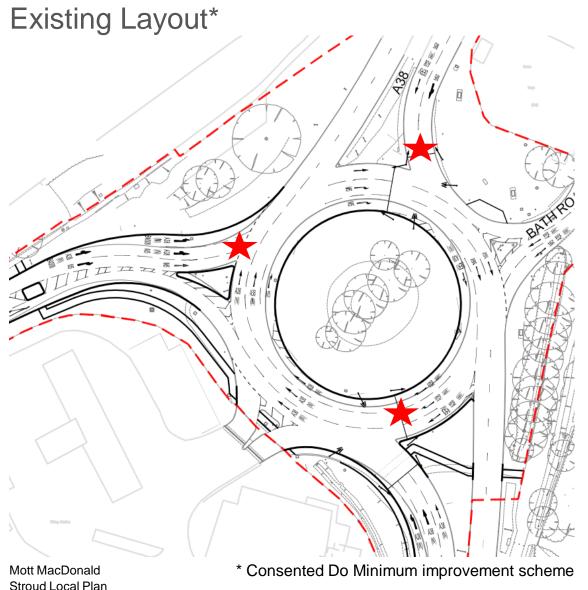
# L. Development of Highway Mitigation

# Junction 1 – Cross Keys Roundabout



# Forecast performance in 2040 Unmitigated Local Plan Scenario

### **AM Peak**

- A38 southbound entry deteriorates from 98% in DM to 105% with Local Plan
- B4008 northbound circulatory link reaches 101% with Local Plan
- A38 northbound approach arm increases to 86% with Local Plan

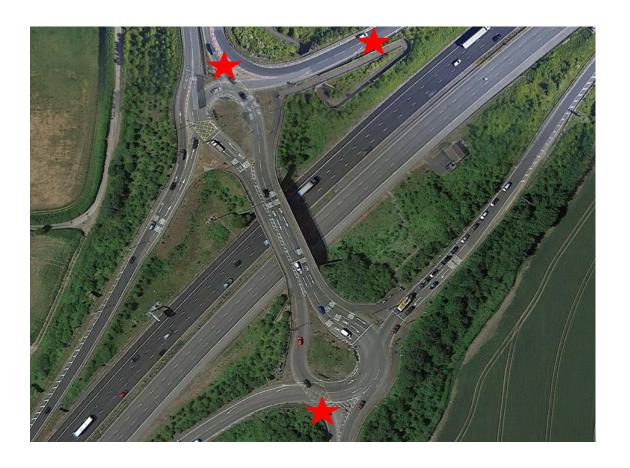
### PM Peak

- A38 southbound DM entry increases from 88% to 98% with Local Plan
- B4008 northbound circulatory link at 92% with Local Plan
- A38 northbound approach arm at 96% with Local Plan

- A38 southbound approach widened to three lanes
- · A38 eastbound approach signalised and flare lengthened
- Signal re-optimisation throughout

## Junction 2 – M5 J12

## **Existing Layout**



# Forecast performance in 2040 Unmitigated Local Plan Scenario

#### AM Peak

- Slight deterioration in performance with the Local Plan, with both B4008 entries approaching or operating at 100%
- Northbound on-slip (merge with mainline) at 101% with Local Plan

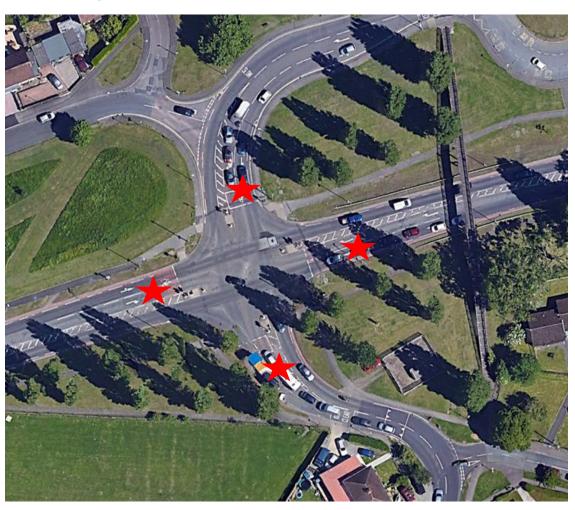
### PM Peak

- B4008 southbound entry increases from 86% in the DM to 97% with the Local Plan
- B4008 NB increases from 102% in the DM to 110% with the Local Plan

- Creation of a new all-movements grade-separated junction, incorporating two overbridges
- · Signalisation of each approach

# Junction 3 – A38 / Epney Road (Gloucester)

## **Existing Layout**



# Forecast performance in 2040 Unmitigated Local Plan Scenario

#### AM Peak

 Substantial deterioration in performance with the Local Plan on both the A38 eastbound and Epney Road northbound approaches – these operate at 105% and 102% respectively in the Unmitigated Local Plan scenario

#### PM Peak

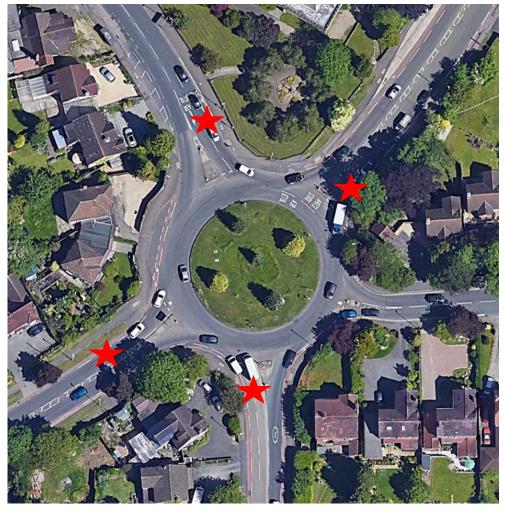
 A38 eastbound and both Epney Road approaches all at, or above, 100% with the Local Plan

### **Assumed mitigation**

 Widening both A38 approaches to provide two ahead lanes, with merging back to a single lane an appropriate distance away from the junction

## Junction 4 – A38 St Barnabas Roundabout

## **Existing Layout\***



### \* Reservoir Road not included in SATURN model

# Forecast performance in 2040 Unmitigated Local Plan Scenario

#### AM Peak

- Both A38 approaches >100% in the DM, with slight further deterioration in the Local Plan scenario
- A4173 northbound approaches increases from <85% in DM to 102% with the Local Plan
- Some northbound A4173 traffic is forecast to rat-run onto adjacent residential streets (e.g. Firwood Drive) to avoid delays at the St Barnabas junction

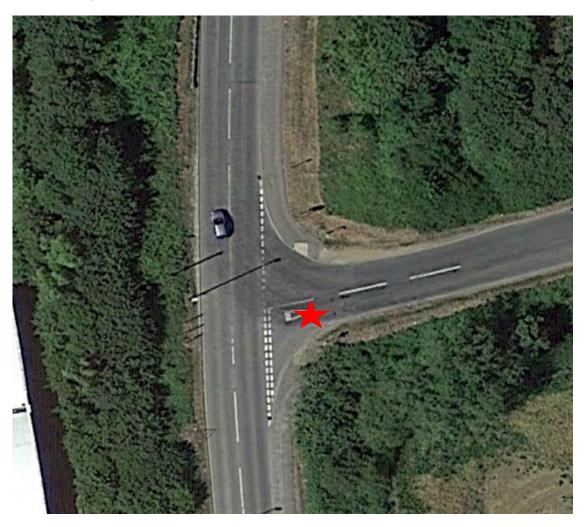
#### PM Peak

- All arms close to, or above, 100% in both the DM and Local Plan scenarios
- A38 westbound reaches 111% in the unmitigated Local Plan scenario

- · Potential improvement scheme provided by GCC
- Includes an enlarged roundabout, with widening on the A38, A4173 and B4072 approaches

## Junction 5 – B4008 / Stonehouse

## **Existing Layout**



# Forecast performance in 2040 Unmitigated Local Plan Scenario

### **AM Peak**

- Minor arm increases from <85% in the DM to 109% with Local Plan
- Link capacity on the B4008 exceeded partly due to demand associated with M5 J12 & Javelin Park employment site allocations

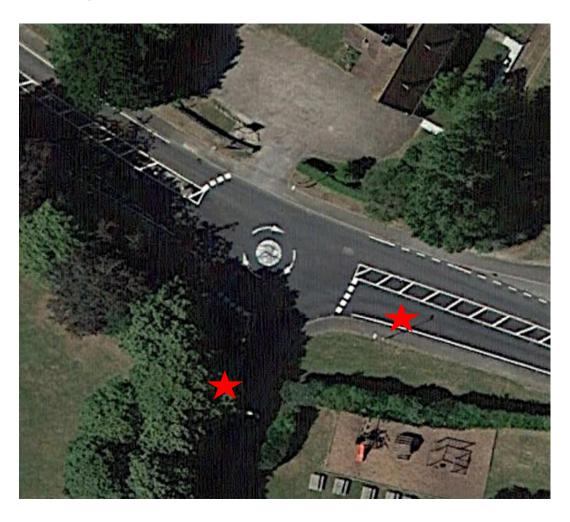
### PM Peak

 Junction itself is within capacity but blocking back from M5 J12 causes the northbound B4008 approach to experience a very high V/C in the Local Plan scenario

- · Signalisation to increase capacity out of side-road
- Further consideration will need to be given to managing demand for through-traffic along the route between the B4008 and A4173 through Haresfield

# Junction 6 – A4173 / Brookthorpe

## **Existing Layout**



# Forecast performance in 2040 Unmitigated Local Plan Scenario

#### AM Peak

 A4173 northbound approach reaches 92% in the Local Plan scenario

### PM Peak

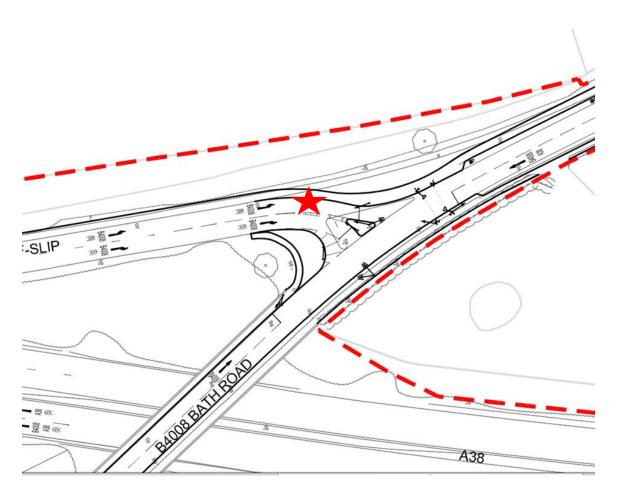
 Both the A4173 northbound and the Haresfield Lane approaches increase from <85% in the DM to >100% with Local Plan

### **Assumed mitigation**

 No mitigation assumed to avoid encouraging additional traffic to use the minor route (via Haresfield) between the A4173 and the B4008

## Junction 7 – B4008 / Bristol Road

## **Existing Layout\***



# Forecast performance in 2040 Unmitigated Local Plan Scenario

### **AM Peak**

 Left-turn out of A38 off-slip increases from 92% in the DM to 102% in the Local Plan scenario (N.B. overall link V/C is at 71% due to limited volume of right-turners)

### PM Peak

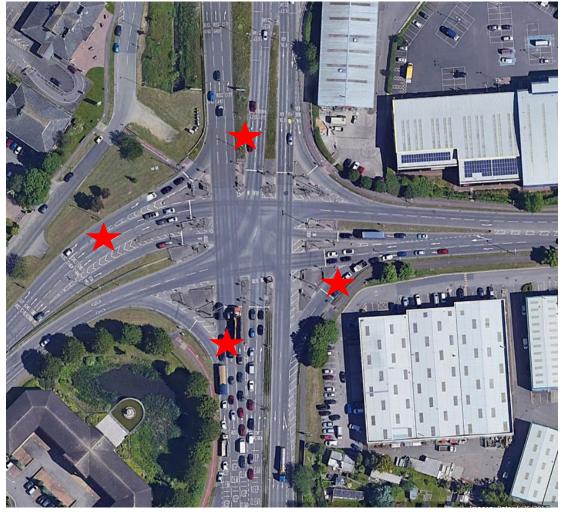
 Left-turn out of A38 off-slip increases from 97% in the DM to 106% in the Local Plan scenario (N.B. overall link V/C is at 77% due to limited volume of right-turners)

### **Assumed mitigation**

· Optimisation of signal timings only - no physical works assumed

## Junction 8 – A38 / A430 / B4008

### **Existing Layout**



### Mott MacDonald Stroud Local Plan

# Forecast performance in 2040 Unmitigated Local Plan Scenario

#### **AM Peak**

- B4008 approach increases to 91% (from 82% in the DM)
- Some turning movements begin exceeding 100% in the Local Plan scenario
- A38 link capacity to east of junction also exceeded in Local Plan scenario

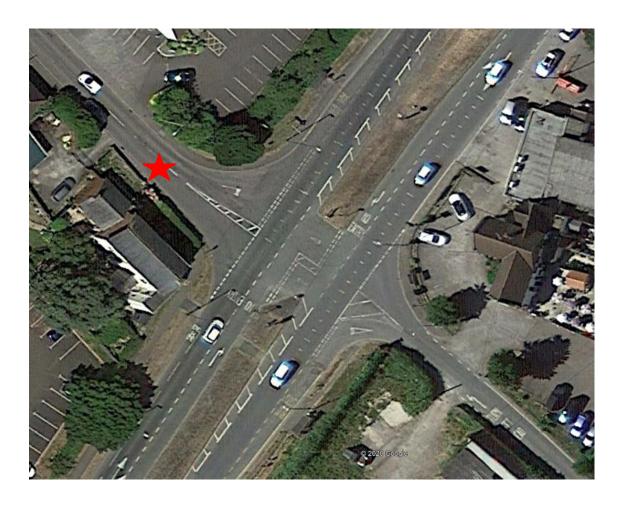
#### PM Peak

- A430 southbound approaches increases from 97% in DM to 100% with Local Plan
- B4008 & A38 northbound approaches >=85% in Local Plan
- A38 link capacity to east of junction also exceeded in Local Plan scenario

- Third ahead lane for A430 southbound traffic, with associated widening on A38 southbound exit
- Longer left-turn flares on the B4008 eastbound and A38 westbound approaches
- Signal re-optimisation throughout

## Junction 9 – A38 / Grove Lane

## **Existing Layout**



# Forecast performance in 2040 Unmitigated Local Plan Scenario

#### AM Peak

### PM Peak

- Flow increases along A38 restrict side-road give-way capacities
- School Lane increases from <50% in the DM to 110% in the Local Plan scenario
- Junction performs comfortably within capacity in the evening peak

- No mitigation at this location to avoid encouraging additional traffic using the minor School Lane route between Frampton and the A38
- Inclusion of traffic signals at the adjacent A38 / B4071 junction to prioritise the B-road as the main connection to/from Frampton, Saul etc

# Junction 10 – A38 at Claypits

## **Existing Layout**



# Forecast performance in 2040 Unmitigated Local Plan Scenario

#### AM Peak

- Both A38 approaches close to, or above, 100% in the Local Plan scenario
- Link capacity on the A38 becomes a constraint with the Local Plan

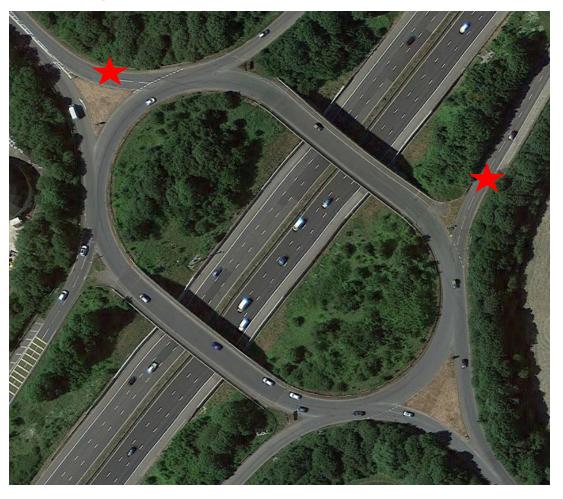
### PM Peak

- A38 southbound reaches 105% in Local Plan scenario – a substantial increase from the DM
- Both other arms at around 85% in the Local Plan scenario

- Widening both A38 approaches to provide two ahead lanes with merging on the exits from the junction
- Further consideration of link capacity improvements along the A38 may also be necessary but are not included within the mitigation forecast scenarios

