quedgeley

Scheme ref	Junction / Corridor	Scheme description
51	A40 / A417 Over Roundabout	Upgrade signals to MOVA or SCOOT operation to optimise signal timings
52	A430/A417 Castlemeads	Upgrade signals to MOVA or SCOOT operation to optimise signal timings
53	A38 Crosskeys Roundabouts	Upgrade signals to MOVA or SCOOT operation to optimise signal timings

Area wide Improvements

Scheme ref	Mode	Scheme description
54	Cycling	• Completing gaps in existing cycle networks within the Cheltenham and Gloucester urban areas and ensuring linkages into new strategic development sites – comprising a package of small cycle improvements • Improved cycle parking – at key destinations • Cheltenham to Bishops Cleeve Cycle Path
55	Passenger Transport	• Improved rail service frequency / stopping pattern for passenger services at Ashchurch railway station – ensuring an hourly service • Improved frequency and review bus service coverage of 41/42 and review of existing services • Improved bus service frequency on Gloucester – Cheltenham Service Route 97/ 98 via Churchdown • Mode Shift Points – built into local centres across the JCS area to provide local park and ride (including cycle park) facilities. Enhanced public transport facilities – upgraded bus stop at local community destinations which provide bike parking / RTPI / car parking – encouraging modal shift onto bus for part of the journey
56	Thinktravel	• School Travel Planning – Support for schools to encourage modal

		shift • Personalised Travel Planning – For new developments – tailored support to inform travel choices before established travel behaviour is established • Business Travel Planning – Support for employers to encourage modal shift • Bike training for children and adults through the travel plan process • Improved cycle information / route finding – Improved signage and promotional materials within the JCS area
57	Highway operation	• Urban Traffic Control Centre – including full review of traffic signals including expansion of SCOOT and MOVA signals where not covered in elsewhere

Appendix K – Do Something 7 Scenario Scheme package

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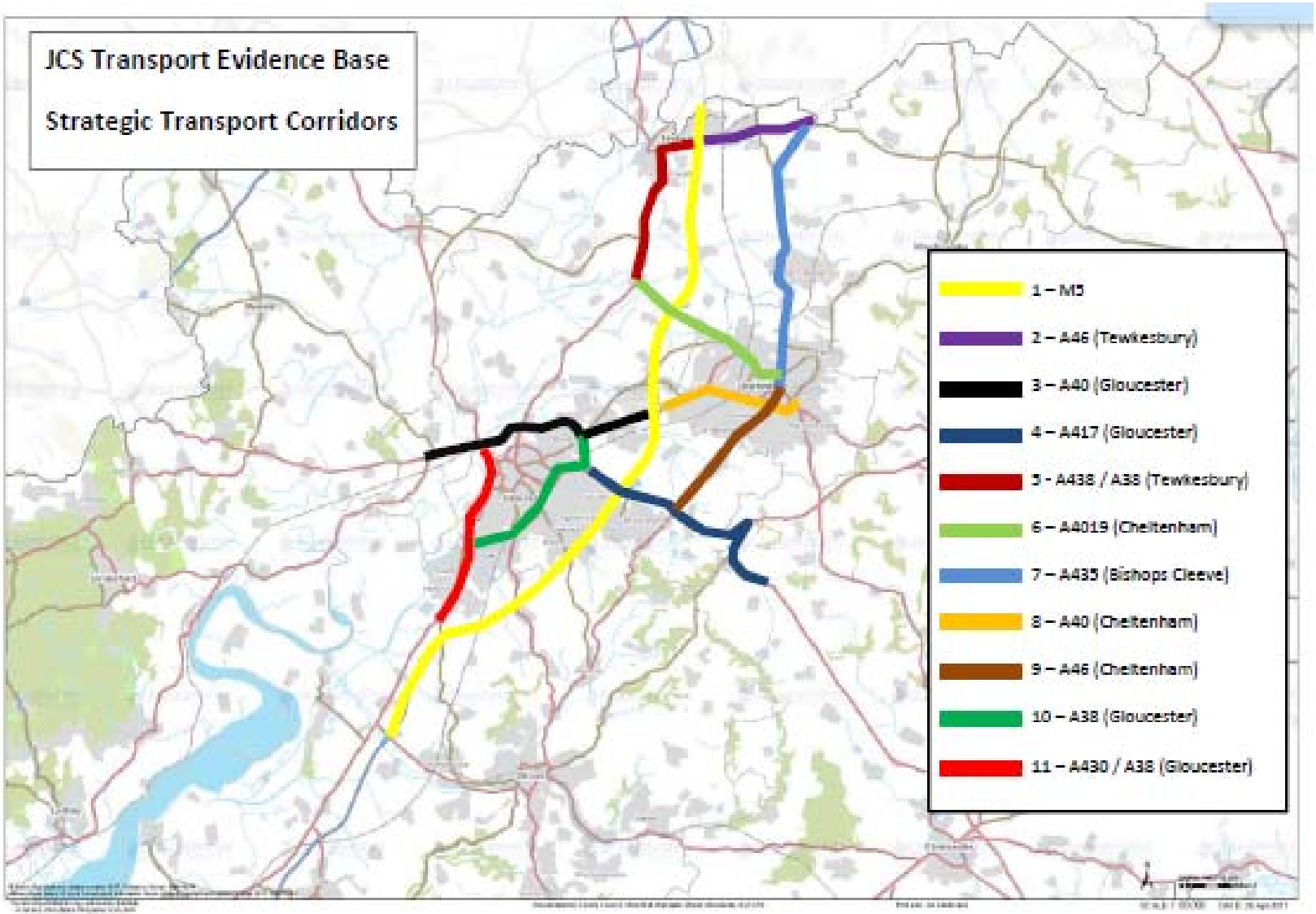
Appendix L – Strategic transport corridors in the JCS area

