

Stroud Local Plan Review

Strategy Options

Transport Discussion Paper

July 2018

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1.0 Background

- 1.1 This Strategy Options Transport Discussion Paper has been produced by Stroud District Council officers in consultation with the Stroud Local Plan Review Transport Officers Group. It has been produced to inform Stroud District Council's decision making process regarding the preferred development strategy. The contents of this paper should not be used outside the context of this decision making process.
- 1.2 The Transport Officers Group includes officers from Stroud District Council in their role as the Local Planning Authority, Highways England in their role as Strategic Highway Authority and Gloucestershire County Council (GCC) in their role as Local Highway Authority and in discharging their transport planning function.
- 1.3 The paper provides a high level assessment of the likely transport issues arising for the four different development scenarios arising from the Issues and Options stage of the Stroud Local Plan Review.
- 1.4 The paper does not constitute the formal views of the local or strategic Highway Authority but does reflect the willingness of all parties to ensure that transport planning matters are discussed and taken into account at the initial plan making stage. The assessment represents a desk top assessment using emerging planning data. No assessment of existing commitments has been made at this stage. Once the preferred development strategy is known a more detailed assessment will be necessary and both the local and strategic Highway Authorities reserve the right for further comment at that stage.

2.0 Assumptions used

- 2.1 Four growth options have been devised by Stroud District Council officers to reflect the broad range of possible ways of delivering the expected levels of growth signalled by the Government's national methodology for identifying future housing requirements. These four options have been used as the basis of this high-level assessment. They include:
 - Option 1 Concentrated development - 5,550 dwellings and 30ha B class employment
 - Option 2 Wider distribution - 5,520 dwellings and 30ha B class employment
 - Option 3 Dispersal -5,695 dwellings and 40ha B class employment
 - Option 4 Growth Point -6,010 dwellings and 40ha B class employment
- 2.2 To aid this assessment process, potential sites with fewer than 300 dwellings have been grouped together and assessed as one site for the purposes of this Stroud Local Plan Review transport assessment only. For some of the rural clusters the transport assessment has been made using the site/location with the largest housing capacity.
- 2.3 Figure 1 outlines the sites considered within each of the development options.
- 2.4 TRICS assessments were undertaken to calculate likely trip rates. These rates are not explicitly endorsed by either highway authority but provide a workable basis for undertaking a high level strategic assessment for the purpose of plan making. All other transport data

was accessed from various sources during the week of the 5th March 2018. Appendix A summarises where this data was accessed and the trip rates used within this assessment.

- 2.5 Figure 2 outlines how the trip rates were applied to the development options identified in Figure 1.

Figure 1 – Strategic Transport Assessment Development table

- Only sites over 300 dwellings or with an employment allocation have been identified / Smaller sites have been grouped under their related clusters –

Site ID	Cluster areas	Settlements	Sites	Option 1 Concentrated development		Option 2 Wider distribution		Option 3 Dispersal		Option 4 Growth Point	
				Dwellings	B class employment	Dwellings	B class employment	Dwellings	B class employment	Dwellings	B class employment
1a	Gloucester Fringe	Hardwicke	One or two A sites South of Hardwicke (G1)	1400		800		150		1400	
1b	Gloucester Fringe	Hardwicke	South of M5/J12 (G4)		10		10		10		10
1c	Gloucester Fringe	Brockworth, Brookthorpe, Haresfield	Merged sites for strategic TA	150		150		220			
2a	Cotswold	Bisley, Oakridge Lynch, Painswick, Cranham, Sheepcombe	Merged sites for strategic TA					100			
3a	Stonehouse	Stonehouse	North Stonehouse B1	750		750		150			
3b	Stonehouse	Stonehouse	M5 J13 (D1/D2)		20		20		20		20
3c	Stonehouse	Large sites within settlement, Alkerton, Kings Stanley, Leonard Stanley, Standish, Middleyard, Selsley	Merged sites for strategic TA	195		195		335			
4a	Severn Vale	Large sites within settlement, Frampton, Whitminster, Arlingham, Longney, Saul	Merged sites for strategic TA			220		140			
5a	Stroud Valleys	Stroud, Minchinhampton, Nailsworth, Brimscombe, Chalford, Horsley, Manor Village, Woodchester, Thrupp & Tier 4/5 locations	Merged sites for strategic TA	445		825		835			
6a	Berkeley	Newtown & Sharpness	Land south of Sharpness					2000	10	2000	10
6b	Berkeley	Newtown & Sharpness	Land at Cam/Cambridge							1750	
6c	Berkeley	Berkeley, Slimbridge, Cambridge, Newport, Stone	Merged sites for strategic TA			200		185			
7a	Cam and Dursley	Cam	North west Cam(A)	1200		200		100			
7b	Cam and Dursley	Cam	North east Cam (C/D/E)	300		750		110			
7c	Cam and Dursley	Cam, Dursley, Nympsfield, Stinchcombe	Merged sites for strategic TA	250		250		290			
8a	Wotton	Wotton under Edge, Kingswood, North Nibley, Hillesley	Merged sites for strategic TA			200		100			
	Windfall	District wide	Not included for the purposes of the site assessments	860		980		980		860	

Figure 2 – Strategic Transport Assessment Development table – Peak Hour Trip Rate Table