## **Junction 11 – M5 J13**

## **Existing Layout**



# Forecast performance in 2040 Unmitigated Local Plan Scenario

### **AM Peak**

 M5 southbound off-slip increases from 53% in the DM to 95% with Local Plan

### PM Peak

 A419 eastbound increases substantially with the Local Plan, reaching 90%

### **Assumed mitigation**

• Signalisation of all approaches to roundabout

## Junction 12 – A419 / Oldends Roundabout

## **Existing Layout**



# Forecast performance in 2040 Unmitigated Local Plan Scenario

#### AM Peak

 Maximum entry V/C at junction of 75%, but the eastbound A419 link capacity to the west of the junction exceeds 100% in the Local Plan scenario

### PM Peak

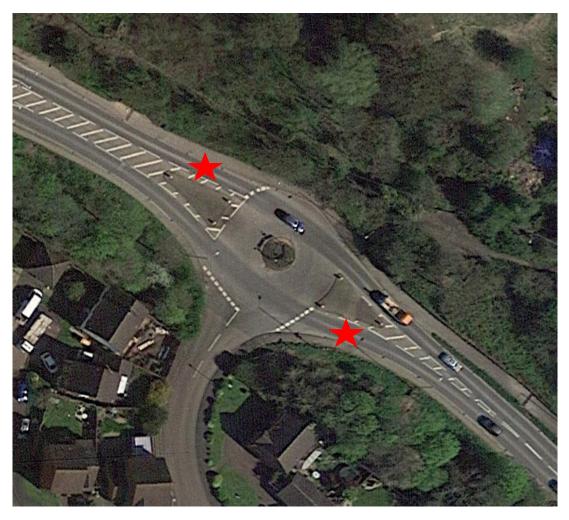
 Junction performs adequately but link capacities either side of junction become a constraint in the Local Plan scenario

### **Assumed mitigation**

 A419 widening between Oldends Roundabout and Chipman's Platt Roundabout

## Junction 13 – A419 / Boakes Drive Roundabout

## **Existing Layout**



# Forecast performance in 2040 Unmitigated Local Plan Scenario

#### AM Peak

- Eastbound A419 approach increases from 92% in the DM to 94% with Local Plan
- Westbound approach exceeds 100% with Local Plan

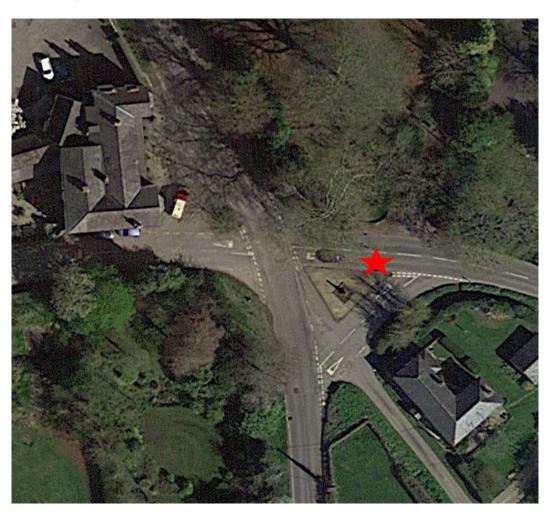
### PM Peak

 Eastbound and westbound approaches at 100% and 101% respectively with the Local Plan

- Minor widening on A419 approaches to the roundabout
- Further consideration of link capacity improvements along this section of the A419 may also be necessary but are not included within the mitigation forecast scenarios

# Junction 14 – Bath Road / Peter's Street (Frocester)

## **Existing Layout**



# Forecast performance in 2040 Unmitigated Local Plan Scenario

### AM Peak

 Large amounts of spare capacity in the DM scenario, but Bath Road (eastbound) reaches 103% with the Local Plan

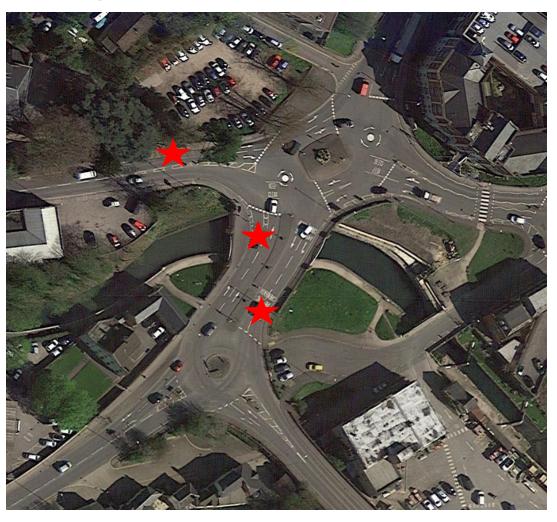
### PM Peak

 Large amounts of spare capacity in the DM scenario, but Leonard Stanley Road (westbound) exceeds 100% with the Local Plan

- No mitigation proposed at this location, to avoid encouraging additional traffic along the minor route between Stroud and Draycott/A38
- Highway capacity improvements instead focused on alternative A419/A38 corridors

# Junction 15 – A419 / Bath Road (Stroud)

## **Existing Layout**



## Forecast performance in 2040 Unmitigated Local Plan Scenario

#### AM Peak

- A419 SB approach to A46 junction >100% in both the DM and Local Plan scenarios
- NB approach to mini-roundabout increases from 93% in DM to 99% with Local Plan
- Merrywalks approach to miniroundabout at 92% with Local Plan
- Other approaches generally operate satisfactorily – i.e. 85% or below

#### PM Peak

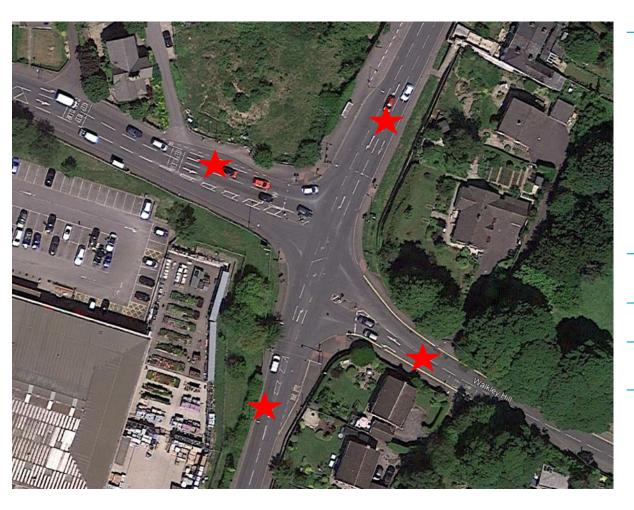
- NB approach to mini-roundabout increases from 97% in DM to 100% with Local Plan
- A419 SB approach to A46 junction increases to 98% with Local Plan (from 86% in DM)
- A419 EB approach to miniroundabout exceeds 90% in Local Plan scenario

### **Assumed mitigation**

 Agreed with GCC that providing additional highway capacity in Stroud town centre is not a preferred option – therefore, no highway mitigation assumed at this location

# Junction 16 – A46 / Dudbridge Hill (Stroud)

## **Existing Layout**



# Forecast performance in 2040 Unmitigated Local Plan Scenario

### **AM Peak**

- Dudbridge Hill approach increases to 99% with Local Plan, from 86% in DM
- Walkley Hill approach at 59% in DM, increasing to 89% with Local Plan
- Both A46 approaches <85% in both the DM and Local Plan scenarios

#### PM Peak

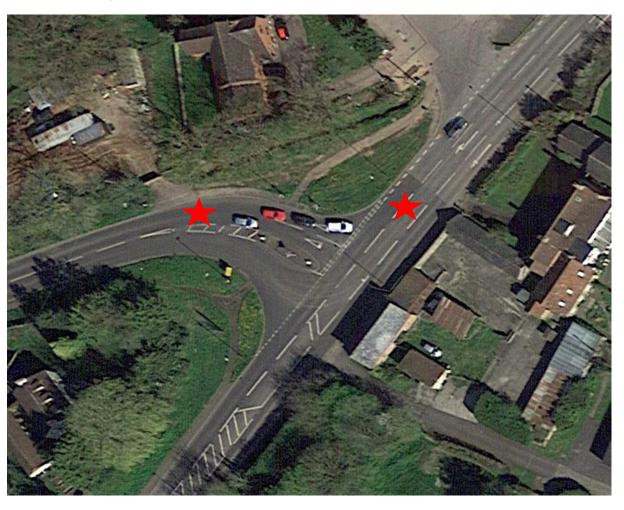
- Substantial deterioration from the DM scenario in which all arms
   <85%</li>
- A46 southbound approach exceeds 100% with Local Plan
- Dudbridge Hill and Walkley Hill approaches both above 90%

### **Assumed mitigation**

 Indicative junction improvement scheme provided by GCC and includes widening the eastbound Dudbridge Hill approach to three lanes

## Junction 17 – A38 / B4066

## **Existing Layout**



# Forecast performance in 2040 Unmitigated Local Plan Scenario

#### **AM Peak**

- No capacity issues in the DM scenario
- B4066 increases to 101% with the Local Plan
- A38 southbound reaches 93% in the Unmitigated Local Plan scenario

#### PM Peak

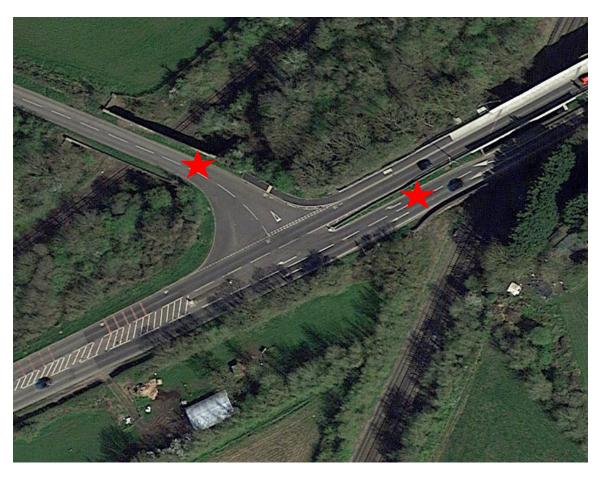
- Large amounts of spare capacity in the DM scenario
- Junction generally performs satisfactorily with the Local Plan, though B4066 reaches 85% and right-turn into B4066 at 100%

### **Assumed mitigation**

Signalisation of junction and increased flare on B4066 approach

## Junction 18 – A38 / Breadstone

## **Existing Layout**



# Forecast performance in 2040 Unmitigated Local Plan Scenario

#### AM Peak

- Junction comfortably within capacity in the DM scenario
- V/C on minor arm (Breadstone) increases but remains within capacity
- A38 southbound approach is also approaching its link capacity

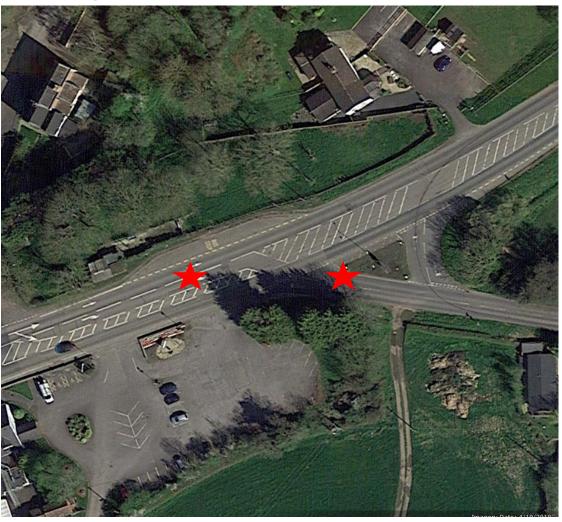
### PM Peak

- Large amounts of spare capacity in the DM scenario
- The A38 right-turn into Breadstone is at-capacity with Local Plan and impedes ahead traffic
- Other arms are within capacity in Local Plan

- No mitigation proposed at this location, to avoid encouraging additional traffic along the minor route via Breadstone
- Further consideration of link capacity improvements along this section of the A38 may also be necessary but are not included within the mitigation forecast scenarios

# Junction 19 – A38 / B4066 Berkeley Road

### **Existing Layout**



# Forecast performance in 2040 Unmitigated Local Plan Scenario

#### AM Peak

- Left-turn out of B4066 increases to >100% with the Local Plan, compared to 65% in the DM
- Northbound link capacity on the A38 is also exceeded in the Unmitigated Local Plan scenario

### PM Peak

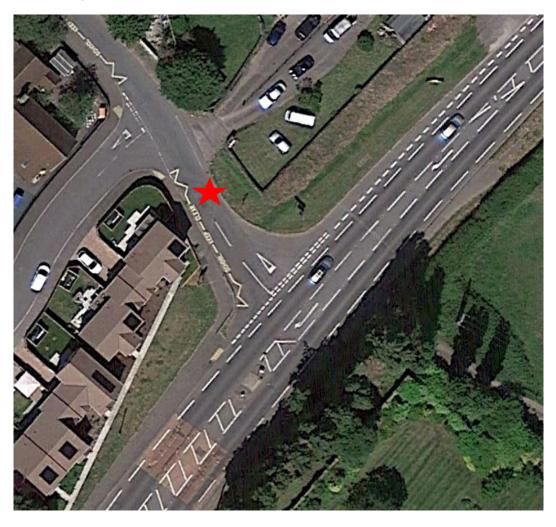
- No capacity issues in the DM scenario
- A38 northbound increases >100% with Local Plan – associated with right-turn into B4066
- B4066 left-turn also at 100% with Local Plan

### **Assumed mitigation**

Signalisation of junction and flaring on southbound approach

## Junction 20 – A38 at Stone

## **Existing Layout**



# Forecast performance in 2040 Unmitigated Local Plan Scenario

#### AM Peak

- Junction comfortably within capacity in the DM scenario
- Minor arm reaches 104% with the Local Plan
- Large increases in southbound demand on this route are associated with Local Plan

### PM Peak

 Junction performs satisfactorily (all arms <85%) in the Unmitigated Local Plan scenario

- No mitigation proposed at this location, to avoid encouraging additional traffic along the minor route via Stone
- Highway capacity improvements instead focused on B4066 and Alkington Lane routes between Sharpness/Berkeley and the A38

# Junction 21 – A38 / Alkington Lane

## **Existing Layout**



# Forecast performance in 2040 Unmitigated Local Plan Scenario

### **AM Peak**

- Alkington Lane forecast to reach 105% with Local Plan
- No capacity issues in the DM scenario at this junction

### PM Peak

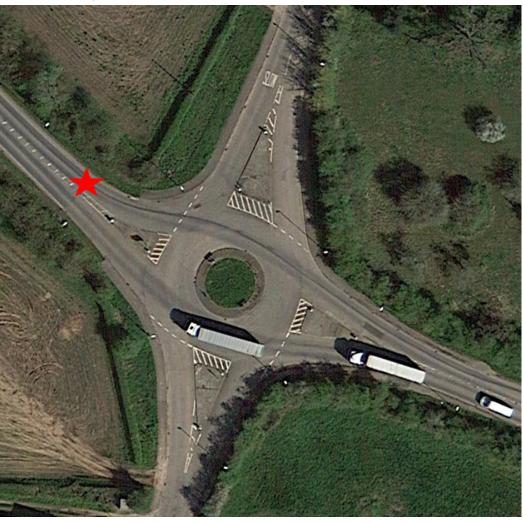
- Alkington Lane at 97% with Local Plan
- Junction performs within capacity in the DM scenario

### **Assumed mitigation**

 Signalisation with some widening assumed on Alkington Lane approach (likely to require third party land)

## Junction 22 – B4066 / Station Road

## **Existing Layout**



### Mott MacDonald Stroud Local Plan

# Forecast performance in 2040 Unmitigated Local Plan Scenario

### AM Peak

- Large volumes of spare capacity in the DM scenario on all arms
- Increased delays on B4066
   eastbound approach, which begins
   to exceed 85% with the Local Plan

### PM Peak

 All approach arms <85% in both the DM and Unmitigated Local Plan scenarios

### **Assumed mitigation**

• Widening on the eastbound approach

## Junction 23 – A38 / A4135

## **Existing Layout**



# Forecast performance in 2040 Unmitigated Local Plan Scenario

### **AM Peak**

### Junction operates comfortably within capacity in DM scenario – maximum V/C on approach of 51%

 A38 northbound approach reaches 106% in the Unmitigated Local Plan scenario

### PM Peak

 A38 northbound approach increases from 48% in the DM to 90% in the Unmitigated Local Plan scenario