JCS Transport Strategy Evidence Base

APPENDIX L – Strategic Transport Corridors in the JCS area



Appendix M – DS7 Scheme cost assumptions

JCS Transport Strategy Evidence Base

Appendix M – DS7 Scheme cost assumptions

As many of the schemes outlined in DS7 are for the moment concepts there are no scheme designs available to inform likely costs. To address this, a series of high level cost bandings have been used and allocated to each of the scheme elements.

This information has been tabulated to aid understanding of these assessments.

The following cost banding assumptions have been used:

Cost banding	**Mid point used a cost of scheme**
<£1m	£1m
£1m to £5m	£3
£5m to £10m	£7.5
£10m to £15m	£12.5
£15m to £30m	£23
>£30m	See individual scheme

Appendix M – DS7 Scheme cost assumptions

DS7 – JCS Transport Strategy

Scheme ref	Junction / Corridor	Scheme description	Estimated cost banding	Mid-point value (if banding used) (£M)	Likely primary funding source
1	M5 J9 to M6 J11a	Upgrade motorway to a smart motorway increasing capacity during peak times and controlling vehicle flows	Estimated Cost £15-30M	22.5	Highways England Funding
2	M5 J9	Extended junction to accommodate new off-line A46 (Scheme ref 7).	No additional cost estimate required as scheme will be included within scheme design of scheme 7	0	Highways England Funding
3	M5 J10	High capacity upgrade of M5 J10 junction providing an 'All Movements' junction including three lanes on slip roads and circulatory lanes on the roundabout to accommodate the associated Cyber Park access road / A4019 junction (Scheme ref 28). This will be a high capacity signal controlled junction, with a separate left turn slip road from M5J10 northbound off-slip onto Cyber Park link road (southbound). New signals on A4019 westbound entry to upgrade motorway junction	Estimated Cost £45M	45	Ad-hoc funding opportunities
4	M5 J11	Signalise South Bound off-slip. North Bound off slip extra lane	Estimated Cost <£1M	1	Ad-hoc funding opportunities
5	M5 11a	Optimise junction operation with improved signing and lining and area wide reassignment	Estimated Cost <£1M	1	Ad-hoc funding opportunities
6	M5 J12	Upgrade to junction to include 2 lane wide off and on slips	Estimated Cost £10-15M	12.5	Ad-hoc funding opportunities