Site ID	Cluster areas	Settlements	Sites	Option 1 Concentrated development		Option 2 Wider distribution		Option 3 Dispersal		Option 4 Growth Point	
				AM	PM	AM	PM	AM	PM	AM	PM
1a	Gloucester Fringe	Hardwicke	One or two A sites South of Hardwicke (G1)	785	853	449	487	84	91	785	853
1b	Gloucester Fringe	Hardwicke	South of M5/J12 (G4)	746	842	746	842	746	842	746	365
1c	Gloucester Fringe	Brockworth, Brookthorpe, Haresfield	Merged sites for strategic TA	84	91	84	91	123	134	0	0
2a	Cotswold	Bisley, Oakridge Lynch, Painswick, Cranham, Sheepcombe	Merged sites for strategic TA	0	0	0	0	56	61	0	0
3a	Stonehouse	Stonehouse	North Stonehouse B1	421	457	421	457	84	91	0	0
3b	Stonehouse	Stonehouse	M5 J13 (D1/D2)	1493	1685	1493	1685	1493	1685	1493	1685
3c	Stonehouse	Large sites within settlement, Alkerton, Kings Stanley, Leonard Stanley, Standish, Middledyard, Selsley	Merged sites for strategic TA	109	119	109	119	188	204	0	0
4a	Severn Vale	Large sites within settlement, Frampton, Whitminster, Arlingham, Longney, Saul	Merged sites for strategic TA	115	125	123	134	79	85	0	0
5a	Stroud Valleys	Stroud, Minchinhampton, Nailsworth, Brimscombe, Chalford, Horsley, Manor Village, Woodchester, Thrupp & Tier 4/5 locations	Merged sites for strategic TA	135	146	463	502	468	509	0	0
6a	Berkeley	Newtown & Sharpness	Land south of Sharpness	0	0	0	0	1868	2060	1868	2060
6b	Berkeley	Newtown & Sharpness	Land at Cam/Cambridge	0	0	0	0	0	0	982	1066
6c	Berkeley	Berkeley, Slimbridge, Cambridge, Newport, Stone	Merged sites for strategic TA	0	0	112	122	104	113	0	0
7a	Cam and Dursley	Cam	North west Cam(A)	673	731	112	122	56	61	0	0
7b	Cam and Dursley	Cam	North east Cam (C/D/E)	168	183	421	457	62	67	0	0
7c	Cam and Dursley	Cam, Dursley, Nympsfield, Stinchcombe	Merged sites for strategic TA	140	152	140	152	163	177	0	0
8a	Wotton	Wotton under Edge, Kingswood, North Nibley, Hillesley	Merged sites for strategic TA	0	0	112	122	56	61	0	0
	Windfall	District wide	Not included for the purposes of the site assessments	482	524	550	597	550	597	482	524

3.0 High level analysis of trip rates

3.1 High level TRICS assessments were undertaken to inform this discussion paper. These rates are not explicitly endorsed by either highway authority but provide a workable basis for informing this stage of the plan making process. Figure 3 summaries the trip rates used within this assessment and Appendix A outlines the assumptions used to derive the trip rates.

Figure 3 – Trip rates used for the purposes of this assessment

	AM peak – 08:00 to 09:00	PM peak – 17:00 to 18:00
Residential trip rates per dwelling	0.561	0.609
Employment trip rates per 100sq.m	1.244	1.404

3.2 Options 1 and 2 generate a similar number of new peak hour trips. As options 3 and 4 have an increase quantum of proposed development the scale of new peak trips increases accordingly. Option 3 records the greatest number of new trips on the network; this is despite not allocating the largest quantum of growth. Figure 4 summaries the number of new peak hour trips generated by development option.

Figure 4 – New peak hour trips by development option

	Option 1 Concentrated development	Option 2 Wider distribution	Option 3 Dispersal	Option 4 Growth Point
New dwellings	5,500	5,520	5,695	6,010
New employment	30ha B class employment	30ha B class employment	40ha B class employment	40ha B class employment
New peak hour trips	11,260	11,225	13,018	12,910

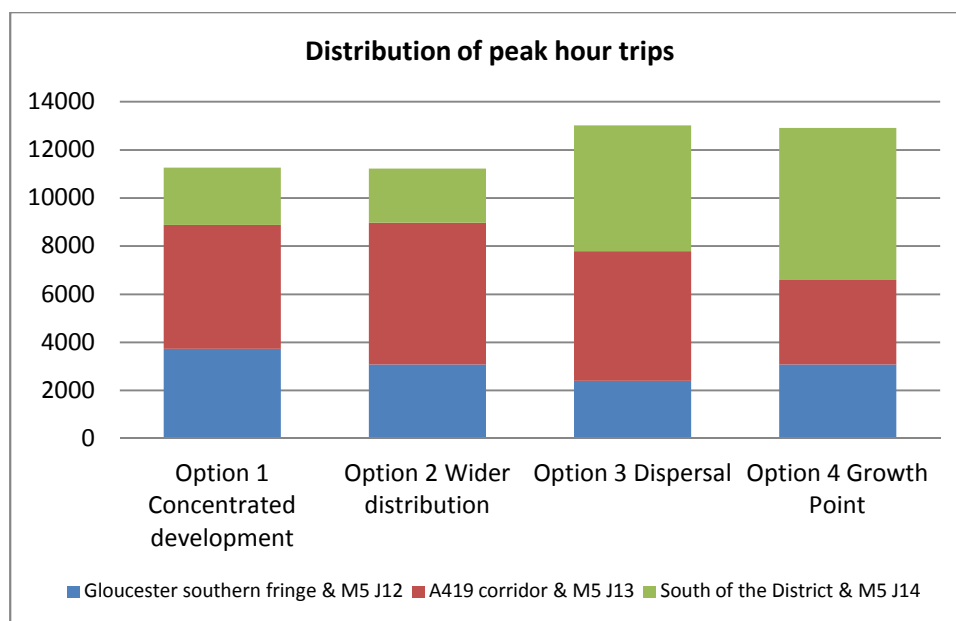
3.3 In terms of strategic transport analysis, Stroud District can be divided into three travel belts linked to accessing the M5 at junctions 12, 13 or 14. Figure 5 provides a summary of the broad location of the three belts and the assumed number of new peak hour trips generated from the development options outlined in Figures 1 and 2.

