

MID SUSSEX TRANSPORT STUDY

DISTRICT PLAN REVIEW

SCENARIO 5 NON-TECHNICAL SUMMARY

| IDENTIFICATION TABLE | |
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SYSTRA

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1. INTRODUCTION

1.1 Work Undertaken

1.1.1 Mid Sussex District Council (MSDC) commissioned SYSTRA to build and apply a strategic highway model to underpin the Mid Sussex Transport Study (MSTS). The work stages are:

- 2019 Base Year Highway Model Production and Validation
- 2039 Reference Case Scenario;
- 2039 District Plan Review (DPR) Scenarios
- 2039 District Plan Review (DPR) Scenarios including potential mitigation

Current Position and Next Steps

1.1.2 This report is part of an iterative process to test the impact of development and the potential mitigations to reduce those impacts. The next steps will be to propose sustainable mitigations and highway mitigations. However, this report does include results of scenarios which have been informed by submissions made by the significant site promoters and tests the potential impact of initial car trip rate reductions as a result of home working, internalisation and mode share assumptions for trips to and from the scenario's significant site developments.

Highway Model

1.1.3 The Mid Sussex Strategic Highway Model (MSSHM) was produced in accordance with standard good practice as set out in the Department for Transport's (DfT) transport analysis guidance (TAG). The model's base year is 2019.

Transport Study

1.1.4 The impacts on the highway network of the agreed development scenarios were assessed based on the National Planning Policy Framework (NPPF) using criteria agreed by MSDC and West Sussex County Council (WSSCC). Where junctions or roads sections are assessed to be adversely impacted by the developments, the potential impact of sustainable transport mitigation will be assessed after which potential highway mitigation schemes will be tested. These mitigations will aim to remove all 'severe' impacts.

1.1.5 A safety review will also be undertaken to provide a junction and road-section based assessment of accident clusters.

1.1.6 Parallel work will include environmental impact to comply with National Planning Practice Guidance on transport evidence bases in plan making and air quality modelling and ecological interpretation for Habitats Regulations Assessment to test the impact of traffic on the Ashdown Forest Special Area of Conservation.

1.2 Scenarios Tested

2039 Reference Case

1.2.1 The 2039 Reference Case represents a benchmark against which the development scenarios are tested. This enables separation of impacts resulting from the scenarios from impacts due to background growth, committed development and infrastructure. The

2039 Reference Case includes the development sites that were in the previously modelled 2031 Sites DPD Scenario including proposed mitigation as referenced below.

Committed Infrastructure in 2039 Reference Case

1.2.2 The reference case schemes from the previous Sites DPD modelling were carried forward to the 2039 Reference Case. The following mitigation associated with the Sites DPD Scenario was also included.

- Sustainable transport trip reductions for the Sites DPD developments
- Ansty A272/B2036 - minor widening on A272 western and eastern arms

1.2.3 In addition, the following mitigation associated with the Sites DPD Scenario as proposed by the Science and Technology Park was included:

- A2300/A23 Hickstead, Eastern Roundabout
- A23 Southbound upgraded merge and diverge between A2300 and Mill Lane
- A2300/Cuckfield Road roundabout upgrade and new S&T Park access/Cuckfield Road roundabout
- A2300/Northern Arc roundabout
- New access road from A272/A23 northbound roundabout for Marylands Nursery

1.2.4 The 2039 development scenarios are being refined as part of the Council’s plan making process, including sustainability appraisal, to help inform preparation of the District Plan Review and select a preferred option. The scenarios build on the Reference Case and assess proposed Local Plan development and supporting infrastructure in 2039.

2039 Scenario 5

1.2.5 Scenario 5 builds on the Reference Case and assesses proposed Local Plan development and supporting infrastructure in 2039.

2039 Scenario 5m2

1.2.6 Building off Scenario 5, Scenario 5m2 tests the potential impact of car trip rate reductions as a result of home working, internalisation, future employment distribution, access and proximity to existing services, and mode share assumptions for trips to and from the scenario’s site developments.