### **Assumed mitigation**

• Widening on A38 northbound approach to roundabout

## Junction 24 – A38 / Wick Road

## **Existing Layout**



# Forecast performance in 2040 Unmitigated Local Plan Scenario

#### AM Peak

 Junction operates satisfactorily both in the DM and Unmitigated Local Plan scenarios

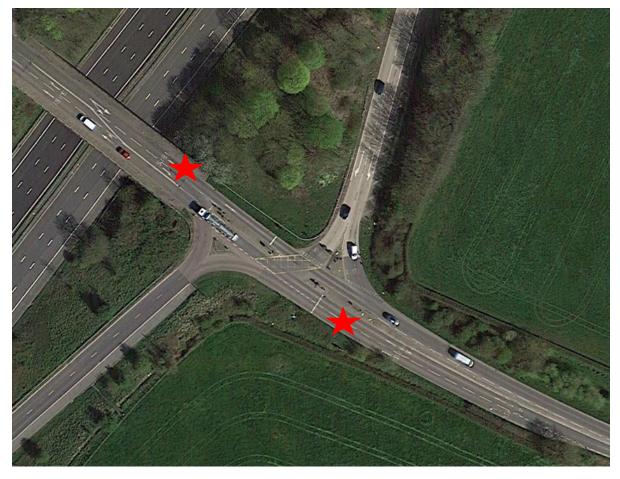
### PM Peak

- Junction operates well within capacity in DM scenario
- Wick Road increases to 98% in Unmitigated Local Plan scenario

- No mitigation proposed at this location, to avoid encouraging additional traffic along the minor Wick Road / Tortworth Road route
- Improvements instead focused along alternative A38 / B4509 route

## Junction 25 – M5 J14 eastern

## **Existing Layout\***



\* Traffic signals are in part-time operation and currently not used in the AM peak

# Forecast performance in 2040 Unmitigated Local Plan Scenario

#### AM Peak

- B4509 approaches at 113% and 103% in the eastbound and westbound directions respectively

   also over-capacity in the DM scenario
- Right-turn onto southbound M5 over-capacity and impedes ahead traffic
- Demand on westbound B4509 exceeds link capacity

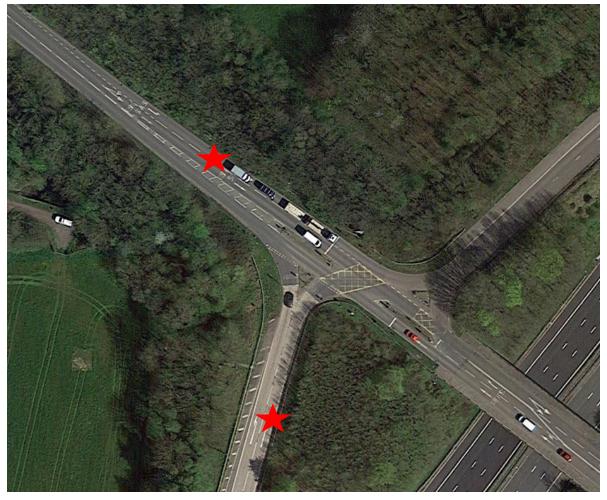
### PM Peak

Right-turn onto southbound M5
begins to block ahead traffic in
Local Plan scenario and this arm
exceeds 100% - this is contributing
to an overall reduction in demand
along B4509 in the Local Plan

- Creation of a new all-movements grade-separated junction, incorporating two overbridges
- · Signalisation of each approach

## Junction 26 – M5 J14 western

### **Existing Layout\***



\* Traffic signals are in part-time operation and currently not used in the AM peak

# Forecast performance in 2040 Unmitigated Local Plan Scenario

#### AM Peak

- Blocking back from eastern junction in Local Plan scenarios causes eastbound B4509 to reach 111%
- Right-turn from northbound off-slip also exceeds capacity due to downstream blocking back

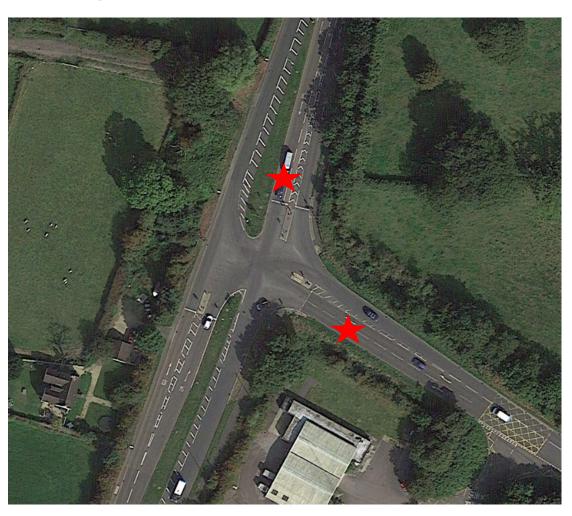
### PM Peak

- Both B4509 arms approaching, or exceeding, 100% in Local Plan scenario
- Blocking back from eastern junction appears to be main cause of issues at this location

- Creation of a new all-movements grade-separated junction, incorporating two overbridges
- Signalisation of each approach

## Junction 27 – A38 / B4509

## **Existing Layout**



# Forecast performance in 2040 Unmitigated Local Plan Scenario

#### AM Peak

- B4509 approach increases to 115% in Local Plan scenario from 94% in DM
- A38 southbound ahead movement also >100% in Local Plan scenario

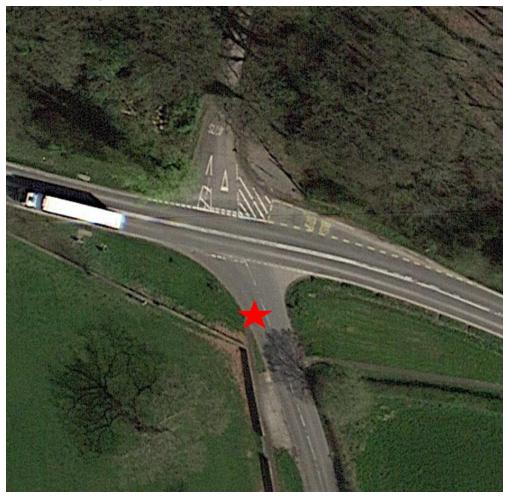
### PM Peak

 B4509 approach increases to 114% in Local Plan scenario from 88% in DM

- Creation of a new large roundabout in place of the existing signalised junction
- Upgrading the B4509 between the A38 and M5 J14 to two-lanes in each direction

# Junction 28 – B4509 / Tortworth Road (south)

## **Existing Layout\***



\* School access (northern arm) not included in SATURN model

# Forecast performance in 2040 Unmitigated Local Plan Scenario

### AM Peak

 Tortworth Road (minor arm from south) increases from 82% in the DM to 99% with the Local Plan

### PM Peak

- Junction performs satisfactorily in the DM scenarios – no arms >85%
- Tortworth Road (minor arm from south) increases to 94% with the Local Plan

- No mitigation proposed at this location, to avoid encouraging additional traffic along the minor Wick Road / Tortworth Road route
- Improvements instead focused along alternative A38 / B4509 route

<sup>\*</sup> Potentially spurious due to skeletal network and also may be impacted by rat-running traffic avoiding A38 and M5 J14

# Junction 29 – B4509 / Tortworth Road (north)

**Existing Layout** 



\* Cromhall (southern arm) not included in SATURN model

# Forecast performance in 2040 Unmitigated Local Plan Scenario

#### AM Peak

 Tortworth Road (minor arm from north) exceeds 100% in the Local Plan scenario

### PM Peak

 All approach arms operate <85% in both the DM and Local Plan scenarios

- No mitigation proposed at this location, to avoid encouraging additional traffic along the minor Wick Road / Tortworth Road route
- Improvements instead focused along alternative A38 / B4509 route

<sup>\*</sup> Potentially spurious due to skeletal network and is impacted by rat-running traffic avoiding A38 and M5 J14

# Junction 30 – B4066 / Alkington Lane

## **Existing Layout**



# Forecast performance in 2040 Unmitigated Local Plan Scenario

### AM Peak

### PM Peak

- Junction operates within capacity in the unmitigated Local Plan scenario in both peak hours
- However, following initial mitigation forecast assignments, the capacity improvements at the southern end of Alkington Lane were shown to contribute to the junction with the B4066 exceeding capacity

### **Assumed mitigation**

Signalisation

## M. Model Outputs at Key Locations

Table M.1: Junction Performance – Maximum Link V/C (AM Peak)

Junction	2040 Do Minimum		2040 Unmitigated		Local Plan  2040 Local Plan with Highway Mitigation				
No.	Junction Location	Approach Arm	V/C	Approach Arm	V/C	Approach Arm	V/C	Approach Arm	V/C
1	Cross Keys Roundabout	A38 SB	98	A38 SB	105	A38 SB	81	A38 SB	80
2	M5 J12	B4008 SB	98	B4008 SB	100	Overbridge SB	97	Overbridge SB	96
3	A38 / Epney Road	Epney Rd NB	77	A38 EB	105	Epney Rd NB	100	Epney Rd NB	96
4	A38 St Barnabas Roundabout	A38 WB	105	A38 WB	108	A38 WB	100	A38 WB	100
5	B4008 / Stonehouse	Stonehouse WB	82	Stonehouse WB	109	B4008 SB	79	B4008 SB	80
6	A4173 / Brookthorpe	A4173 NB	77	A4173 NB	92	A4173 NB	88	A4173 NB	87
7	B4008 / Bristol Road	A38 off-slip	57	A38 SB	73	A38 SB	82	A38 SB	82
8	A38 / A430	B4008 NB	82	B4008 NB	91	A38 NB	77	A38 NB	75
9	A38 / Grove Lane	A38 SB	50	School Lane EB	110	School Lane EB	72	School Lane EB	72
10	A38 at Claypits	A38 NB	73	A38 NB	107	A38 NB	100	A38 NB	100
11	M5 J13	A419 WB	65	M5 SB Off-slip	95	Gyratory West	88	Gyratory West	87
12	A419 / Oldens Roundabout	A419 WB	68	A419 WB	75	A419 WB	85	A419 WB	83
13	A419 / Boakes Drive Roundabout	A419 WB	93	A419 WB	105	A419 WB	95	A419 WB	93
14	Bath Rd / Peter's St (Frocester)	Frocester Hill NB	29	Peters St EB	103	Peters St EB	103	Peters St EB	101
15	A419 / Bath Rd (Stroud)	Cainscross Rd SB	102	Cainscross Rd SB	105	Cainscross Rd SB	104	Cainscross Rd SB	104
16	A46 / Dudbridge Hill (Stroud)	Dudbridge Hill EB	86	Dudbridge Hill EB	99	Walkley Hill WB	91	Walkley Hill WB	86
17	A38 / B4066	A38 SB	46	B4066 EB	101	A38 SB	72	A38 SB	74
18	A38 / Breadstone	A38 SB	50	A38 SB	95	A38 SB	104	A38 SB	103
19	A38 / B4066 Berkeley Road	Berkeley Road WB	65	A38 NB	103	A38 NB	91	A38 NB	85
20	A38 at Stone	A38 NB	44	Minor Rd	104	Minor Rd	101	Minor Rd	97
21	A38 / Alkington Lane	Alkington Ln EB	66	Alkington Ln EB	105	A38 SB	65	A38 SB	63
22	B4066 / Station Road	B4066 EB	17	B4066 EB	86	B4066 EB	83	B4066 EB	79
23	A38 / A4135	A38 NB	51	A38 NB	106	A4135 WB	64	A4135 WB	61
24	A38 / Wick Road	A38 SB	57	A38 SB	76	A38 SB	95	A38 SB	90
25	M5 J14 Eastern	Overbridge EB	112	Overbridge EB	113	Overbridge EP	00	Overbridge EP	90
26	M5 J14 Western	B4509 EB	83	B4509 EB	111	Overbridge EB	82	Overbridge EB	80
27	A38 / B4509	B4509 WB	94	B4509 WB	115	A38 SB	67	A38 SB	65
28	B5409 / Tortworth Rd (south)	B4509 EB	90	Tortworth Rd	99	B4509 EB	102	B4509 EB	103
29	B4509 / Tortworth Rd (north)	B4509 WB	80	Tortworth Rd	108	B4509 WB	82	B4509 WB	82
30	B4066 / Alkington Lane	B4066 EB	29	Alkington Ln	76	B4066 EB	86	B4066 EB	79

Table M.2: Junction Performance – Maximum Link V/C (PM Peak)

Junction	2040 Do Minimum			2040 Unmitigated Local Plan		2040 Local Plan with Preferred Highway Mitigation		2040 Local Plan with Preferred Highway Mitigation and STS	
No.	Junction Location	Approach Arm	V/C	Approach Arm	V/C	Approach Arm	V/C	Approach Arm	V/C
1	Cross Keys Roundabout	A38 SB	88	A38 SB	98	B4008 NB Circ.	101	B4008 NB Circ.	101
2	M5 J12	B4008 NB	102	B4008 NB	110	Overbridge SB	92	Overbridge SB	91
3	A38 / Epney Road	Epney Rd NB	95	A38 EB	108	A38 EB	67	A38 EB	63
4	A38 St Barnabas Roundabout	A38 WB	106	A38 WB	111	A38 WB	89	A38 WB	88
5	B4008 / Stonehouse	B4008 NB	63	B4008 NB	116	B4008 NB	99	B4008 NB	96
6	A4173 / Brookthorpe	A4173 NB	64	Minor Rd	104	Minor Rd	101	Minor Rd	99
7	B4008 / Bristol Road	A38 off-slip	59	A38 off-slip	77	A38 NB	74	A38 NB	74
8	A38 / A430	A430 SB	97	A430 SB	100	A38 WB	78	A38 WB	76
9	A38 / Grove Lane	A38 SB	42	A38 SB	53	A38 NB	85	A38 NB	81
10	A38 at Claypits	A38 SB	64	A38 SB	105	A38 SB	97	A38 SB	95
11	M5 J13	A419 WB	72	A419 EB	90	Overbridge WB	77	Overbridge WB	76
12	A419 / Oldens Roundabout	A419 WB	75	A419 WB	81	A419 WB	83	A419 WB	84
13	A419 / Boakes Drive Roundabout	A419 WB	98	A419 WB	101	A419 EB	87	A419 WB	86
14	Bath Rd / Peter's St (Frocester)	Frocester Hill NB	32	Leonard Stan. Rd	101	Leonard Stan. Rd	53	Leonard Stan. Rd	45
15	A419 / Bath Rd (Stroud)	Cairnscross Rd NB	97	Cairnscross Rd NB	100	Cairnscross Rd NB	101	Cairnscross Rd NB	100
16	A46 / Dudbridge Hill (Stroud)	A46 Bath Rd SB	67	A46 Bath Rd SB	104	A46 Bath Rd SB	103	A46 Bath Rd SB	104
17	A38 / B4066	A38 NB	41	A38 SB	89	A38 NB	75	A38 NB	75
18	A38 / Breadstone	A38 NB	59	A38 SB	92	A38 SB	100	A38 SB	94
19	A38 / B4066 Berkeley Road	A38 NB	56	A38 NB	104	A38 NB	102	A38 NB	101
20	A38 at Stone	A38 NB	53	Minor Rd	78	A38 NB	88	A38 NB	85
21	A38 / Alkington Lane	A38 NB	55	Alkingon Ln EB	97	A38 NB	79	A38 NB	76
22	B4066 / Station Road	B4066 WB	17	B4066 EB	74	B4066 EB	64	B4066 EB	61
23	A38 / A4135	A38 NB	48	A38 NB	90	A38 SB	63	A38 SB	61
24	A38 / Wick Road	A38 NB	38	Wick Rd	98	Wick Rd	67	Wick Rd	62
25	M5 J14 Eastern	B4509 WB	80	Overbridge EB	108	Overbridge M/P	70	Overbridge MP	77
26	M5 J14 Western	M5 NB Off-slip	79	B4509 EB	104	Overbridge WB	78	Overbridge WB	77
27	A38 / B4509	B4509 WB	88	B4509 WB	114	B4509 WB	79	B4509 WB	78
28	B5409 / Tortworth Rd (south)	B4509 EB	83	Tortworth Rd	94	B4509 EB	91	B4509 EB	91
29	B4509 / Tortworth Rd (north)	B4509 WB	60	Tortworth Rd	81	B4509 WB	72	B4509 WB	71
30	B4066 / Alkington Lane	Alkington Ln	31	Alkington Ln	85	Alkington Ln	77	Alkington Ln	75