Figure 5 – Total peak hour trips (AM & PM) by development option

Travel Belt	Site Cluster Areas	Option 1 Concentrated development	Option 2 Wider distribution	Option 3 Dispersal	Option 4 Growth Point
North	<ul style="list-style-type: none"> Gloucester Fringe 	3,738	3,083	2,404	3,085
Central	<ul style="list-style-type: none"> Cotswold Stonehouse Severn Vale Stroud Valleys 	5,139	5,888	5,385	3,513
South	<ul style="list-style-type: none"> Berkeley Cam and Dursley Wotton 	2,383	2,254	5,229	6,312
Total		11,260	11,225	13,018	12,910

3.4 When banding the number of additional trips generated from the proposed development under these three belts it provides an insight into the distribution of the likely impacts of this growth. Figure 6 visualises this distribution.

Figure 6 – Distribution of additional peak hour trips by development option



3.5 Within all of the options the impact on M5 J12 and the local network in the northern belt remains consistent. For options 1 and 2 the growth focuses on M5 J13 and the A419 corridor. Option 3 also focusses growth on this corridor, but the distribution of impact is more dispersed across the district. Option 4 will have a significant impact on M5 J14 in the south of the District.

3.6 Travel to work data provided through the 2011 Census is a useful source when determining likely trip patterns based on household locations and workplace destinations. Figure 7 provides a summary of this data. A more detailed set of data is provided within Appendix A.

Figure 7 – Likely work place destinations by proposed development site based on 2011 Census data

Site ID	Cluster areas	Travel Band	Within Gloucestershire				Outside Gloucestershire		
			Within Stroud District	CSV	Cotswold	Forest of Dean	West of England	West Midlands	Other
1a & 1b	Gloucester Fringe	North	20%	65%	2%	2%	6%	2%	4%
1c	Gloucester Fringe	North	23%	62%	2%	1%	5%	2%	4%
2a	Cotswold	Central	42%	33%	7%	0%	5%	2%	10%
3a, 3b & 3c	Stonehouse	Central	65%	19%	4%	1%	6%	1%	4%
4a	Severn Vale	Central	52%	27%	3%	1%	11%	2%	5%
5a	Stroud Valleys	Central	59%	17%	9%	0%	6%	1%	8%
6a, 6b & 6c	Berkeley	South	47%	13%	2%	2%	33%	1%	4%
7a, 7b & 7c	Cam & Dursley	South	58%	14%	3%	1%	18%	1%	4%
8a	Wotton	South	44%	8%	4%	0%	38%	1%	6%

3.7 The northern belt of the district forms part of Gloucester’s southern fringe and can be considered in terms of an urban extension. From this part of the District the main entry point onto the SRN is M5 J12 and the key travel corridors on the local network include the A38 and B4008. Based on travel to work data collected through the 2011 over 60% of trips are to the Central Severn Vale area and 7% of travel outside the county either to the south to the West of England or north to the West Midlands. These trips would probably be undertaken using the M5.

3.8 The central belt of the district is dominated by the A419 corridor and the highways feeding onto it. The main entry point onto the SRN is M5 J13 and the key travel corridors on the local network include the A38 and A4019. For those sites within the A419 corridor (Stroud and Stonehouse) approximately 60% of trips remain within Stroud District. For sites outside the A419 corridor (Severn Vale and Cotswold) there are fewer trips within the District and approximately 30% of trips to the Central Severn Vale. Approximately 7% of trips are likely to use the M5 accessing the West of England or West Midlands.

3.9 The southern belt of the district is rural and has no dominating highway corridor. When accessing the SRN for north bound trips M5 J13 may be accessed, for south bound trips M5 J14 would be used. The key travel corridors on the local network are more dispersed and include the A38, A4135, B4066 and B4058. Based on travel to work data collected through the 2011 Census, Cam and Dursley has a high level of self containment with approximately 60% of trips remaining within Stroud District. For Berkeley and Wotton there is also a high level of travel within the District, but far greater proportion of trips (between 33% and 38%) travelling to the West of England.

4.0 Likely mitigation packages

4.1 To understand the likely mitigation packages for each development option a high level desk top assessment of each site has been undertaken. This information is summarised in Appendix B. It includes an assessment of census data to understand likely trip destinations and the mode of travel during peak travel time; it also includes a summary on the availability of existing travel choices before identifying any likely mitigation requirements to maintain a safe and functioning transport network.

Figure 8 – Likely mitigation required by development option

	1 – Concentrated Growth	2 – Wider Distribution	3 - Dispersal	4 – Growth Point
Strategic Road Network	<ul style="list-style-type: none"> M5 J12 – capacity improvement M5 J13 – capacity improvement M5 J14 – capacity improvement 	<ul style="list-style-type: none"> M5 J12 – capacity improvement M5 J13 – capacity improvement M5 J14 – capacity improvement 	<ul style="list-style-type: none"> M5 J12 – capacity improvement M5 J13 – capacity improvement M5 J14 – significant capacity improvement 	<ul style="list-style-type: none"> M5 J12 – capacity improvement M5 J13 – capacity improvement M5 J14 – significant capacity improvement
Major Road Network	<ul style="list-style-type: none"> A38 - Cross Keys Roundabout A38 - Cole Avenue 	<ul style="list-style-type: none"> A38 - Cross Keys Roundabout 	<ul style="list-style-type: none"> A38 - Cross Keys Roundabout 	<ul style="list-style-type: none"> A38 - Cross Keys Roundabout – A38 - Cole Avenue
Local Road Network	<ul style="list-style-type: none"> A419 – possible dualling from Oldend Lane to M5 A419 corridor significant improvements Level crossing on Oldends Lane may need to be upgraded 	<ul style="list-style-type: none"> A419 – possible dualling from Oldend Lane to M5 A419 corridor significant improvements Level crossing on Oldends Lane may need to be upgraded 	<ul style="list-style-type: none"> A419 – possible dualling from Oldend Lane to M5 A38 & Alkington Lane – Access improvements 	<ul style="list-style-type: none"> A419 – possible dualling from Oldend Lane to M5 A38 & Alkington Lane – Access improvements
Bus Network	<ul style="list-style-type: none"> Bus service 12 - extension of existing service Bus service 61 extension & increased frequency for access to Stroud. Bus service frequency increase and better linkages to Cam & Dursley railway station 	<ul style="list-style-type: none"> Bus service 12 - extension of existing service Bus service 61 extension & increased frequency for access to Stroud. Bus service frequency increase and better linkages to Cam & Dursley railway station 	<ul style="list-style-type: none"> Bus service 12 - extension of existing service Bus service 61 extension & increased frequency for access to Stroud New bus service required to serve new strategic allocation at Sharpness 	<ul style="list-style-type: none"> Bus service 12 - extension of existing service Bus service 61 extension & increased frequency for access to Stroud New bus service required to serve new strategic allocation at Sharpness & Cambridge
Rail Network	<ul style="list-style-type: none"> Upgrade to Cam & Dursley station 	<ul style="list-style-type: none"> Upgrade to Cam & Dursley station 		
Walking and Cycling network	<ul style="list-style-type: none"> Linkages to Countywide cycle network Improved cycle linkages to Cam & Dursley station 	<ul style="list-style-type: none"> Linkages to Countywide cycle network Improved cycle linkages to Cam & Dursley station 	<ul style="list-style-type: none"> Local access improvements 	<ul style="list-style-type: none"> Linkages to Countywide cycle network Improved cycle linkages to Cam & Dursley station