2039 Scenario 5m4

1.2.7 Building off Scenario 5m2, Scenario 5m4 tests the potential impact of additional car trip rate reductions as a result of proposed LCWIP cycle improvement and site specific sustainable travel improvements.

2039 Scenario 5m5

1.2.8 Building off Scenario 5m2, Scenario 5m5 includes testing of an initial Highway Mitigation package.

1.2.9 **Table 1** summarises the total housing units considered in the modelled scenarios.

Table 1. Total Housing units Considered in Mid-Sussex in Scenario 5

| SCENARIO | TOTAL UNITS CONSIDERED | DIFFERENCE FROM REF |
|------------------------------------|------------------------|---------------------|
| 2039 Reference Case | 13,884 | N/A |
| 2039 Scenario 5 | 20,505 | 6,621 |
| 2039 Scenario 5 including windfall | 21,993 | 8,109 |

1.2.10 **Figure 1** shows the location of the Scenario 5 development sites labelled by SHLAAID (Strategic Housing Land Availability Assessment ID).

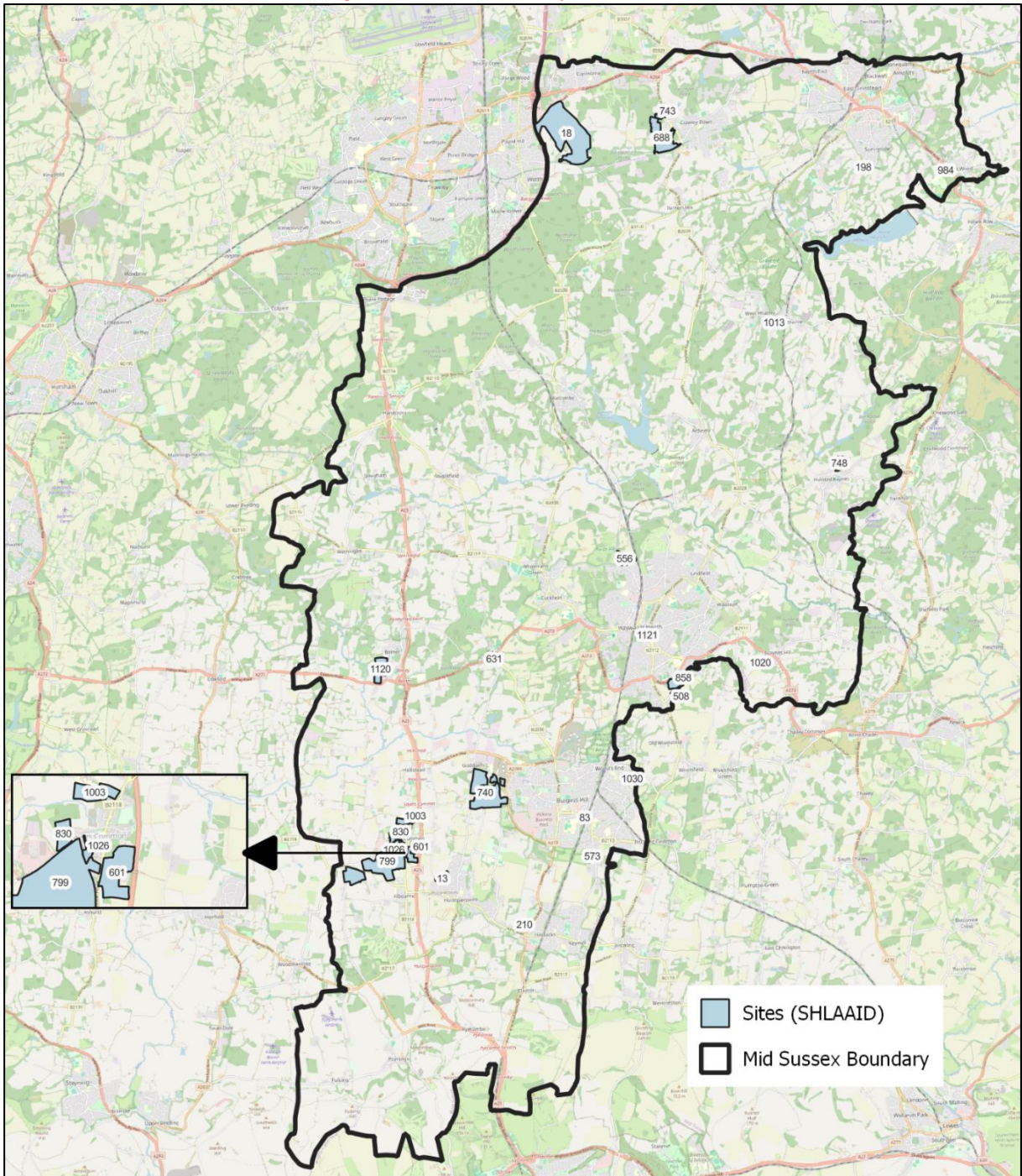
2039 Scenarios 5 and 5 with Car Trip Rate Reduction (Scenarios 5 and 5m2/m4/m5)