Table M.3: Maximum Delay on Approach Link (AM Peak)

Junction		2040 Do Minimum		2040 Unmitigated Local Plan		2040 Local Plan with Preferred Highway Mitigation		2040 Local Plan with Preferred Highway Mitigation and STS	
No.	Junction Location	Approach Arm	Delay (sec)	Approach Arm	Delay (sec)	Approach Arm	Delay (sec)	Approach Arm	Delay (sec)
1	Cross Keys Roundabout	B4008 NB circ.	36	A38 SB	143	A38 NB Circ.	30	B4008 NB circ.	32
2	M5 J12	B4008 SB	52	B4008 SB	73	Overbridge SB	51	Overbridge SB	45
3	A38 / Epney Road	Epney Rd SB	63	A38 EB	205	Epney Rd NB	123	Epney Rd NB	96
4	A38 St Barnabas Roundabout	A38 WB	160	A38 WB	204	A38 WB	49	A38 WB	49
5	B4008 / Stonehouse	Stonehouse WB	33	Stonehouse WB	257	Stonehouse WB	37	Stonehouse WB	36
6	A4173 / Brookthorpe	A4173 NB	16	A4173 NB	23	A4173 NB	20	A4173 NB	19
7	B4008 / Bristol Road	A38 off-slip	29	Hunts Gr. Access	87	Hunts Gr. Access	32	Hunts Gr. Access	31
8	A38 / A430	B4008 NB	97	B4008 NB	181	B4008 NB	80	B4008 NB	74
9	A38 / Grove Lane	School Lane EB	19	School Lane EB	304	School Lane EB	96	School Lane EB	88
10	A38 at Claypits	A38 SB	29	A38 NB	202	Minor Rd WB	90	Minor Rd WB	85
11	M5 J13	M5 NB off-slip	21	M5 NB off-slip	91	Gyratory West	53	Gyratory West	52
12	A419 / Oldens Roundabout	A419 WB	7	A419 WB	7	A419 WB	10	A419 WB	9
13	A419 / Boakes Drive Roundabout	A419 EB	43	A419 WB	159	A419 EB	50	A419 EB	47
14	Bath Rd / Peter's St (Frocester)	Frocester Hill NB	8	Peters St EB	137	Peters St EB	121	Peters St EB	80
15	A419 / Bath Rd (Stroud)	Cainscross Rd SB	85	Cainscross Rd SB	128	Cainscross Rd SB	126	Cainscross Rd SB	116
16	A46 / Dudbridge Hill (Stroud)	Walkley Hill WB	71	Dudbridge Hill EB	117	Walkley Hill WB	112	Walkley Hill WB	100
17	A38 / B4066	A38 SB	7	B4066 EB	60	A38 NB	40	A38 NB	39
18	A38 / Breadstone	A38 NB	9	Breadstone SB	33	A38 SB	123	A38 SB	108
19	A38 / B4066 Berkeley Road	A38 SB	16	A38 NB	146	A38 SB	58	A38 SB	55
20	A38 at Stone	Minor Rd	17	Minor Rd	157	Minor Rd	127	Minor Rd	90
21	A38 / Alkington Lane	Alkington Ln EB	19	Alkington Ln EB	164	Alkington Ln EB	31	Alkington Ln EB	27
22	B4066 / Station Road	B4066 EB	6	B4066 EB	40	B4066 EB	36	B4066 EB	33
23	A38 / A4135	A38 NB	8	A38 NB	151	A4135 EB	7	A4135 EB	7
24	A38 / Wick Road	Wick Rd	14	Wick Rd	23	Wick Rd	28	Wick Rd	25
25	M5 J14 Eastern	Overbridge EB	342	Overbridge EB	382	Overbridge EB	26	Overbridge EB	36
26	M5 J14 Western	M5 NB Off-slip	49	B4509 EB	272	Overbridge EB	36	Overbridge EB	JU
27	A38 / B4509	B4509 WB	73	B4509 WB	361	A38 SB	6	A38 SB	6
28	B5409 / Tortworth Rd (south)	B4509 EB	48	Tortworth Rd	83	B4509 EB	143	B4509 EB	148
29	B4509 / Tortworth Rd (north)	B4509 WB	45	Tortworth Rd	225	B4509 WB	49	B4509 WB	49
30	B4066 / Alkington Lane	Alkington Ln	7	Alkington Ln	18	Alkington Ln	58	Alkington Ln	56

Table M.4: Maximum Delay on Approach Link (PM Peak)

Junction		2040 Do Minimum		2040 Unmitigated Local Plan		2040 Local Plan with Preferred Highway Mitigation		2040 Local Plan with Preferred Highway Mitigation and STS	
No.	Junction Location	Approach Arm	Delay (sec)	Approach Arm	Delay (sec)	Approach Arm	Delay (sec)	Approach Arm	Delay (sec)
1	Cross Keys Roundabout	B4008 NB circ.	31	A38 NB	76	B4008 NB circ.	66	B4008 NB circ.	66
2	M5 J12	B4008 NB	101	B4008 NB	248	Gyratory North	43	Gyratory North	42
3	A38 / Epney Road	Epney Rd NB	133	Epney Rd NB	293	Epney Rd SB	59	Epney Rd SB	58
4	A38 St Barnabas Roundabout	A38 WB	164	A38 WB	268	A38 WB	45	A38 WB	44
5	B4008 / Stonehouse	Stonehouse WB	13	B4008 NB	369	B4008 NB	72	B4008 NB	53
6	A4173 / Brookthorpe	A4173 NB	12	Minor Rd	123	Minor Rd	71	Minor Rd	39
7	B4008 / Bristol Road	A38 off-slip	51	A38 off-slip	142	Hunts Gr. Access	25	Hunts Gr. Access	24
8	A38 / A430	A430 SB	95	A430 SB	125	B4008 NB	68	B4008 NB	66
9	A38 / Grove Lane	School Lane EB	12	School Lane EB	21	School Lane EB	35	School Lane EB	35
10	A38 at Claypits	A38 SB	36	A38 SB	183	Minor Rd WB	127	Minor Rd WB	119
11	M5 J13	M5 NB off-slip	50	M5 NB off-slip	76	Gyratory East	57	Gyratory East	57
12	A419 / Oldens Roundabout	A419 WB	8	A419 WB	9	A419 WB	9	A419 WB	9
13	A419 / Boakes Drive Roundabout	A419 EB	51	A419 WB	94	A419 EB	39	A419 EB	38
14	Bath Rd / Peter's St (Frocester)	Frocester Hill NB	9	Leonard Stan. Rd	79	Peters St EB	20	Peters St EB	16
15	A419 / Bath Rd (Stroud)	A419 WB	68	A419 WB	114	A419 WB	114	A419 WB	110
16	A46 / Dudbridge Hill (Stroud)	Walkley Hill WB	69	A46 Bath Rd SB	194	A46 Bath Rd SB	195	A46 Bath Rd SB	201
17	A38 / B4066	B4066 EB	9	A38 SB	39	B4066 EB	38	B4066 EB	37
18	A38 / Breadstone	A38 NB	13	A38 SB	32	A38 SB	66	A38 SB	34
19	A38 / B4066 Berkeley Road	A38 SB	16	A38 NB	161	A38 NB	110	A38 NB	100
20	A38 at Stone	Minor Rd	18	Minor Rd	43	Minor Rd	46	Minor Rd	39
21	A38 / Alkington Lane	Alkington Ln EB	14	Alkington Ln EB	62	Alkington Ln EB	34	Alkington Ln EB	32
22	B4066 / Station Road	B4066 EB	5	B4066 EB	29	B4066 EB	23	B4066 EB	21
23	A38 / A4135	A38 NB	7	A38 NB	16	A4135 EB	7	A4135 EB	6
24	A38 / Wick Road	Wick Rd	15	Wick Rd	81	Wick Rd	32	Wick Rd	29
25	M5 J14 Eastern	B4509 WB	60	Overbridge EB	222	Occarbaida a ED	20	Overski sidera ED	20
26	M5 J14 Western	M5 NB Off-slip	73	M5 NB Off-slip	142	Overbridge EB	30	Overbridge EB	30
27	A38 / B4509	A38 NB	129	B4509 WB	339	A38 NB	7	A38 NB	6
28	B5409 / Tortworth Rd (south)	B4509 EB	38	Tortworth Rd	52	B4509 EB	49	B4509 EB	48
29	B4509 / Tortworth Rd (north)	B4509 WB	23	Tortworth Rd	37	B4509 WB	36	B4509 WB	34
30	B4066 / Alkington Lane	Alkington Ln	8	Alkington Ln	23	Alkington Ln	64	Alkington Ln	62

Table M.5: Maximum Queue on Approach Link (AM Peak)

Junction	Junction Location	2040 Do Minimum		2040 Unmitigated Local Plan		2040 Local Plan with Preferred Highway Mitigation		2040 Local Plan with Preferred Highway Mitigation and STS	
No.		Approach Arm	Queue (pcu)	Approach Arm	Queue (pcu)	Approach Arm	Queue (pcu)	Approach Arm	Queue (pcu)
1	Cross Keys Roundabout	A38 SB	6	A38 SB	79	A38 SB	9	A38 SB	9
2	M5 J12	M5 SB Off-slip	8	M5 SB Off-slip	10	Overbridge SB	12	Overbridge SB	12
3	A38 / Epney Road	Epney Rd NB	7	A38 EB	17	A38 EB	10	Epney Rd NB	9
4	A38 St Barnabas Roundabout	A38 WB	44	A38 WB	61	A38 WB	6	A38 WB	6
5	B4008 / Stonehouse	Stonehouse WB	2	Stonehouse WB	19	B4008 SB	5	B4008 SB	5
6	A4173 / Brookthorpe	A4173 NB	0	A4173 NB	1	A4173 NB	1	A4173 NB	0
7	B4008 / Bristol Road	A38 off-slip	0	A38 off-slip	8	A38 SB	9	A38 SB	9
8	A38 / A430	A38 NB	34	A38 NB	40	A38 NB	39	A38 NB	38
9	A38 / Grove Lane	School Lane EB	1	School Lane EB	35	School Lane EB	6	School Lane EB	6
10	A38 at Claypits	A38 SB	5	A38 NB	49	A38 NB	6	A38 NB	6
11	M5 J13	M5 NB off-slip	3	M5 NB off-slip	16	Gyratory West	7	Gyratory West	7
12	A419 / Oldens Roundabout	A419 WB	0	A419 WB	0	A38 EB	0	A38 EB	0
13	A419 / Boakes Drive Roundabout	A419 WB	0	A419 WB	31	A419 WB	0	A419 WB	0
14	Bath Rd / Peter's St (Frocester)	Peters St EB	0	Peters St EB	15	Peters St EB	13	Peters St EB	7
15	A419 / Bath Rd (Stroud)	Cainscross Rd SB	25	Cainscross Rd SB	38	Cainscross Rd SB	37	Cainscross Rd SB	34
16	A46 / Dudbridge Hill (Stroud)	Dudbridge Hill EB	10	Dudbridge Hill EB	13	Dudbridge Hill EB	12	Dudbridge Hill EB	11
17	A38 / B4066	B4066 EB	0	B4066 EB	12	A38 SB	4	A38 SB	4
18	A38 / Breadstone	Breadstone SB	0	Breadstone SB	3	A38 SB	29	A38 SB	23
19	A38 / B4066 Berkeley Road	Berkeley Road WB	0	A38 NB	19	A38 SB	5	A38 SB	5
20	A38 at Stone	Minor Rd	0	Minor Rd	10	Minor Rd	6	Minor Rd	4
21	A38 / Alkington Lane	Alkingon Ln EB	1	Alkingon Ln EB	13	A38 SB	4	A38 SB	4
22	B4066 / Station Road	B4066 EB	0	B4066 WB	0	B4066 EB	0	B4066 EB	0
23	A38 / A4135	A38 NB	0	A38 NB	31	A4135 WB	1	A4135 WB	1
24	A38 / Wick Road	A38 NB	0	Wick Rd	1	Wick Rd	0	Wick Rd	0
25	M5 J14 Eastern	Overbridge EB	31	Overbridge EB	31	Overbridge EB	13	Overbridge EB	12
26	M5 J14 Western	M5 NB Off-slip	5	B4509 EB	32	Overbridge EB	13	Overbridge EB	14
27	A38 / B4509	B4509 WB	9	B4509 WB	51	A38 SB	0	A38 SB	0
28	B5409 / Tortworth Rd (south)	Tortworth Rd	2	Tortworth Rd	5	B4509 EB	11	B4509 EB	12
29	B4509 / Tortworth Rd (north)	Tortworth Rd	0	Tortworth Rd	17	Tortworth Rd	0	Tortworth Rd	0
30	B4066 / Alkington Lane	Alkington Ln	3	Alkington Ln	1	B4066 EB	5	B4066 EB	4

Table M.6: Maximum Queue on Approach Link (PM Peak)

Junction		2040 Do Minimum		2040 Unmitigated Local Plan		2040 Local Plan with Preferred Highway Mitigation		2040 Local Plan with Preferred Highway Mitigation and STS	
No.	Junction Location	Approach Arm	Queue (pcu)	Approach Arm	Queue (pcu)	Approach Arm	Queue (pcu)	Approach Arm	Queue (pcu)
1	Cross Keys Roundabout	A38 SB	4	A38 NB	16	B4008 NB Circ.	20	B4008 NB Circ.	19
2	M5 J12	B4008 NB	15	B4008 NB	33	Gyratory South	10	Gyratory South	10
3	A38 / Epney Road	A38 EB	6	A38 EB	39	A38 EB	8	A38 EB	7
4	A38 St Barnabas Roundabout	A38 WB	44	A38 WB	78	A38 WB	2	A38 WB	1
5	B4008 / Stonehouse	B4008 NB	0	B4008 NB	53	B4008 NB	3	B4008 NB	3
6	A4173 / Brookthorpe	Minor Rd	0	Minor Rd	25	Minor Rd	13	Minor Rd	5
7	B4008 / Bristol Road	A38 off-slip	0	A38 off-slip	22	A38 NB	6	A38 NB	5
8	A38 / A430	A38 NB	35	A38 NB	37	A38 NB	36	A38 NB	35
9	A38 / Grove Lane	School Lane EB	0	School Lane EB	1	School Lane EB	2	School Lane EB	2
10	A38 at Claypits	A38 SB	4	A38 SB	35	A38 NB	5	A38 NB	5
11	M5 J13	M5 NB off-slip	6	M5 NB off-slip	12	Overbridge WB	9	Overbridge WB	9
12	A419 / Oldens Roundabout	A419 WB	0	A419 WB	1	A419 WB	1	A419 WB	1
13	A419 / Boakes Drive Roundabout	A419 WB	0	A419 WB	10	A419 WB	0	A419 WB	0
14	Bath Rd / Peter's St (Frocester)	Leonard Stan. Rd	0	Leonard Stan. Rd	7	Leonard Stan. Rd	1	Leonard Stan. Rd	1
15	A419 / Bath Rd (Stroud)	A419 WB	21	A419 WB	36	A419 WB	35	A419 WB	34
16	A46 / Dudbridge Hill (Stroud)	A46 Bath Rd SB	7	A46 Bath Rd SB	18	A46 Bath Rd SB	13	A46 Bath Rd SB	16
17	A38 / B4066	B4066 EB	0	A38 SB	4	B4066 EB	4	A38 NB	4
18	A38 / Breadstone	A38 SB	0	A38 SB	3	A38 SB	7	A38 SB	4
19	A38 / B4066 Berkeley Road	A38 NB	0	A38 NB	23	A38 NB	21	A38 NB	17
20	A38 at Stone	Minor Rd	0	Minor Rd	1	Minor Rd	2	Minor Rd	1
21	A38 / Alkington Lane	Alkington Ln EB	0	Alkington Ln EB	4	A38 NB	3	A38 NB	3
22	B4066 / Station Road	Station Rd NB	0	Station Rd NB	0	Station Rd NB	0	Station Rd NB	0
23	A38 / A4135	A38 NB	0	A38 NB	2	A4135 WB	0	A4135 WB	0
24	A38 / Wick Road	Wick Rd	0	Wick Rd	5	Wick Rd	1	Wick Rd	1
25	M5 J14 Eastern	B4509 WB	7	Overbridge EB	31	Overbridge EB 9	0	Overbridge EB 9	0
26	M5 J14 Western	M5 NB Off-slip	7	B4509 EB	19		¥ 		ອ 
27	A38 / B4509	A38 NB	11	B4509 WB	65	A38 NB	0	A38 NB	0
28	B5409 / Tortworth Rd (south)	Tortworth Rd	0	Tortworth Rd	3	Tortworth Rd	1	Tortworth Rd	1
29	B4509 / Tortworth Rd (north)	Tortworth Rd	0	Tortworth Rd	2	Tortworth Rd	0	Tortworth Rd	0
30	B4066 / Alkington Lane	Alkington Ln	2	Alkington Ln	1	B4066 WB	4	B4066 WB	3