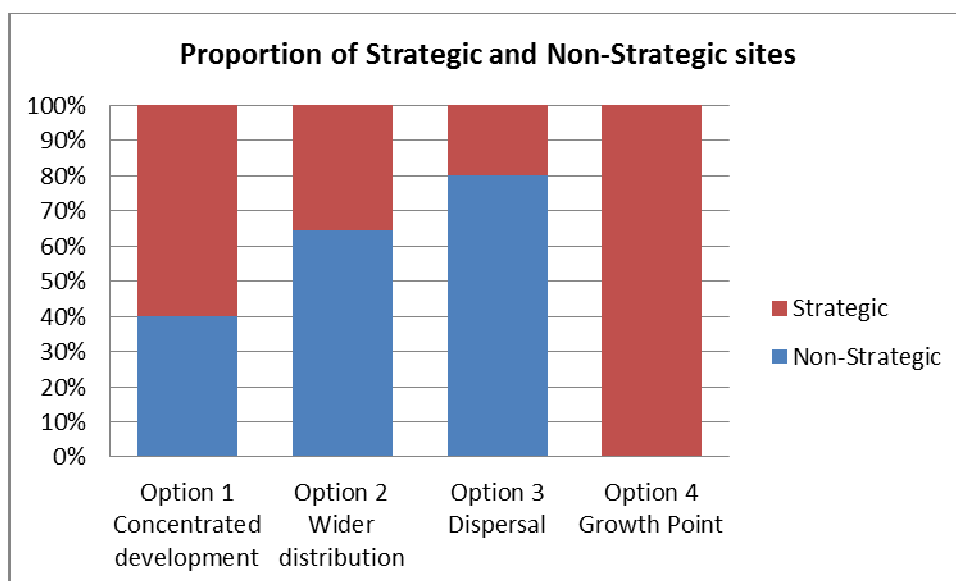
4.2 Figure 8 summaries the main mitigation consideration by development option. It is interesting to note that regardless of the development option many of the mitigation measures remain constant. This suggests that there are already transport capacity issues within the transport network serving Stroud District and any form of new development will

require mitigation. The issue is the scale of mitigation required and the likely funding sources to finance the mitigation required.

5.0 Likely sources of funding by development option

- 5.1 The ability to attract major scheme funding from Government and other stakeholders is a major consideration when linking likely mitigation scenarios with development options. Larger sites require larger mitigation packages; however, they are also more likely to benefit from Government funding bids to support housing delivery. Smaller scale sites may contribute cumulatively towards the need for large scale mitigation schemes, but it is more difficult to attract sufficient funding to cover the cost of mitigation. Stroud District Council's Community Infrastructure Levy (CIL) may facilitate this, but this will be impacted by the phased trigger points linked to housing delivery. This may result in a timing issue in terms of infrastructure being built after the development instead of ahead of it.
- 5.2 For the purposes of this strategic assessment sites with fewer than 300 dwellings were merged into one grouping and are considered as being non-strategic. It has been assumed for the purposes of this assessment that sites with over 300 dwellings are strategic and therefore more likely to be able to finance any mitigation required to reduce the impact of their development.
- 5.3 It can therefore be assumed that the greater the number of strategic sites by development option, the greater the chances of its mitigation strategy attracting funding through developer contributions or Government funding bids.
- 5.4 The greater number of non-strategic sites within the development option the more reliance on CIL to fund the mitigation, which under the existing regulations may result in a funding shortfall or a delay in the mitigation being delivered.
- 5.5 Figure 9 illustrates the balance of each development scenario in terms of strategic or non-strategic sites.
- 5.6 Options 1 and 4 have more strategic development sites and are more likely to attract Government funding towards any required mitigation packages. However, it should be noted that due to the small number of sites in option 4 the scale of impact is more focussed and may be more expensive. Options 2 and particularly 3 will be reliant on CIL and may result in issues when mitigating the cumulative impact of the development option.

Figure 9 – Proportion of Strategic and Non-Strategic sites



6.0 Matrix assessment by development option

6.1 To provide a high-level summary of each of the development options four separate assessments have been undertaken that summarise the individual assessments included in Appendix B. The assessments include:

- Likely scale of mitigation required
- Cumulative impact of the site – linked to location of likely impact
- Existing car use based on 2011 census data
- Propensity of using passenger transport – before any mitigation

6.2 Figures 10 to 14 illustrate the matrix assessment by development option. It is important to consider that this assessment only provides a high level summary and it needs to be considered in the context of the narrative provided in Section 7 to explain the impacts of each of the development options.