7	A46 Ashchurch	New dual carriageway bypass linking Teddington Hands roundabout with M5 Junction 9 and associated changes to junctions. Based on the Department for Transport's 1993 alignment.	Estimated Cost £70M	70	Highways England Funding
8	Grange Road / Hardwicke Bank Road	Close Railway Level Crossing, and replace with new bridge linking Grange Road with Hardwicke Bank Road	Estimated Cost £5-10M	7.5	Local Growth Fund
9	Alexandra Way / A46	Upgrade signals to MOVA or SCOOT operation to optimise signal timings	Estimated Cost <£1M	1	Ad-hoc funding opportunities
10	Fiddington Lane / A46	Upgrade signals to MOVA or SCOOT operation to optimise signal timings	Estimated Cost <£1M	1	Ad-hoc funding opportunities
11	Northway Lane / A46	Upgrade signals to MOVA or SCOOT operation to optimise signal timings	Estimated Cost <£1M	1	Ad-hoc funding opportunities
12	A40/A48 Highnam Roundabout	Signalise roundabout – MOVA signals	Estimated Cost £1-5M	3	Ad-hoc funding opportunities
13	A40 Over Roundabout	Add a dedicated left slip from A40 east to the south towards Gloucester	Estimated cost £5-10M	7.5	Ad-hoc funding opportunities
14	A40 Longford Roundabout	Existing A40 / A38 Longford junction changed from a roundabout to a signalised crossroads. Junction arrangement designed to complement the introduction of Longford Bypass. Turn from A40 east to A38 north not allowed. Bus priority – traffic signals will be used to facilitate north / south movements.	Estimated Cost £1-5M	3	Local Growth Fund
15	New junction on A40	New signalised junction on A40 between Longford and Elmbridge Court roundabouts	Estimated Cost £1-5M	3	Developer Contributions
16	New junction on A38	New priority junction on A38 giving priority to new highway link accessing to new junction on A40 (scheme 17)	Estimated Cost £1-5M	3	Developer Contributions

17	New section of highway	New 50 mph highway link, joining upgraded junctions on A40 and A38 through development site	Estimated Cost £5-10M	7.5	Developer Contributions
18	A38 Tewkesbury Road	A38 Tewkesbury Road to be downgraded between A40/A38 Longford signalised crossroads and new A38/Twigworth junction to 20mph, and encourage as a sustainable travel corridor. Access from A38 north is restricted to one lane entry to crossroads, A40 west to A38 north - right hand turn banned with alternative route via A40 / A38 Link Road.	Estimated Cost <£1M	1	Developer Contributions
19	A38 Tewkesbury Road	Upgrade A38 Tewkesbury Rd / Down Hatherley Lane junction, to include a dedicated right turn from A38 south.	Estimated Cost <£1M	1	Developer Contributions
20	A40 Elmbridge Court Roundabout	Remove B4063 Cheltenham Rd East approach arm from the junction and remove Business Park arm. . New junction east of Elmbridge – four way signals with turning restrictions. New link road from B4063 and access to Business Park. Both roads would access the new junction. New free flow left turn link from A40 East to A40 Barnwood Link and a free flow left turn link from A40 North to A40 East	Estimated cost £10-15M	12.5	Local Growth Fund
21	A417 / Delta Way 'Zoons' Roundabout	Junction Improvement: Removing the existing left turn slip from Delta Way (Brockworth) to C&G Roundabout, and signalising the A417 approach (from Cirencester) and the opposing roundabout circulatory movement.	Estimated Cost £1-5M	3	Local Growth Fund
22	A417 Brockworth Bypass	Signalising the westbound and eastbound 'Off-slips'.	Estimated Cost <£1M	1	Ad-hoc funding opportunities
24	Shannon Way	Improvement to the A438/Shannon Way traffic signal junction to provide an additional eastbound exit lane from the junction to M5J9; separate left turn lane from A438 (west) to Shannon Way, with two straight ahead lanes eastbound. Upgrade signals to MOVA or SCOOT operation to optimise signal timings	Estimated Cost £1-5M	3	Local Growth Fund
26	A438/A38 Tewkesbury Bypass	Upgrade signals to MOVA to optimise signal timings	Estimate cost <£1m	1	Ad-hoc funding opportunities