# N. Network Performance – M5 J12 & Gloucester

#### **Contents**

Link V/C and Node Delay Plots

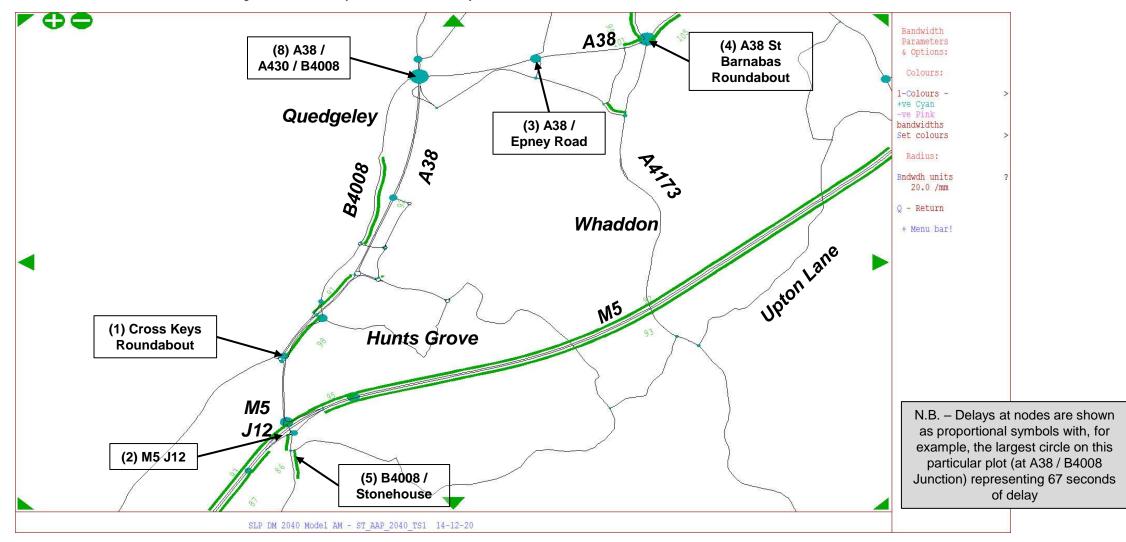
#### **AM Peak**

- a. Baseline
- b. Local Plan Unmitigated
- c. Local Plan with Preferred Highway Mitigation
- d. Local Plan with Preferred Highway Mitigation and Sustainable Transport Strategy

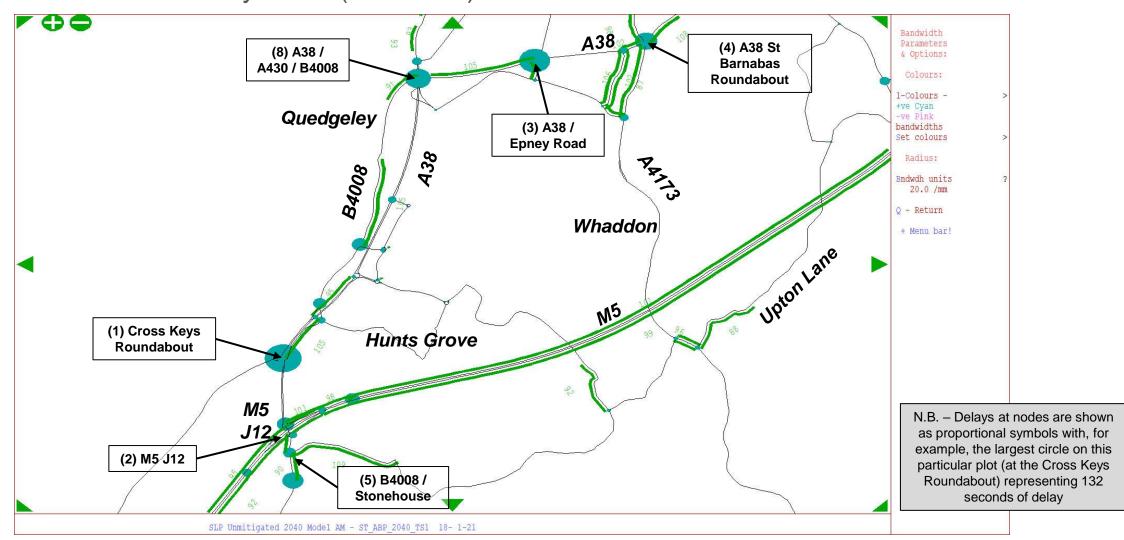
#### **PM Peak**

- e. Baseline
- f. Local Plan Unmitigated
- g. Local Plan with Preferred Highway Mitigation
- h. Local Plan with Preferred Highway Mitigation and Sustainable Transport Strategy

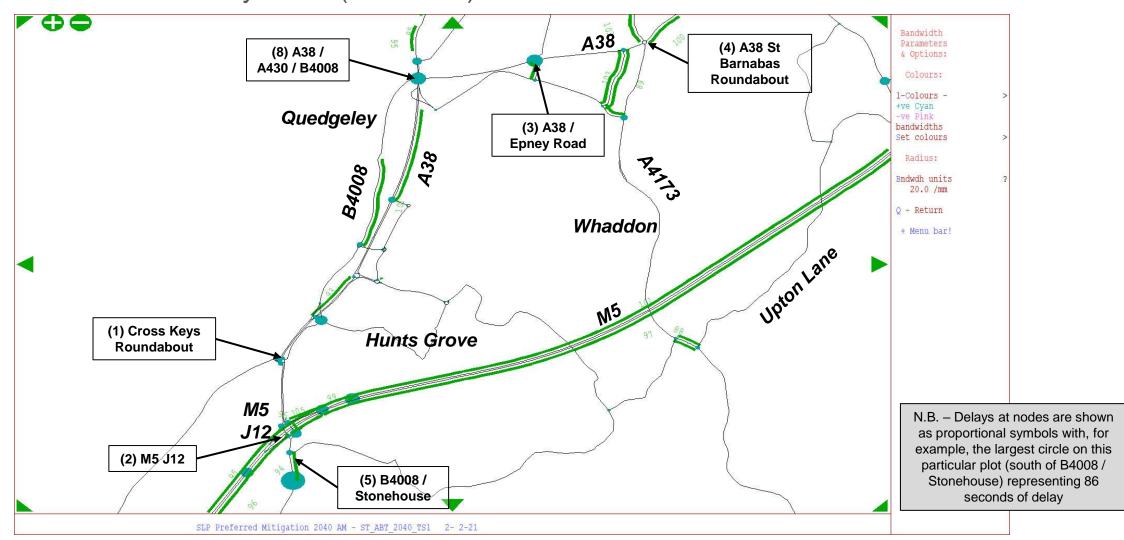
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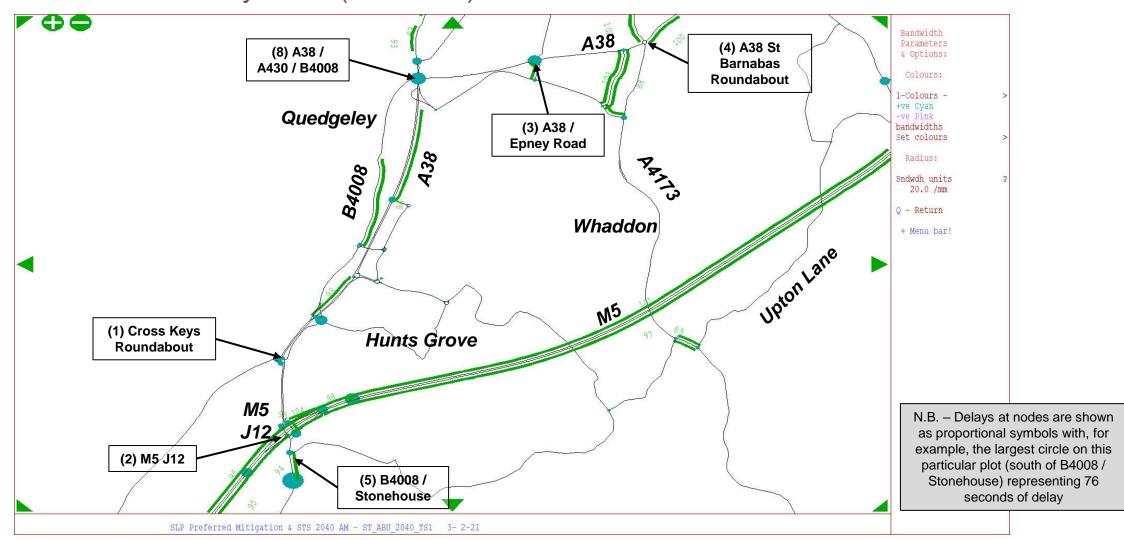
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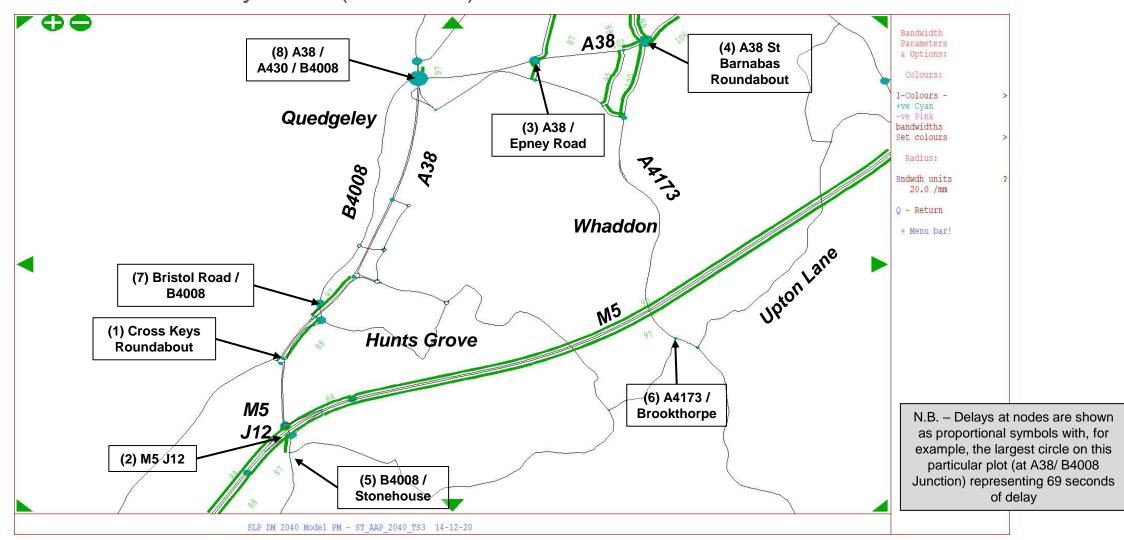
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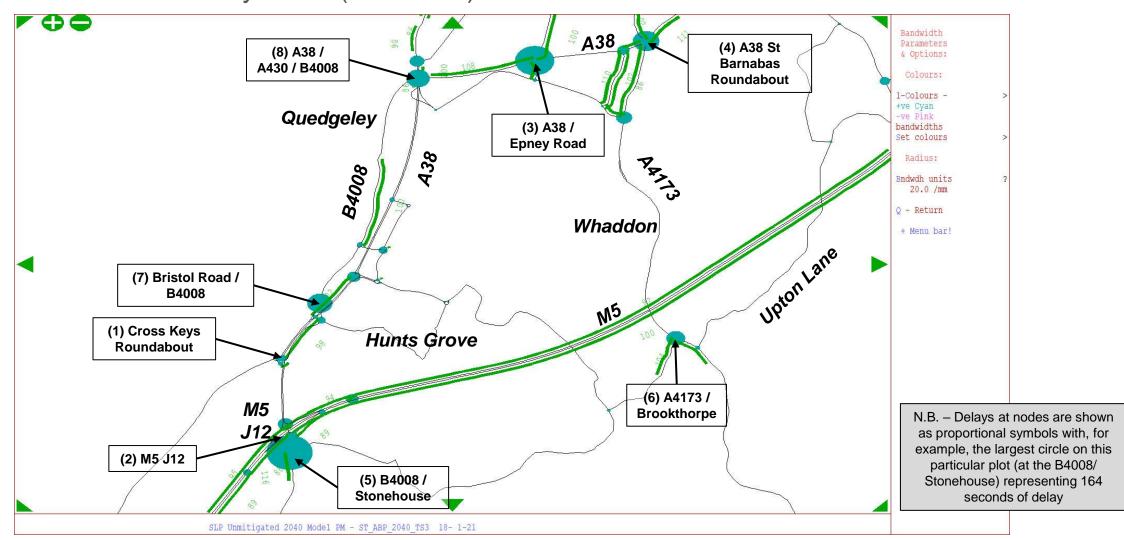
# d. Local Plan with Preferred Mitigation and STS



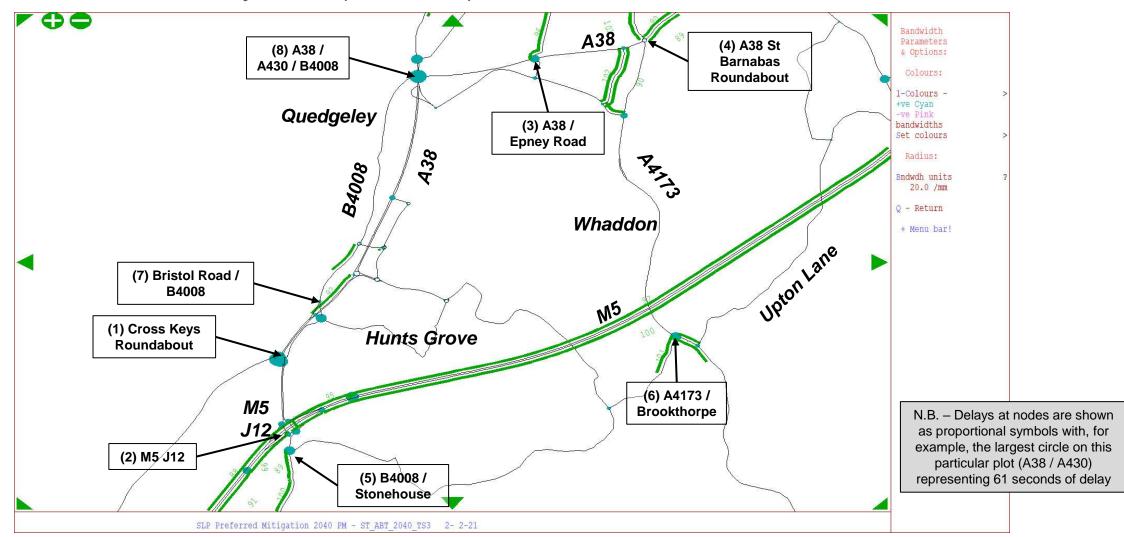
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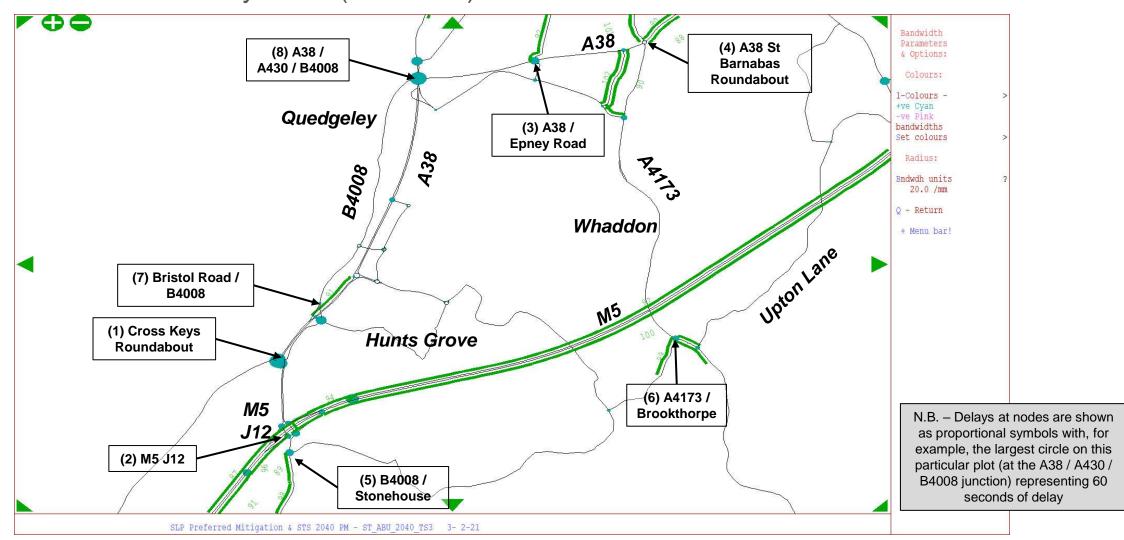
### f. Local Plan Unmitigated