Figure 10 – Likely scale of mitigation required

	Mitigation will require additional funding bid >£10m
	Mitigation will require additional funding bid <£10m
	Mitigation will need to be covered through planning conditions and CIL
	No evidence of impacts at this stage – subject to detailed assessment

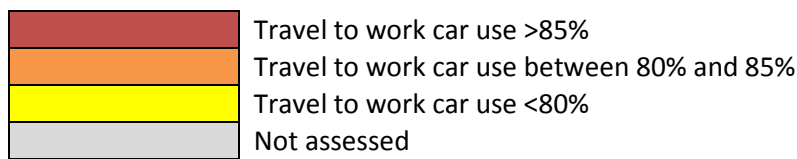
Assessments	1 – Concentrated Growth	2 – Wider Distribution	3 - Dispersal	4 – Growth Point
Hardwicke - One or two A sites South of Hardwicke (G1)	A38 - Cross Keys Roundabout – upgrade of access	A38 - Cross Keys Roundabout – upgrade of access		A38 - Cross Keys Roundabout – upgrade of access
Hardwicke - South of M5/J12 (G4)	A38 - Cross Keys Roundabout – upgrade of access	A38 - Cross Keys Roundabout – upgrade of access	A38 - Cross Keys Roundabout – upgrade of access	A38 - Cross Keys Roundabout – upgrade of access
Brockworth, Brookthorpe, Haresfield - Merged sites for strategic TA				
Bisley, Oakridge Lynch, Painswick, Cranham, Sheepcombe - Merged sites for strategic TA				
Stonehouse - North Stonehouse B1	A419 corridor	A419 corridor		
Stonehouse - M5 J13 (D1/D2)	A419 corridor – possible dualling	A419 corridor – possible dualling	A419 corridor – possible dualling	A419 corridor – possible dualling
Large sites within settlement, Alkerton, Kings Stanley, Leonard Stanley, Standish, Middleyard, Selsley - Merged sites for strategic TA				
Large sites within settlement, Frampton, Whitminster, Arlingham, Longney, Saul - Merged sites for strategic TA				
Stroud, Minchinhampton, Nailsworth, Brimscombe, Chalford, Horsley, Manor Village, Woodchester, Thrupp & Tier 4/5 locations - Merged sites for strategic TA	A419 corridor	A419 corridor	A419 corridor	
Newtown & Sharpness - Land south of Sharpness			Access onto A38	Access onto A38
Newtown & Sharpness - Land at Cam/Cambridge				Access onto A38
Berkeley, Slimbridge, Cambridge, Newport, Stone - Merged sites for strategic TA				
Cam - North west Cam(A)	Upgrade to Cam & Dursley station			
Cam - North east Cam (C/D/E)	Upgrade to Cam & Dursley station	Upgrade to Cam & Dursley station		
Cam, Dursley, Nympsfield, Stinchcombe - Merged sites for strategic TA				
Wotton under Edge, Kingswood, North Nibley, Hillesley - Merged sites for strategic TA				

Figure 11 - Cumulative impact of the site – linked to location of likely impact

	Site will impact on known pinch point and require significant infrastructure
	Site will impact on known pinch point and require infrastructure
	Unlikely to impact on known pinch point
	No evidence of impacts at this stage – subject to detailed assessment

Assessments	1 – Concentrated Growth	2 – Wider Distribution	3 - Dispersal	4 – Growth Point
Hardwicke -One or two A sites South of Hardwicke (G1)	M5 J12 – Capacity improvement	M5 J12 – Capacity improvement	M5 J12 – Capacity improvement	M5 J12 – Capacity improvement
Hardwicke - South of M5/J12 (G4)	M5 J12 – Capacity improvement	M5 J12 – Capacity improvement	M5 J12 – Capacity improvement	M5 J12 – Capacity improvement
Brockworth, Brookthorpe, Haresfield - Merged sites for strategic TA	M5 J12 – Capacity improvement	M5 J12 – Capacity improvement	M5 J12 – Capacity improvement	
Bisley, Oakridge Lynch, Painswick, Cranham, Sheepcombe - Merged sites for strategic TA				
Stonehouse - North Stonehouse B1	A419 corridor – M5 J13 – Capacity improvement	A419 corridor – M5 J13 – Capacity improvement	A419 corridor – M5 J13 – Capacity improvement	
Stonehouse - M5 J13 (D1/D2)	A419 corridor – M5 J13 – Capacity improvement	A419 corridor – M5 J13 – Capacity improvement	A419 corridor – M5 J13 – Capacity improvement	A419 corridor – M5 J13 – Capacity improvement
Large sites within settlement, Alkerton, Kings Stanley, Leonard Stanley, Standish, Middleyard, Selsley - Merged sites for strategic TA	A419 corridor – M5 J13 – Capacity improvement	A419 corridor – M5 J13 – Capacity improvement	A419 corridor – M5 J13 – Capacity improvement	
Large sites within settlement, Frampton, Whitminster, Arlingham, Longney, Saul - Merged sites for strategic TA				
Stroud, Minchinhampton, Nailsworth, Brimscombe, Chalford, Horsley, Manor Village, Woodchester, Thrupp & Tier 4/5 locations - Merged sites for strategic TA	A419 corridor – M5 J13 – Capacity improvement	A419 corridor – M5 J13 – Capacity improvement	A419 corridor – M5 J13 – Capacity improvement	
Newtown & Sharpness - Land south of Sharpness			Access to A38 M5 J14 – capacity improvements	Access to A38 M5 J14 – capacity improvements
Newtown & Sharpness - Land at Cam/Cambridge				Access to A38 M5 J14 – capacity improvements
Berkeley, Slimbridge, Cambridge, Newport, Stone - Merged sites for strategic TA		Impacts on both M5 J13 and J14	Impacts on both M5 J13 and J14	
Cam - North west Cam(A)	Impacts on both M5 J13 and J14	Impacts on both M5 J13 and J14	Impacts on both M5 J13 and J14	
Cam - North east Cam (C/D/E)	Impacts on both M5 J13 and J14	Impacts on both M5 J13 and J14	Impacts on both M5 J13 and J14	
Cam, Dursley, Nympsfield, Stinchcombe - Merged sites for strategic TA	Impacts on both M5 J13 and J14	Impacts on both M5 J13 and J14	Impacts on both M5 J13 and J14	
Wotton under Edge, Kingswood, North Nibley, Hillesley - Merged sites for strategic TA				