27	A38 Coombe Hill	Optimise signals	Estimate cost <£1m	1	Ad-hoc funding opportunities
28	New junction west of M5 J10	New 50 mph dual carriageway two-lane link road, providing free-flow access from A4019 / M5J10 to West of Cheltenham site only.	Estimated Cost -£15-30M	22.5	Developer contributions
29	West of M5 J10	Major/Minor Priority Junction on new 50 mph dual carriageway two-lane link road, with Minor junction arm for West of Cheltenham residential site access only.	Estimated Cost - £1-5M	3	Developer contributions
30	West of M5 J10	Change to highway priorities west of M5J10, with a new Major/Minor Priority Junction, with A4019 (West) as Minor junction arm.	Estimated Cost - £5-10M	7.5	Developer contributions
31	A4019 / A4013 Kingsditch	A4019 / A4013 Kingsditch (Centrum Park) Roundabout – replacing existing roundabout with traffic signals,	Estimated Cost - £1-5M.	3	Developer contributions
32	West of B4634 Old Gloucester Road	New A4019 traffic signals site access junction, west of B4634 Old Gloucester Rd	Estimated Cost - £1-5M.	3	Developer contributions
33	A4019 / B4634 Gallagher Retail Park	Revised A4019 traffic signals site access junction at B4634 Old Gloucester Rd / Gallagher Retail Park	Estimated Cost - £1-5M.	3	Developer contributions
34	A4019 Tewkesbury Road	Upgrade signals to SCOOT operation to optimise signal timings with bus priority along A4019 corridor junctions including: o B4634 Old Gloucester Rd/A4019 Junction o Hayden Road/A4019/Manor Road Junction o A4019 / Elm Street Junction o B4633 Gloucester Rd / A4019 /Townsend Street	Estimated Cost - £5-10M.	7.5	Ad-hoc funding opportunities
35	Withybridge Lane	Close access onto A4019	Estimated Cost < £1M.	1	Developer contributions
36	A435 / Hyde Lane / Southam Lane Signalised Junction	Signalised Junction -Upgraded to provide additional straight ahead lanes on all junction approaches	Estimated Cost <£1M	1	Developer contributions
37	A435/ Stoke Road and A435 / Finlay Way Roundabouts	Capacity Improvements by approach arm widening	Estimated Cost <£1M	1	Developer contributions