1.2.11 This report includes scenarios which have been informed by submissions made by the significant site promoters and tests the potential impact of car trip rate reductions as a result of home working, internalisation and mode share assumptions for trips to and from the scenario’s significant site developments. Further scenarios will be prepared to test the impact of proposed sustainable mitigation, and the resulting mode shift from car, to support the proposed allocations.

It is considered that Mid Sussex could have a higher homeworking proportion than the south-east and UK as a whole. Therefore, an additional 5% reduction on all Local Plan sites has been assumed and applied to commuter trips. In addition to this, the following trip rate reductions have been assumed for the more significant sites:

- 15% reduction on residential unit car trip rates to account for home working, internalisation and mode share assumptions
- 80% reduction on primary school car trip rates to account for internalisation of trips

Figure 1. Scenario Map with SHLAAID



2. SCENARIO 5 CAPACITY IMPACTS

2.1 Introduction

2.1.1 This chapter reports the capacity impact results of **Scenario 5** compared to the Reference Case. The following items are reported:

- Impacts on the M23 and A23 Strategic Road Network
- Identification of Junctions with Capacity Impacts (using NPPF based criteria)
- Cross Boundary Impacts

2.2 Impacts on the M23 and A23 Strategic Road Network

2.2.1 The highest percentage increases in the AM peak are northbound on the A23 between the B2115 and the B2110, and southbound between the A281 and the A273. Both of these are a **10%** increase.

2.2.2 The highest percentage increases in the PM peak are both northbound on the A23 between the A273 and the A281, where the increase is up to approximately **10%**, and between the A281 and the B2117, where the increase is up to approximately **11%**

2.2.3 There are some locations where the maximum vehicles per hour (as defined by the Design Manual for Roads and Bridges CD122 Geometric design of grade separated junctions) is exceeded. It should be noted that many of these are also exceeded in the Reference Case.

2.3 Identification of Junctions with Capacity Impacts

2.3.1 The impact of development was assessed based on the National Planning Policy Framework (NPPF) using criteria agreed by MSDC and WSCC.

2.3.2 **Table 2** shows how many junctions are forecast to be impacted significantly or severely in **Scenario 5** when compared to the Reference Case.

Table 2. Scenario 5: 'Severe' and 'Significant' Junction Impacts

| SCENARIO | 'SEVERE' IMPACTS | 'SIGNIFICANT' IMPACTS |
|------------------------------|------------------|-----------------------|
| Scenario 5 vs Reference Case | 12 | 41 |

2.3.3 In **Scenario 5** there are 'severe' impacts at **12** junctions and 'significant' impacts at **41** junctions. The junctions with 'severe' impacts are:

- N8 B2110 / B2028 Turners Hill
- C7 A272 / B2036 Ansty
- C12 A273 / Isaac's Lane / Traustein Way
- S2 A23 / A2300 Eastern Roundabout
- S3 A2300 / Cuckfield Road
- S6 Junction Road / B2113, Burgess Hill
- S8 A273 / B2116 Hassocks (Stonepound)
- S21 B2112 / Green Road (LEWES DISTRICT)
- S22 Valebridge Road / Junction Road / Leylands Road
- S35 A23 / B2118 Sayers Common
- S38 A23 / A2300 Western Roundabout

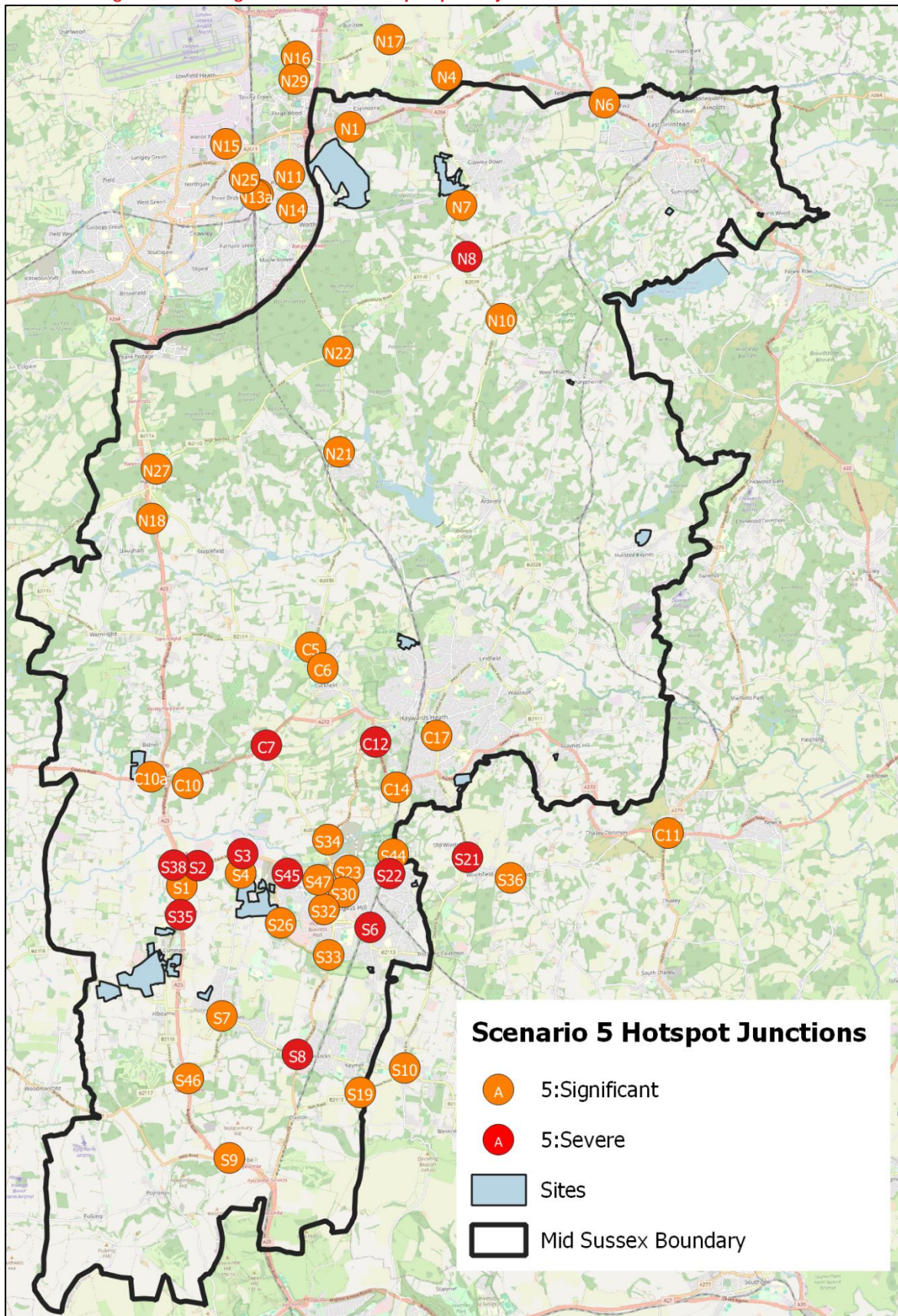
- S45 A2300 / A273 Jane Murray Way

2.3.4 **Figure 2** shows the locations of the significant and severely impacted junctions.