Figure 12 - Existing car usage



Assessments	1 – Concentrated Growth	2 – Wider Distribution	3 - Dispersal	4 – Growth Point
Hardwicke -One or two A sites South of Hardwicke (G1)				
Hardwicke - South of M5/J12 (G4)				
Brockworth, Brookthorpe, Haresfield - Merged sites for strategic TA				
Bisley, Oakridge Lynch, Painswick, Cranham, Sheepcombe - Merged sites for strategic TA				
Stonehouse - North Stonehouse B1				
Stonehouse - M5 J13 (D1/D2)				
Large sites within settlement, Alkerton, Kings Stanley, Leonard Stanley, Standish, Middleyard, Selsley - Merged sites for strategic TA				
Large sites within settlement, Frampton, Whitminster, Arlingham, Longney, Saul - Merged sites for strategic TA				
Stroud, Minchinhampton, Nailsworth, Brimscombe, Chalford, Horsley, Manor Village, Woodchester, Thrupp & Tier 4/5 locations - Merged sites for strategic TA				
Newtown & Sharpness - Land south of Sharpness				
Newtown & Sharpness - Land at Cam/Cambridge				
Berkeley, Slimbridge, Cambridge, Newport, Stone - Merged sites for strategic TA				
Cam - North west Cam(A)				
Cam - North east Cam (C/D/E)				
Cam, Dursley, Nympsfield, Stinchcombe - Merged sites for strategic TA				
Wotton under Edge, Kingswood, North Nibley, Hillesley - Merged sites for strategic TA				

Figure 13 - Propensity of using passenger transport – Before any mitigation

	Site located on a corridor with PT frequency less than 60 mins
	Site located on a non-urban corridor with an PT frequency greater than 60 mins
	Site located on an urban corridor with an PT frequency greater than 60 mins
	Not assessed

Assessments	1 – Concentrated Growth	2 – Wider Distribution	3 - Dispersal	4 – Growth Point
Hardwicke -One or two A sites South of Hardwicke (G1)				
Hardwicke - South of M5/J12 (G4)				
Brockworth, Brookthorpe, Haresfield - Merged sites for strategic TA				
Bisley, Oakridge Lynch, Painswick, Cranham, Sheepcombe - Merged sites for strategic TA				
Stonehouse - North Stonehouse B1				
Stonehouse - M5 J13 (D1/D2)				
Large sites within settlement, Alkerton, Kings Stanley, Leonard Stanley, Standish, Middleyard, Selsley - Merged sites for strategic TA				
Large sites within settlement, Frampton, Whitminster, Arlingham, Longney, Saul - Merged sites for strategic TA				
Stroud, Minchinhampton, Nailsworth, Brimscombe, Chalford, Horsley, Manor Village, Woodchester, Thrupp & Tier 4/5 locations - Merged sites for strategic TA				
Newtown & Sharpness - Land south of Sharpness				
Newtown & Sharpness - Land at Cam/Cambridge				
Berkeley, Slimbridge, Cambridge, Newport, Stone - Merged sites for strategic TA				
Cam - North west Cam(A)				
Cam - North east Cam (C/D/E)				
Cam, Dursley, Nympsfield, Stinchcombe - Merged sites for strategic TA				
Wotton under Edge, Kingswood, North Nibley, Hillesley - Merged sites for strategic TA				

Figure 14 – Combined matrix assessment

Figure 14 summarises the matrix assessments in Figures 9 to 12. Each location is represented by 4 cells. The first cell relates to the likely scale of mitigation required to mitigate the impacts of the proposed development, the second relates to likely cumulative impact of the site in terms of trip growth, the third relates to existing car use and the fourth relates to the likely use passenger transport based on existing service coverage.