38	A435/GE Aviation Roundabout	Capacity Improvements by increasing the number of circulatory lanes to 2, and the A435 south bound exit to two lanes	Estimate cost £1 – 5M	3	Developer contributions
39	A435 / Racecourse Roundabout	Capacity Improvements by approach arm widening	Estimated Cost <£1M	1	Developer contributions
40	Arle Court Park and Ride	Expansion of existing Arle Court P&R parking facilities (100% Increase in Capacity), and new walking and cycling improvements to link P&R site with the new West of Cheltenham Employment site	Estimated Cost £5-10M	7.5	Local Growth Fund
41	Arle Court Park and Ride / A40 Arle Court Roundabout	New signalised junction on the A40 to the west of Arle Court roundabout to provide access into Park and Ride site only. With left turn out and right turn in only. This will not allow through traffic into Hatherley Lane.	Estimated Cost £5-10M	3	Local Growth Fund
42	Leckhampton Lane	Upgrade A46 / Leckhampton Lane priority junction, to include a dedicated right turn from A46 south into Leckhampton Lane.	Estimated Cost £1-5M	3	Developer contributions
43	Moorend Park Road	A46 Shurdington Road northbound approach to Moorend Park Road – additional highway space for right turning traffic by providing a longer stacking lane.	Estimated Cost £1-5M	3	Developer contributions
44	Badgeworth Lane	A46 / Badgeworth Lane priority Junction – Signalisation of junction to provide improved access to/from Badgeworth.	Estimated Cost <£1M	1	Ad-hoc funding
45	A40 / A417 C&G roundabout	A40 / A417 C&G roundabout –Capacity Improvement on 2014 Pinch Point Scheme, by provision of a 'free left turn lane' from the A40 Barnwood Link approach arm to A417 Barnwood Bypass, and from A417 Corinium Avenue approach arm to A40 Barnwood Link.	Estimated Cost £1-5M	3	Ad-hoc funding
46	A38 / Walls roundabout	Capacity Improvement on 2014 Pinch Point Scheme, by providing 3 lane circulatory on the roundabout between Barnwood Rd / A38 Eastern Avenue approaches.	Estimated Cost £1-5M	3	Ad-hoc funding
47	A38 / A4173 St. Barnabas roundabout	Remove roundabout and signalising junction(with removal of Reservoir Rd approach arm	Estimated Cost £5-10M	7.5	Developer contributions
49	A38 / A430 / B4008 Cole Avenue	A38 / A430 / B4008 Cole Avenue Junction - Grade separation to allow straight through movement of north / south traffic on A38 Southern Connector/A430 corridor	Estimated Cost £5-10M	7.5	Local Growth Fund

51	A40 / A417 Over Roundabout	Upgrade signals to MOVA or SCOOT operation to optimise signal timings	Estimates cost <£1m	1	Ad-hoc funding
52	A430/A417 Castlemeads	Upgrade signals to MOVA or SCOOT operation to optimise signal timings	Estimates cost <£1m	1	Ad-hoc funding
53	A38 Crosskeys Roundabouts	Upgrade signals to MOVA or SCOOT operation to optimise signal timings	Estimates cost <£1m	1	Ad-hoc funding
54	Cycling	• Completing gaps in existing cycle networks within the Cheltenham and Gloucester urban areas and ensuring linkages into new strategic development sites – comprising a package of small cycle improvements • Improved cycle parking – at key destinations • Cheltenham to Bishops Cleeve Cycle Path	Estimated cost -£10-15M	12.5	Ad-hoc funding
55	Passenger Transport	• Improved rail service frequency / stopping pattern for passenger services at Ashchurch railway station – ensuring an hourly service • Improved frequency and review bus service coverage of 41/42 and review of existing services • Improved bus service frequency on Gloucester – Cheltenham Service Route 97/ 98 via Churchdown • Mode Shift Points – built into local centres across the JCS area to provide local park and ride (including cycle park) facilities. Enhanced public transport facilities – upgraded bus stop at local community destinations which provide bike parking / RTPI / car parking – encouraging modal shift onto bus for part of the journey	Estimated cost -£10-15M	12.5	Passenger Transport Operators
56	Thinktravel	• School Travel Planning – Support for schools to encourage modal shift • Personalised Travel Planning – For new developments – tailored support to inform travel choices before established travel behaviour is established • Business Travel Planning – Support for employers to encourage modal shift	Estimated cost -£1-5M	3	Developer contributions

		• Bike training for children and adults through the travel plan process • Improved cycle information / route finding – Improved signage and promotional materials within the JCS area			
57	Highway operation	Urban Traffic Control Centre – including full review of traffic signals including expansion of SCOOT and MOVA signals where not covered in elsewhere	Estimated cost -£15-30M	22.5	Ad-hoc funding opportunities
Total				361.5	

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