# g. Local Plan with Preferred Mitigation



# h. Local Plan with Preferred Mitigation and STS



# O. Network Performance – M5 J13, Stonehouse & Stroud

#### **Contents**

Link V/C and Node Delay Plots

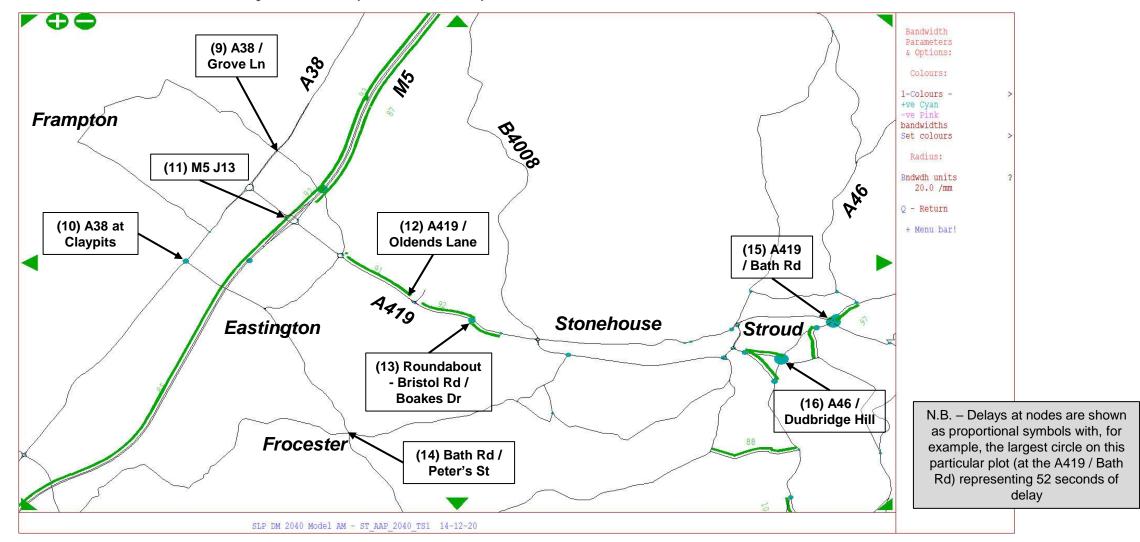
#### **AM Peak**

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- b. Local Plan Unmitigated
- c. Local Plan with Preferred Mitigation
- d. Local Plan with Preferred Mitigation and Sustainable Transport Strategy

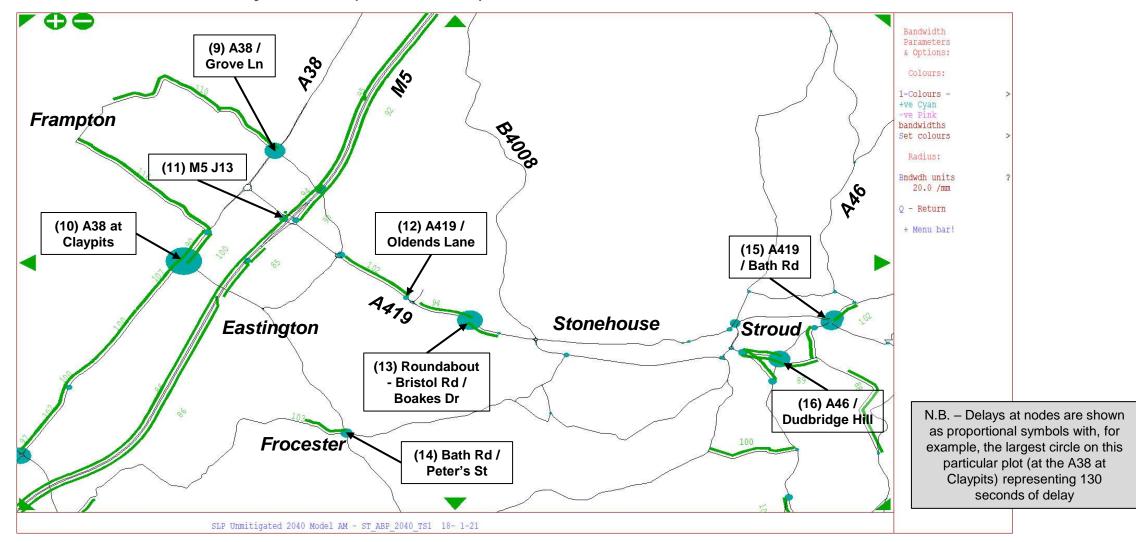
#### **PM Peak**

- e. Baseline
- f. Local Plan Unmitigated
- g. Local Plan with Preferred Mitigation
- h. Local Plan with Preferred Mitigation and Sustainable Transport Strategy

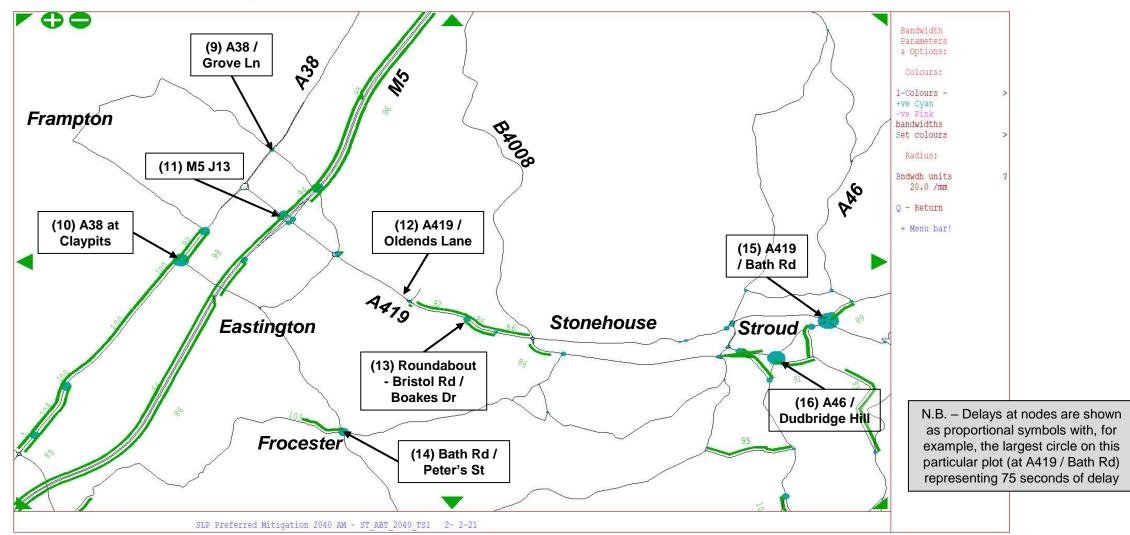
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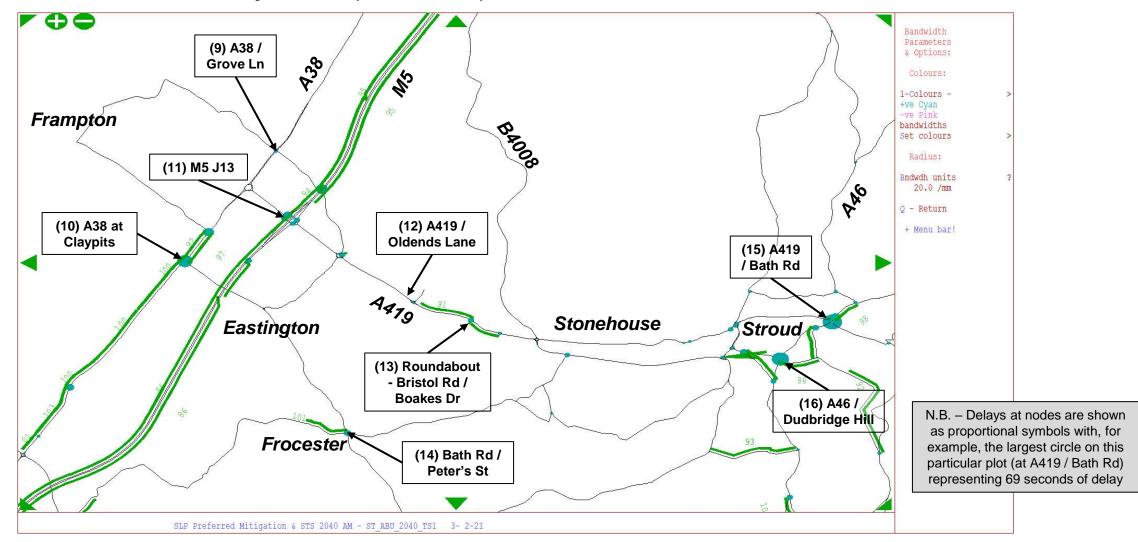
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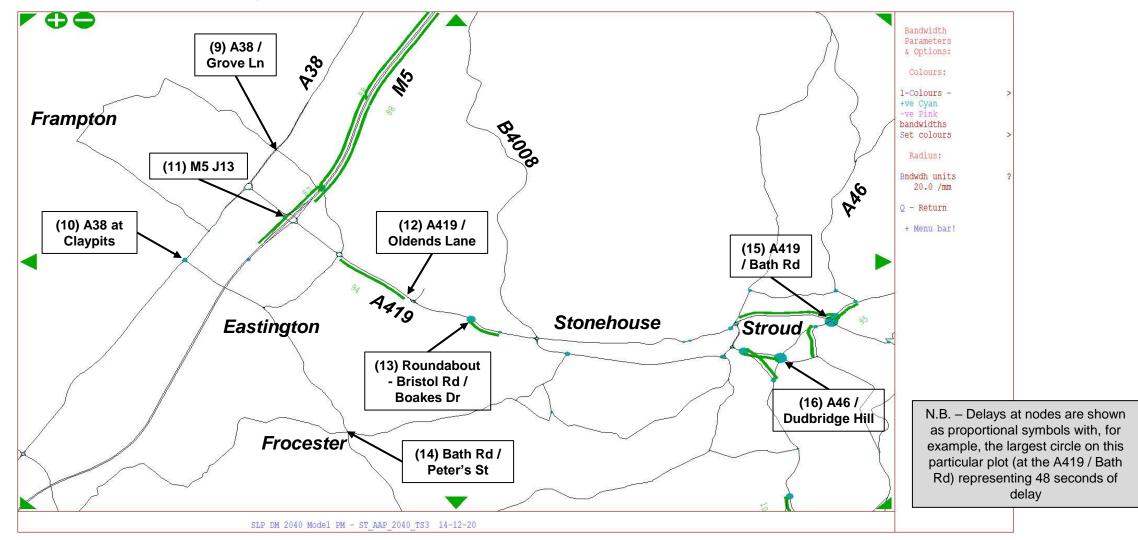
# c. Local Plan with Preferred Mitigation



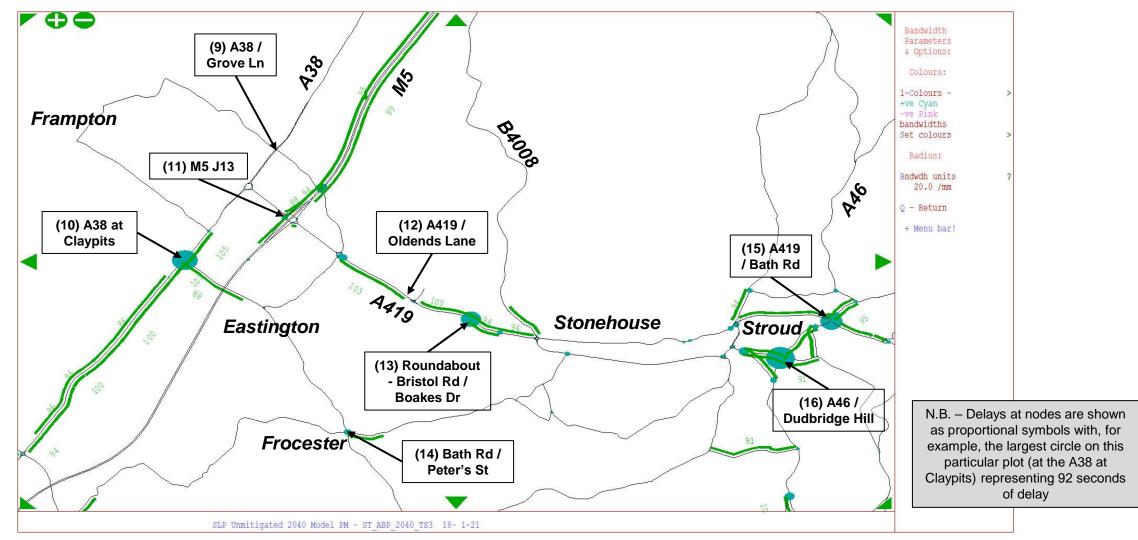
# d. Local Plan with Preferred Mitigation and STS



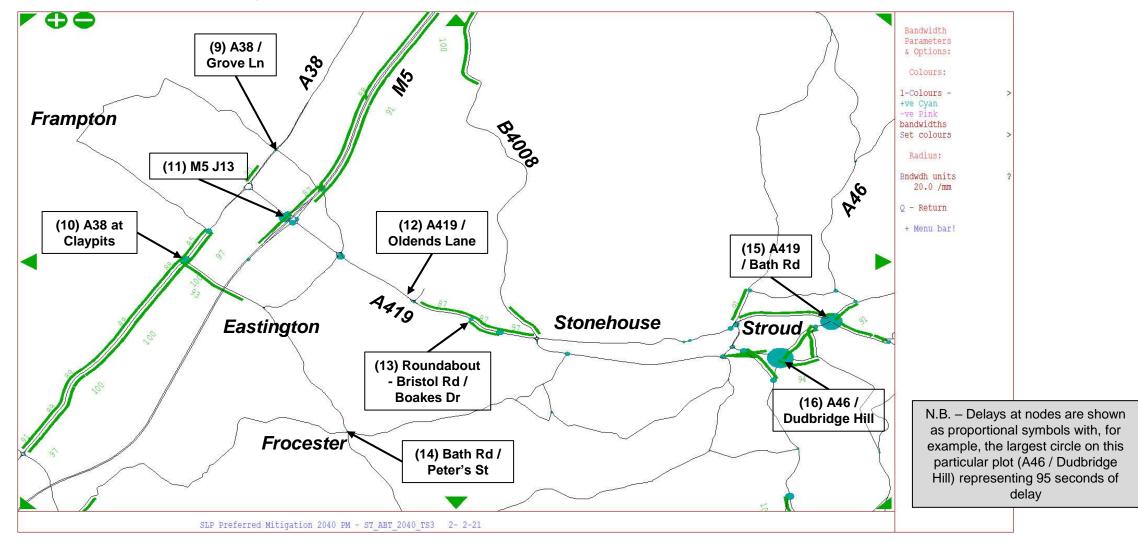
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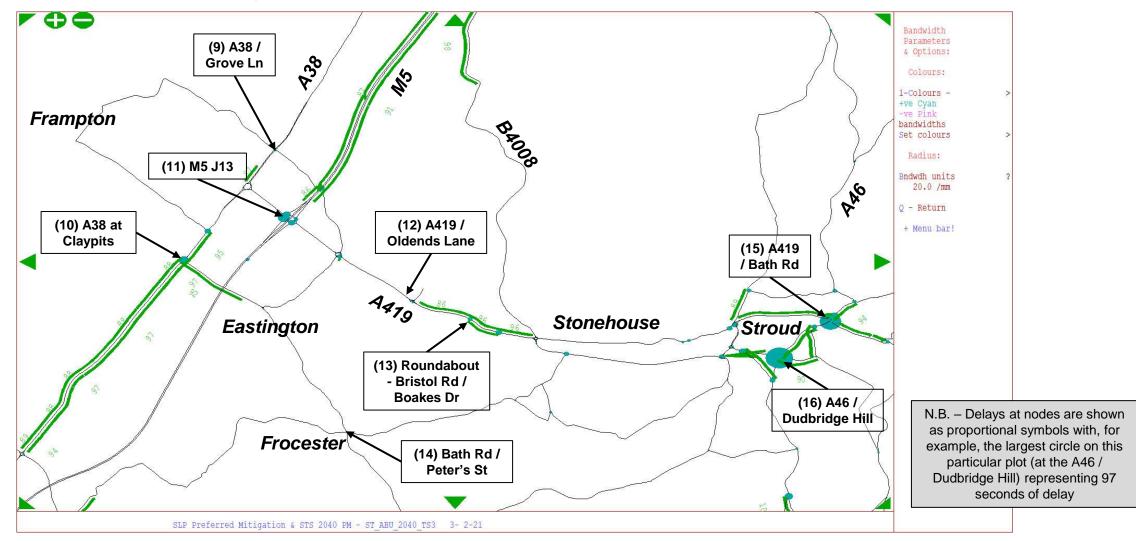
### f. Local Plan Unmitigated