Assessments	1 – Concentrated Growth	2 – Wider Distribution	3 - Dispersal	4 – Growth Point
Hardwicke - One or two A sites South of Hardwicke (G1)	Red	Orange	Yellow	Red
	Red	Orange	Yellow	Red
	Red	Orange	Yellow	Red
	Yellow	Orange	Yellow	Yellow
Hardwicke - South of M5/J12 (G4)	Red	Orange	Orange	Red
	Red	Orange	Orange	Red
	Red	Orange	Orange	Red
	Yellow	Orange	Orange	Yellow
Brockworth, Brookthorpe, Haresfield - Merged sites for strategic TA	Yellow	Orange	Orange	Grey
	Orange	Orange	Orange	Grey
	Orange	Orange	Orange	Grey
	Orange	Orange	Orange	Grey
Bisley, Oakridge Lynch, Painswick, Cranham, Sheepcombe - Merged sites for strategic TA	Grey	Grey	Yellow	Grey
	Grey	Grey	Yellow	Grey
	Grey	Grey	Red	Grey
	Grey	Grey	Red	Grey
Stonehouse - North Stonehouse B1	Orange	Orange	Yellow	Grey
	Orange	Orange	Yellow	Grey
	Orange	Orange	Yellow	Grey
	Orange	Orange	Orange	Grey
Stonehouse - M5 J13 (D1/D2)	Red	Red	Red	Red
	Red	Red	Red	Red
	Red	Red	Red	Red
	Yellow	Orange	Orange	Orange
Alkerton, Kings Stanley, Leonard Stanley, Standish, Middleyard, Selsley - Merged sites	Yellow	Orange	Orange	Grey
	Red	Orange	Orange	Grey
	Yellow	Orange	Orange	Grey
	Orange	Orange	Orange	Grey
Frampton, Whitminster, Arlingham, Longney, Saul - Merged sites for strategic TA	Grey	Yellow	Yellow	Grey
	Grey	Yellow	Yellow	Grey
	Grey	Red	Red	Grey
	Grey	Red	Red	Grey
Stroud, Minchinhampton, Nailsworth, Brimscombe, Chalford, Thrupp & other locations - Merged sites	Orange	Orange	Orange	Grey
	Red	Orange	Orange	Grey
	Orange	Orange	Orange	Grey
	Yellow	Orange	Orange	Grey
Newtown & Sharpness - Land south of Sharpness	Grey	Grey	Red	Red
	Grey	Grey	Red	Red
	Grey	Grey	Red	Red
	Grey	Grey	Red	Red
Newtown & Sharpness - Land at Cam/Cambridge	Grey	Grey	Grey	Red
	Grey	Grey	Grey	Red
	Grey	Grey	Grey	Red
	Grey	Grey	Orange	Orange
Berkeley, Slimbridge, Cambridge, Newport, Stone - Merged sites for strategic TA	Grey	Yellow	Orange	Grey
	Grey	Orange	Orange	Grey
	Grey	Red	Red	Grey
	Grey	Red	Red	Grey
Cam - North west Cam(A)	Orange	Yellow	Yellow	Grey
	Orange	Yellow	Yellow	Grey
	Orange	Yellow	Yellow	Grey
	Orange	Orange	Orange	Grey
Cam - North east Cam (C/D/E)	Orange	Orange	Yellow	Grey
	Orange	Orange	Yellow	Grey
	Orange	Orange	Yellow	Grey
	Orange	Orange	Orange	Grey
Cam, Dursley, Nympsfield, Stinchcombe - Merged sites for strategic TA	Yellow	Orange	Orange	Grey
	Orange	Orange	Orange	Grey
	Red	Orange	Orange	Grey
	Orange	Orange	Orange	Grey
Wotton under Edge, Kingswood, North Nibley, Hillesley - Merged sites for strategic TA	Grey	Yellow	Yellow	Grey
	Grey	Yellow	Yellow	Grey
	Grey	Red	Red	Grey
	Grey	Orange	Orange	Grey

7.0 Development Option Transport Summaries

7.1 Option 1 - Concentrated development

Transport Summary

- 7.1.1 This option provides an even distribution of new peak hour traffic across the district.
- 7.1.2 Gloucester's southern fringe is the most sustainable location in terms of existing passenger transport services and this option includes the greatest proportion of new development traffic within its location. Approximately 35% of new development traffic will be generated within this area. It should be noted that if this additional travel demand is not serviced by passenger transport there is likely to be more reliance and need to upgrade M5 J12.
- 7.1.3 45% of the new development traffic is likely to impact the A419 corridor and similar to option 2 it is likely to require a significant upgrade to this primary transport corridor including an upgrade to M5 J13.
- 7.1.4 The southern part of the District is the most rural and is likely to be the most dependant on the car for travel. Options 1 and 2 are similar in their likely impact within this area with approximately 20% of new development traffic generated within this area. The focus of development is around Cam and Dursley and there is the potential for rail to provide an alternative option for longer distance trips especially those travelling to the West of England.
- 7.1.5 There is likely to be a high level of self containment with travel within Stroud and the A419 corridor. This option is the most sustainable in terms of the location of planned growth and existing levels of non car based trips and is most likely to benefit from the existing passenger transport network.
- 7.1.6 This option is the most sustainable in terms of the location of planned growth and existing levels of non car based trips and is most likely to benefit from the existing passenger transport network.

Likely Mitigation package to include:

- A419 corridor – possible dualling from Chipmans Platt Roundabout
- M5 J12 – Capacity improvement
- A38 - Cross Keys Roundabout – upgrade of access
- A419 corridor improvements
- Upgrade to Cam & Dursley station
- M5 J13 – Capacity improvement
- M5 J14 – capacity improvements

Ability to attract major scheme funding

- 7.1.7 60% of the sites identified within this option can be classified as strategic and are more likely to attract Government funding to address the cumulative impacts of the development.
- 7.1.8 There will be a reliance on CIL to mitigate the cumulative impacts and further work will be required to understand the priorities for this funding source.

7.2 Option 2 - Wider Distribution

Transport Summary

- 7.2.1 This option provides an even distribution of new peak hour traffic across the district.
- 7.2.3 Approximately 30% of new development traffic will occur within Gloucester's southern fringe. In terms of passenger transport links into Gloucester this is the most sustainable location, however for vehicles travelling from and from other locations there will remain a reliance on the private car and the need to upgrade M5 J12.
- 7.2.4 This option includes the greatest proportion of new development traffic to impact the A419 corridor (50%) and it is likely to require a significant upgrade to this transport corridor including an upgrade to M5 J13.
- 7.2.5 The southern part of the District is the most rural and is likely to be the most dependant on the car for travel. Options 1 and 2 are similar in their likely impact within this area with approximately 20% of new development traffic generated within this area. With the focus around Cam and Dursley there is the potential for rail to provide an alternative option for longer distance trips especially those travelling to the West of England.
- 7.2.6 There is likely to be a high level of self containment with travel within Stroud and the A419 corridor. This option is likely to have the strong transport links to Gloucester and the Central Severn Vale.
- 7.2.7 This option is highly sustainable in terms of the location of planned growth and existing levels of non car based trips
- 7.2.8 Investment would be required to encourage the viability of passenger transport options as a realistic travel choice, but there is scope for this potential.