2.4 Cross Boundary Impacts

2.4.1 There is **one** junction in neighbouring authorities which experience a 'severe' impact. This is S21 (Lewes District).

Figure 2. 'Significant' and 'severely' impacted junctions - Scenario 5 versus Reference Case



3. SCENARIO 5 WITH CAR TRIP RATE REDUCTION (5M2) CAPACITY IMPACTS

3.1 Introduction

3.1.1 This chapter reports the capacity impact results of **Scenario 5m2** compared to the Reference Case. The following items are reported:

- Impacts on the M23 and A23 Strategic Road Network
- Identification of Junctions with Capacity Impacts (using NPPF based criteria)

3.2 Impacts on the M23 and A23 Strategic Road Network

3.2.1 The highest percentage increases in the AM peak are southbound on the A23 between the A272 and the A2300, where the increase is up to approximately **11%**

3.2.2 The highest percentage increases in the PM peak are northbound on the A23 between the B2118, the A2300 and where the increase is up to approximately **12%**

3.2.3 There are some locations where the maximum vehicles per hour (as defined by the Design Manual for Roads and Bridges CD122 Geometric design of grade separated junctions) is exceeded. It should be noted that many of these are also exceeded in the Reference Case.

3.3 Identification of Junctions with Capacity Impacts

3.3.1 **Table 3** shows how many junctions are forecast to be impacted significantly or severely in **Scenario 5m2** when compared to the Reference Case.

Table 3. Scenario 5m2: ‘Severe’ and ‘Significant’ Junction Impacts

| SCENARIO | ‘SEVERE’ IMPACTS | ‘SIGNIFICANT’ IMPACTS |
|---------------------------------------|------------------|-----------------------|
| Scenario 5 vs Reference Case | 12 | 41 |
| Scenario 5m2 vs Reference Case | 3 | 40 |

3.3.2 In **Scenario 5m2** there are ‘severe’ impacts at **3** junctions and ‘significant’ impacts at **40** junctions. Overall, there are 9 fewer ‘severe’ impact junctions than in Scenario 5. The junctions with ‘severe’ impacts in Scenario 5m2 are shown below in **bold**. The Scenario 5 junctions are listed again below with a strikethrough for those that are not ‘severe’ in Scenario 5m2.