# g. Local Plan with Preferred Mitigation



## h. Local Plan with Preferred Mitigation and STS



# P. Network Performance – Sharpness and Berkeley

#### **Contents**

Link V/C and Node Delay Plots

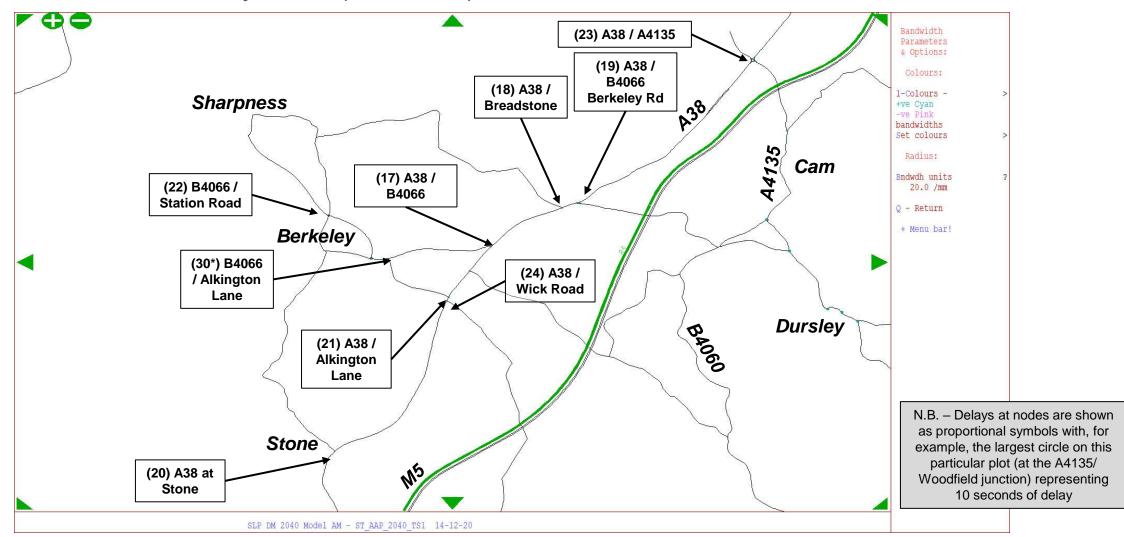
#### **AM Peak**

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- b. Local Plan Unmitigated
- c. Local Plan with Preferred Mitigation
- d. Local Plan with Preferred Mitigation and Sustainable Transport Strategy

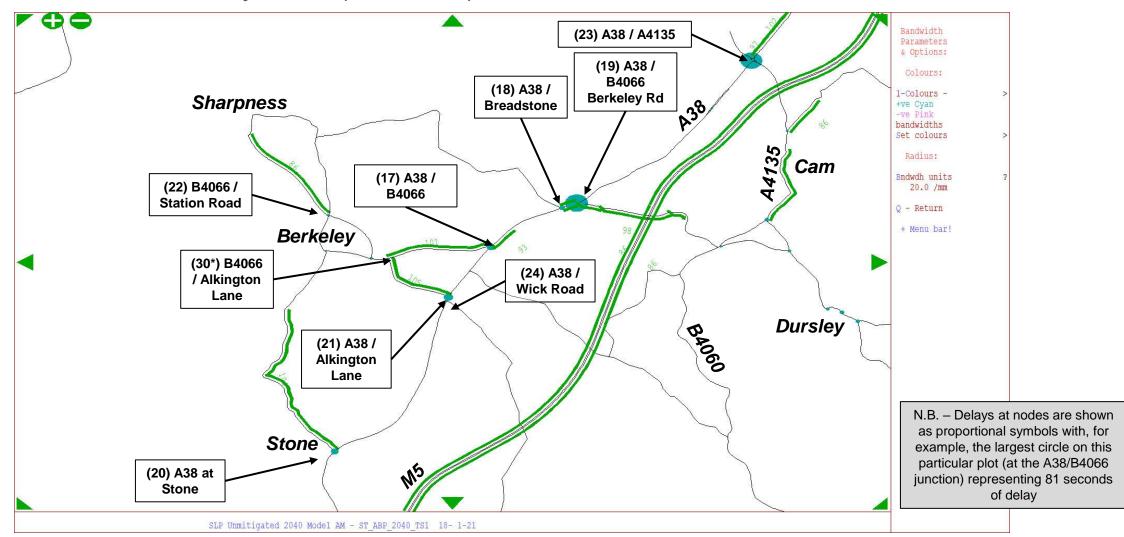
#### **PM Peak**

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- f. Local Plan Unmitigated
- g. Local Plan with Preferred Mitigation
- h. Local Plan with Preferred Mitigation and Sustainable Transport Strategy

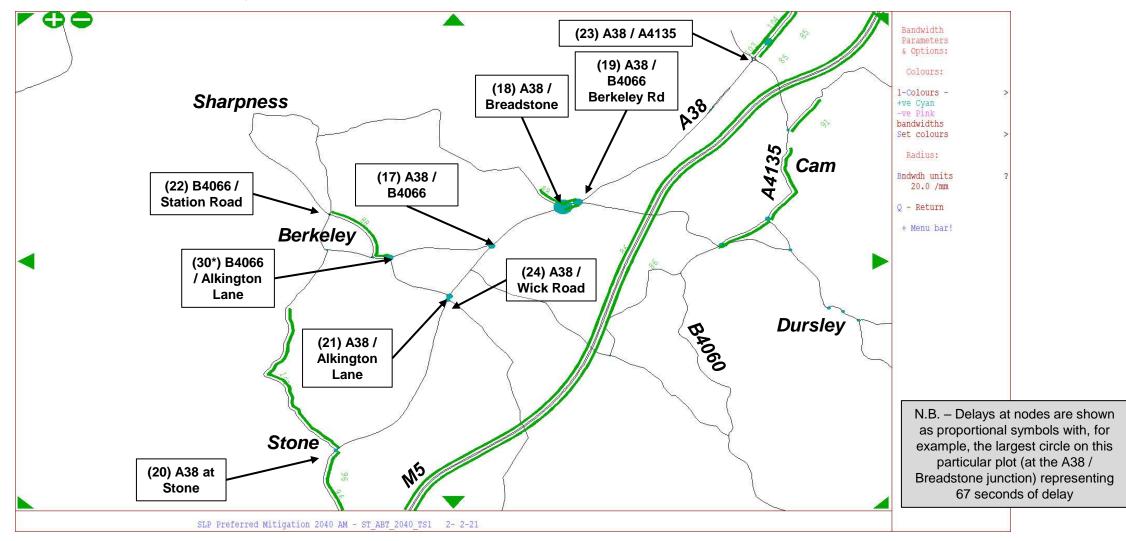
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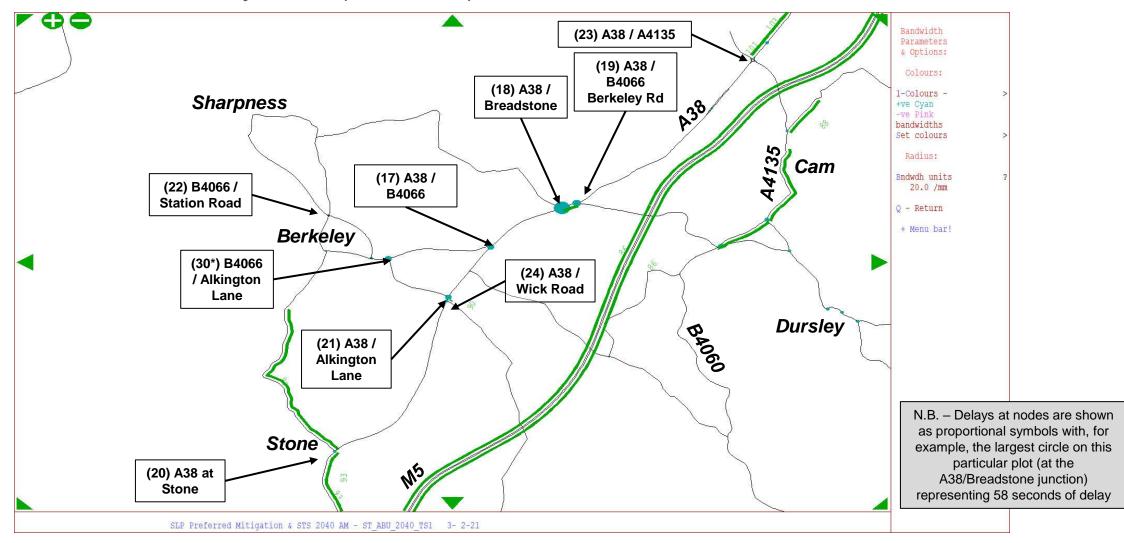
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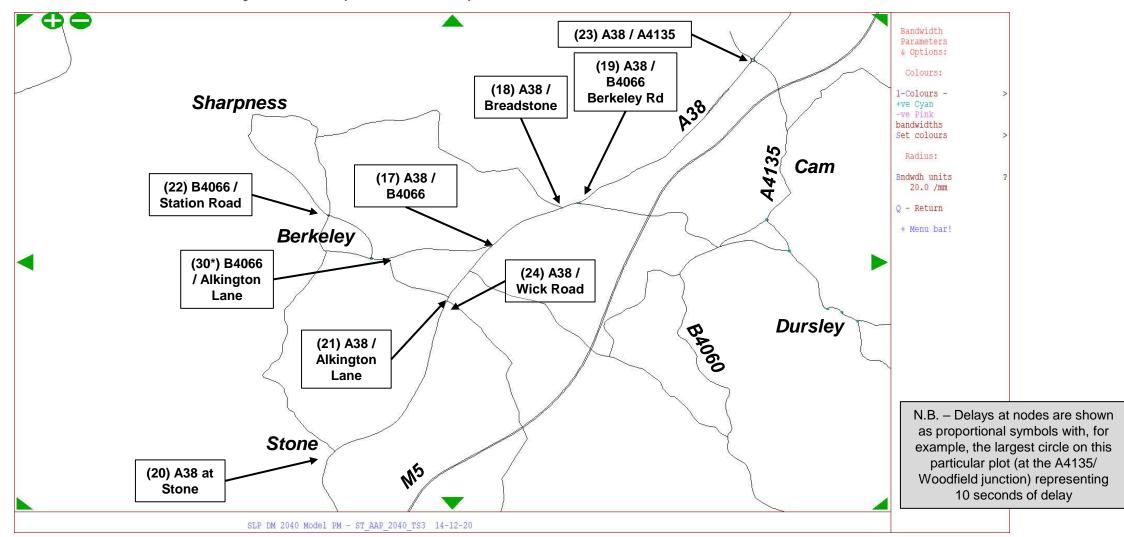
# c. Local Plan with Preferred Mitigation



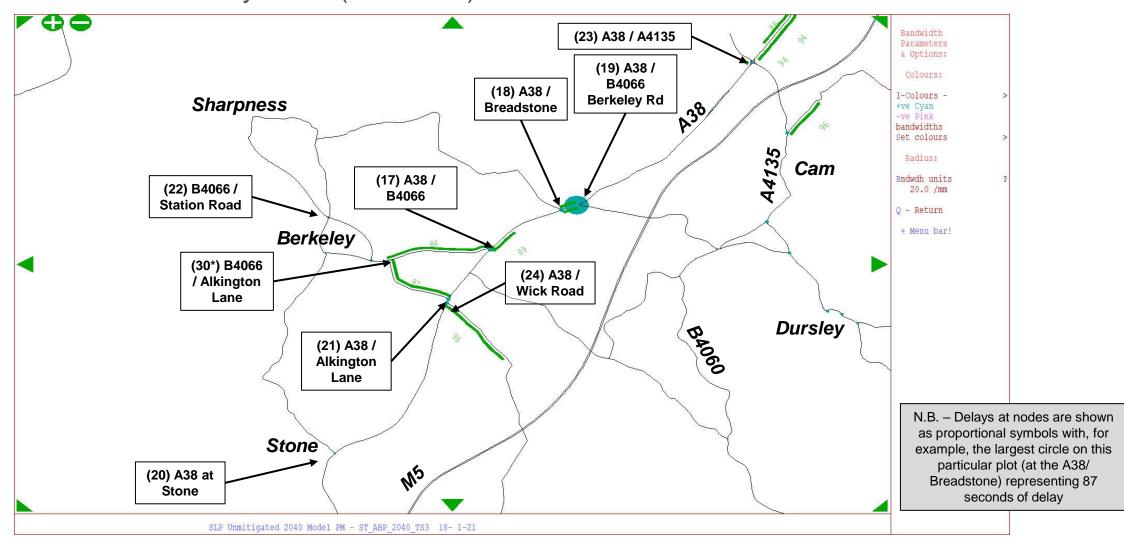
# d. Local Plan with Preferred Mitigation and STS