Likely Mitigation package to include:

- A419 corridor – possible dualling from Chipmans Platt Roundabout
- A38 - Cross Keys Roundabout – upgrade of access
- A419 corridor – Chipmans Platt roundabout
- Upgrade to Cam & Dursley station
- M5 J12 – Capacity improvement
- M5 J13 – Capacity improvement
- M5 J14 – capacity improvements

Ability to attract major scheme funding

- 7.2.9 40% of the sites identified within this option can be classified as strategic and are more likely to attract Government funding to address the cumulative impacts of the development.
- 7.2.10 There will however be a strong reliance on CIL to migrate the cumulative impacts and the limitations this may present in terms of viability will need to be considered

7.3 Option 3 – Dispersal

Transport Summary

- 7.3.1 This option disperses growth across the district. In the absence of growth points this is likely to reduce the critical mass required for passenger transport services. The mode share of the car is likely to be greater when compared with the other development options.
- 7.3.2 Approximately 20% of new trips will impact Gloucester's southern fringe; this option has the least impact in this part of the District however the scale of growth if car focussed is likely to still require an upgrade to M5 J12.
- 7.3.3 Approximately 40% of new trips will impact the A419 corridor, which less than options 1 and 2, however it remains likely due to the cumulative impacts of vehicle using this corridor that an upgrade will be require to many of the junctions and M5 J13.
- 7.3.4 This option includes a large strategic allocation in Sharpness, an area with connectivity issues. If not addressed it is likely this will be car dominated and will negatively impact on the networks around Berkeley. There are concerns that the scale of growth identified within this option is not enough to justify the scale of investment in passenger transport services to mitigate this impact.
- 7.3.5 The new development in Sharpness is likely to face Bristol in terms of work related trips.
- 7.3.6 This option is the least sustainable in terms of the location of planned growth and it likely to be the most reliant on the car and least likely to benefit from the passenger transport network due to the lack of growth points required to sustain passenger transport services.

Likely Mitigation package to include:

- A419 corridor – possible dualling from Chipmans Platt Roundabout
- Improved access onto A38 from Sharpness
- A38 - Cross Keys Roundabout – upgrade of access
- M5 J12 – Capacity improvement
- M5 J13 – Capacity improvement
- M5 J14 – capacity improvements

Ability to attract major scheme funding

- 7.3.7 The scale of impact on a site by site basis is likely to be limited to the local environment of the site; however attracting funding to mitigate the cumulative impacts is likely to be more challenging.
- 7.3.8 This option is the least likely to attract Government funding due to the number of small scale development sites and will be reliant on CIL.
- 7.3.9 In terms of mitigating the cumulative impacts of the development this is likely to be the least viable.

7.4 Option 4 - Growth Point

Transport Summary

- 7.4.1 This option focusses growth within the south of the District at two new settlements. Existing travel patterns indicate this location to be the least sustainable in terms of alternatives to the car. However, the scale of growth may provide the opportunity for a step change in passenger transport provision.
- 7.4.2 Approximately 25% of new development traffic will occur within Gloucester's southern fringe. In terms of passenger transport links into Gloucester this is the most sustainable location, however for vehicles travelling from other locations there will remain a reliance on the private car and the need to upgrade M5 J12.
- 7.4.3 This option includes the least proportion of new development traffic to impact the A419 corridor and may only require upgrades to the corridor between Chipmans Platt Roundabout and the M5 J12.
- 7.4.4 Approximately 50% of new traffic will occur in the south of the district focussed on two strategic allocations. This presents an opportunity for the development of new passenger transport services, but this needs to be balanced against the need for significant upgrades to the highway network including an upgrade to the A38 and M5 J14.
- 7.4.5 This option is focussed on the south of the district and is most likely to require strong transport links to Bristol and the West of England.
- 7.4.6 Based on existing travel patterns the locations of the two strategic allocations is likely to be reliant on the car. However due to the scale of growth proposed there is the opportunity to provide non car based alternatives.
- 7.4.7 Investment would be required to encourage the viability of passenger transport options as a realistic travel choice, but there is scope for this potential.

Likely Mitigation package to include:

- A419 corridor – possible dualling from Chipmans Platt Roundabout
- Improved access onto A38 from Sharpness
- M5 J12 – capacity improvements
- M5 J14 – capacity improvements
- A38 - Cross Keys Roundabout – upgrade of access
- M5 J13 – Capacity improvement

Ability to attract major scheme funding

- 7.4.8 This option is most likely to attract Government funding, but the cost of the mitigation package is likely to be greater than the other options.

8.0 Next Steps

8.1 The results of this Transport Discussion Paper will be used, together with other evidence, to inform the development of the preferred development strategy for the Local Plan Review. Depending upon the nature of the preferred strategy, the relevant areas of work identified above will be progressed during 2019 to support the future publication of the draft Local Plan Review document.

8.2 There remain a number of areas of work where further analysis is required to fully understand the impacts of the potential development options. This includes (in no particular order):

- **Cross Keys Roundabout and M5 J12** - To understand the impacts of the growth options for Gloucester's southern fringe and M5 Junction 12 it will be necessary to undertake a high level capacity assessment for Cross Keys Roundabout and M5 J12. This assessment could be undertaken in partnership with the JCS authorities.
- **A419 corridor and M5 J13** - To understand the impacts of the growth options for the A419 corridor through Stonehouse and Stroud to M5 Junction 13 it will be necessary to undertake a high level capacity corridor assessment.
- **A38 corridor and M5 J14** – To understand the impact of proposed scale of growth in the southern belt of the district on M4 J14. This assessment should be undertaken in partnership with the South Gloucestershire Council and Highways England.
- **Access strategy for Sharpness** - To understand the scale of access improvements required from the proposed Sharpness development site to the A38. This will require a strategic assessment of linkages from Sharpness and Berkeley to the A38.
- **District-wide Bus Strategy** – To understand the operational issues of a bus strategy including changes to existing services (12 & 61) and viability of establishing new services (Sharpness)
- **Stroud Cycling Infrastructure Plan** – To identify a District wide masterplan for cycle linkages within the District linked to the County Council's countywide cycleway.
- **Masterplan for Cam & Dursley Railway Station** – Should a development option identifying growth in Cam be progressed it will be essential to produce a Masterplan for the station and its surrounding environment including car, bus and cycle access.