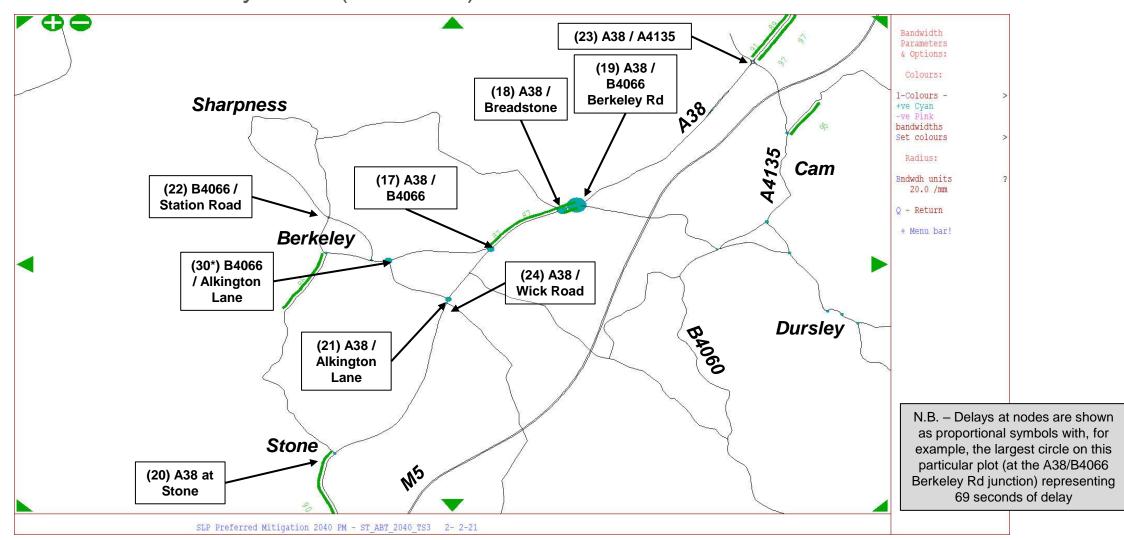
### e. Baseline



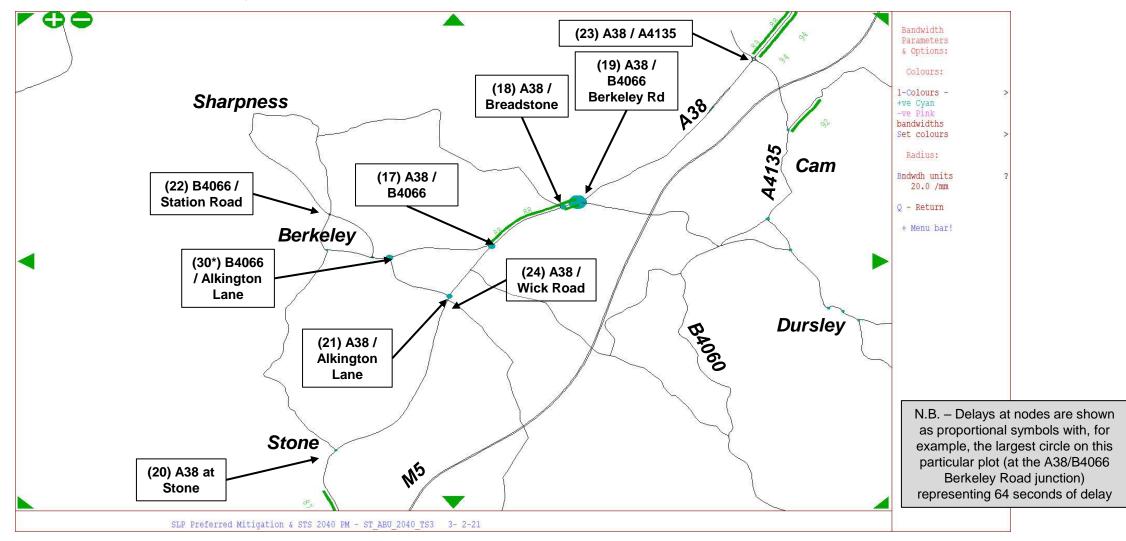
### f. Local Plan Unmitigated



# g. Local Plan with Preferred Mitigation



# h. Local Plan with Preferred Mitigation and STS



### Q. Network Performance - M5 J14

#### **Contents**

Link V/C and Node Delay Plots

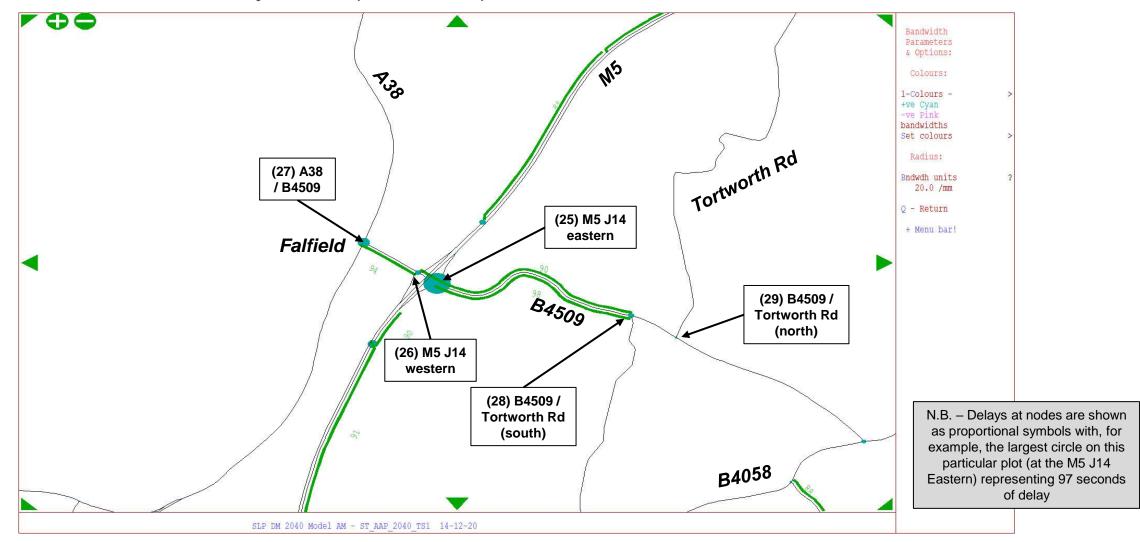
#### **AM Peak**

- a. Baseline
- b. Local Plan Unmitigated
- c. Local Plan with Preferred Mitigation
- d. Local Plan with Preferred Mitigation and Sustainable Transport Strategy

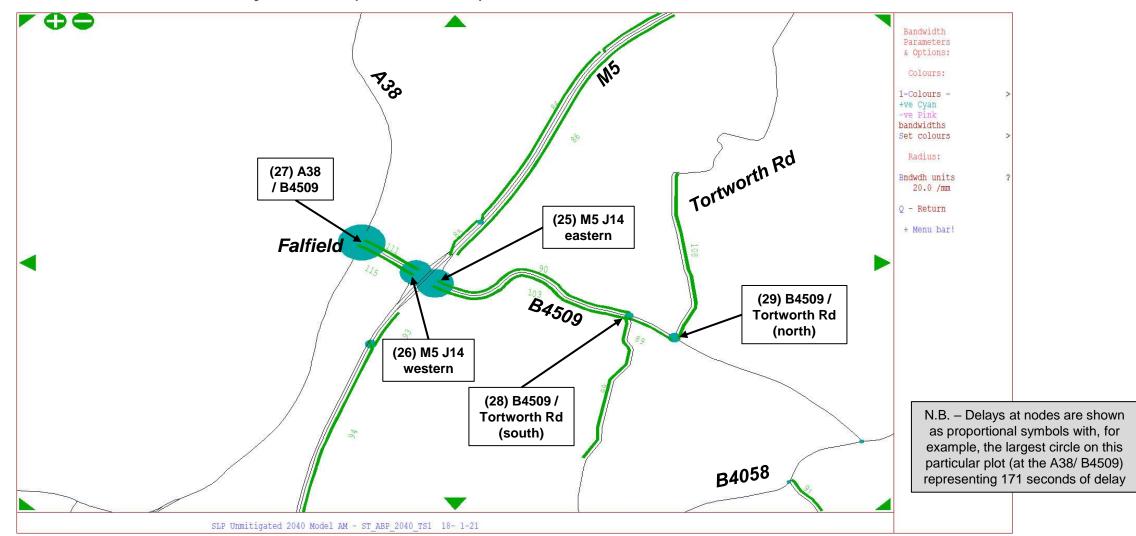
#### **PM Peak**

- e. Baseline
- f. Local Plan Unmitigated
- g. Local Plan with Preferred Mitigation
- h. Local Plan with Preferred Mitigation and Sustainable Transport Strategy

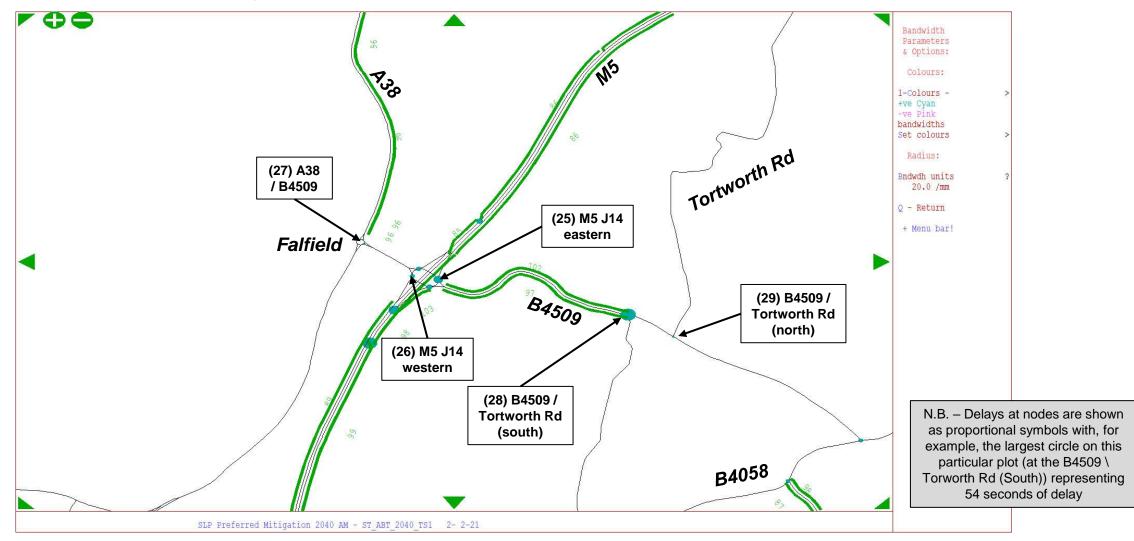
### a. Baseline



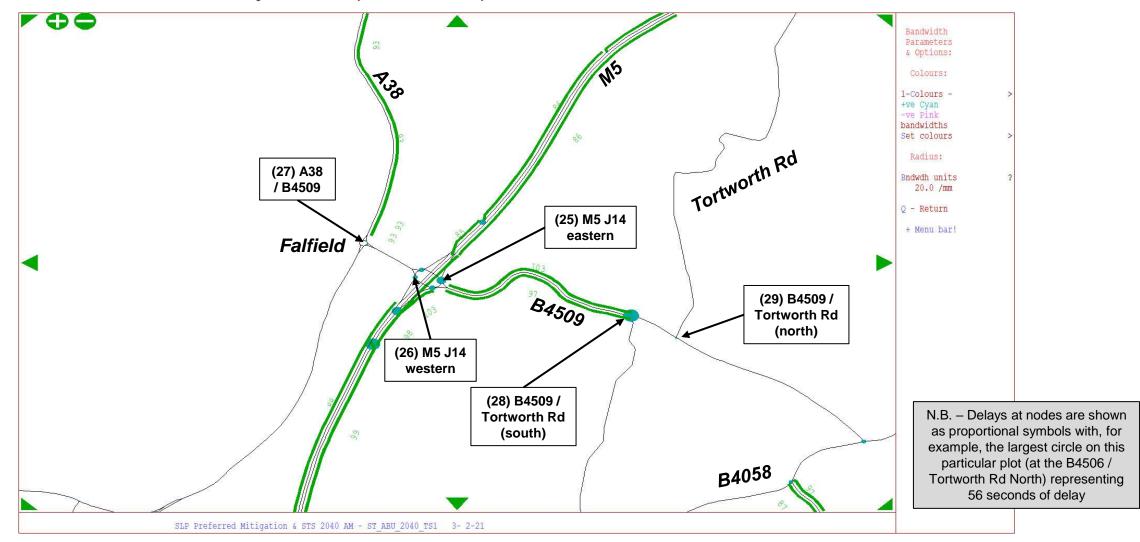
# b. Local Plan Unmitigated



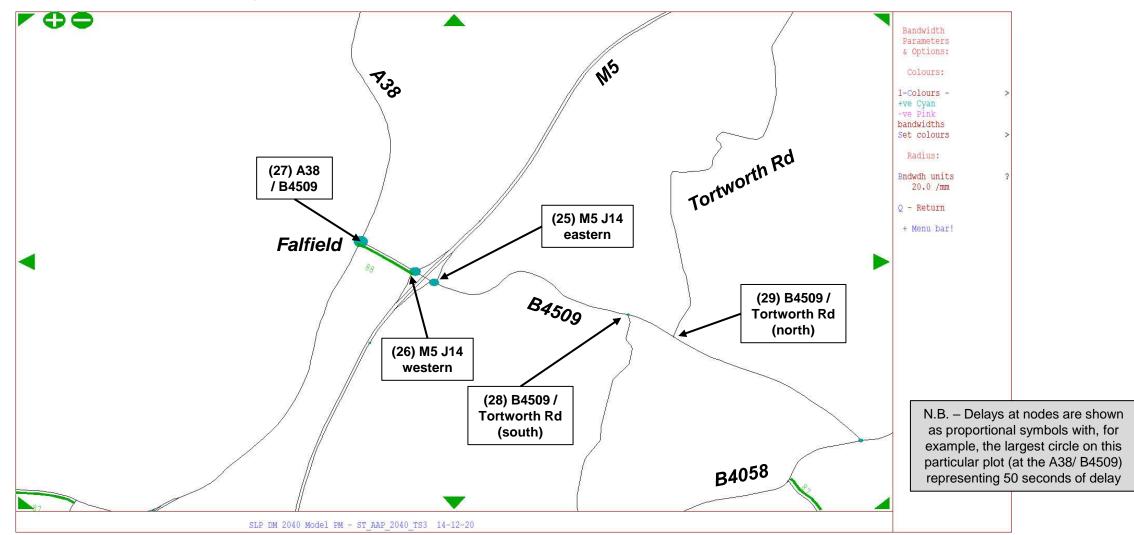
### c. Local Plan with Preferred Mitigation



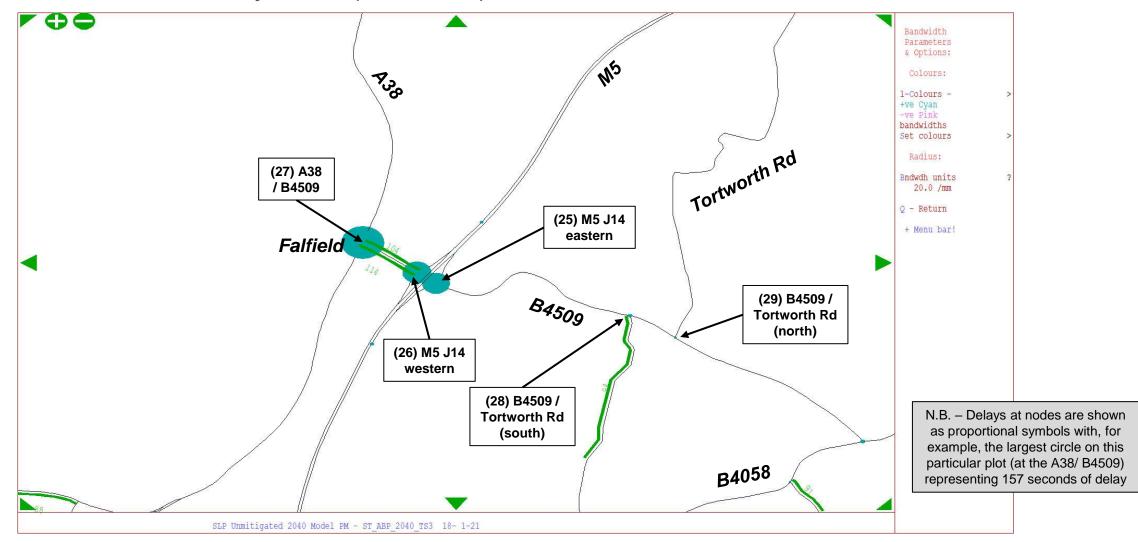
## d. Local Plan with Preferred Mitigation and STS



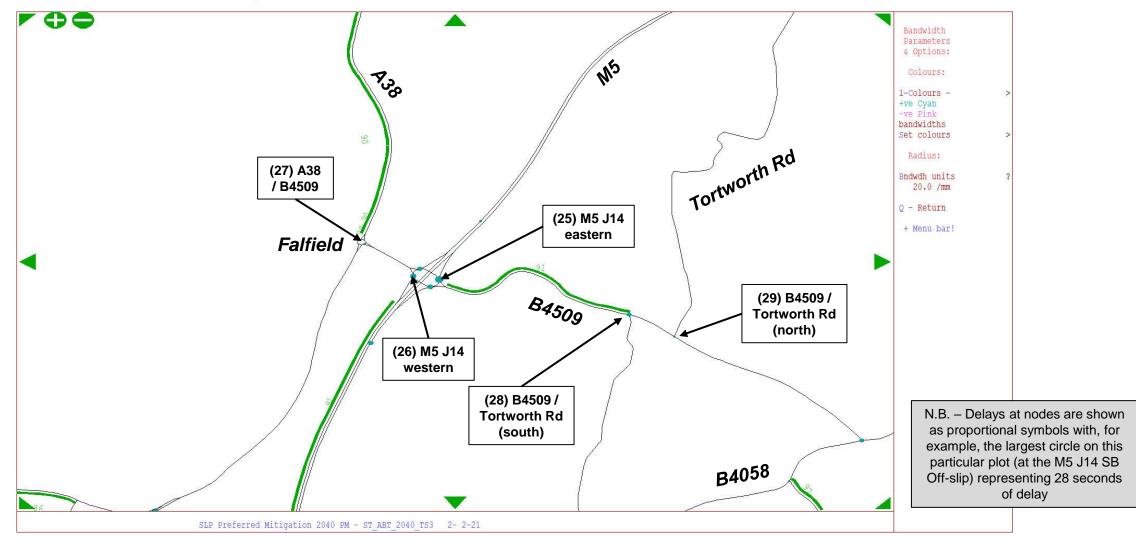
### e. Baseline



### f. Local Plan Unmitigated



# g. Local Plan with Preferred Mitigation



# h. Local Plan with Preferred Mitigation and STS