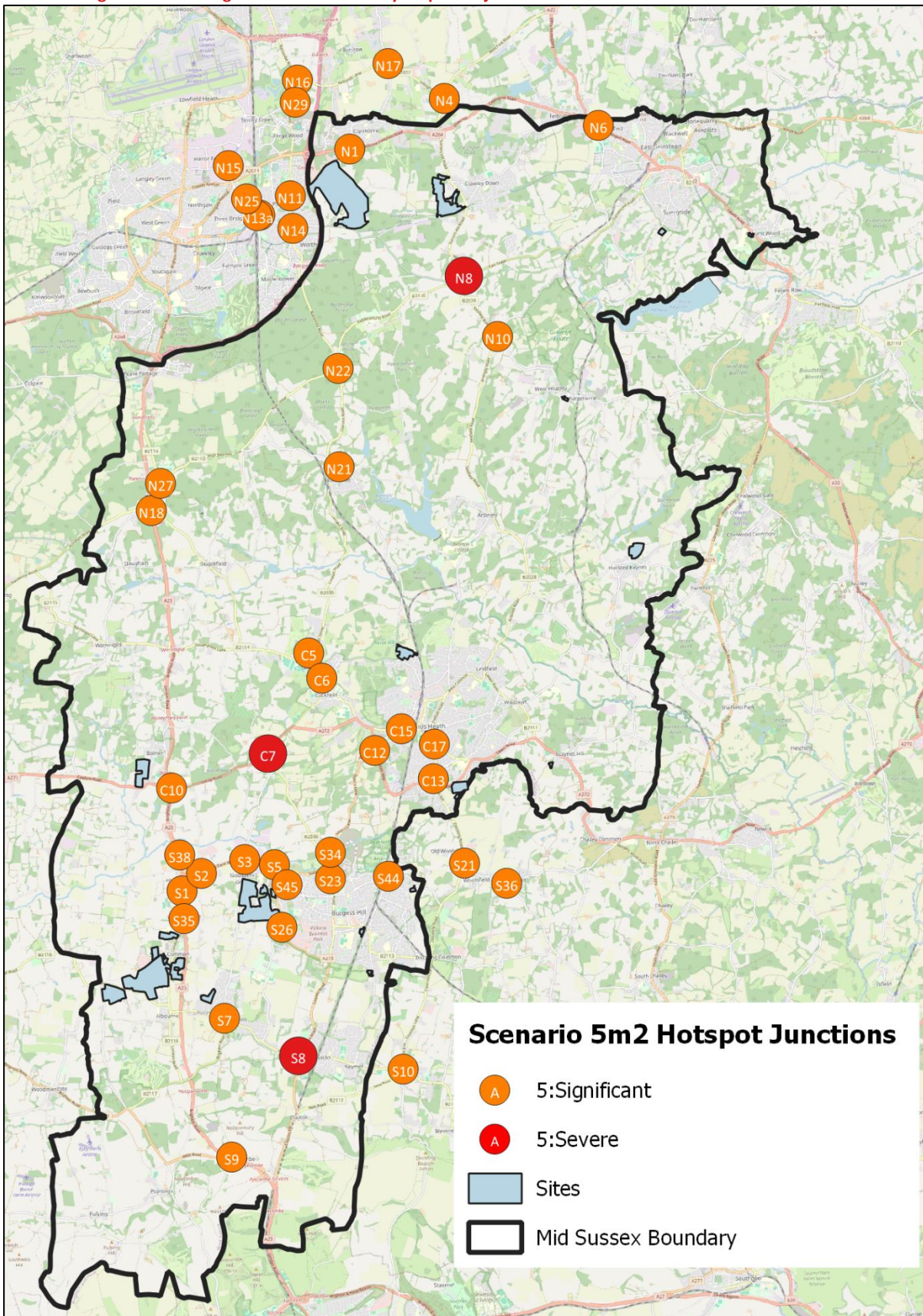
- **N8 B2110 / B2028 Turners Hill**
- **C7 A272 / B2036 Ansty**
- ~~C12 A273 / Isaac's Lane / Traustein Way~~
- ~~S2 A23 / A2300 Eastern Roundabout~~
- ~~S3 A2300 / Cuckfield Road~~
- ~~S6 Junction Road / B2113, Burgess Hill~~
- **S8 A273 / B2116 Hassocks (Stonepound)**
- ~~S21 B2112 / Green Road (LEWES DISTRICT)~~
- ~~S22 Valebridge Road / Junction Road / Leylands Road~~
- ~~S35 A23 / B2118 Sayers Common~~
- ~~S38 A23 / A2300 Western Roundabout~~
- ~~S45 A2300 / A273 Jane Murray Way~~

3.3.3 **Figure 3** is a map showing the locations of the significant and severely impacted junctions.

3.4 Cross Boundary Impacts

3.4.1 There are no junctions in neighbouring authorities which experience a 'severe' impact.

Figure 3. 'Significant' and 'severely' impacted junctions - Scenario 5m2 versus Reference Case



4. SCENARIO 5 WITH CYCLE INFRASTRUCTURE IMPACTS (5M4) CAPACITY IMPACTS

4.1 Introduction

4.1.1 This chapter describes the results of **Scenario 5m4** which, informed by submissions made by the significant site promoters, tests the potential impact of initial car trip rate reductions as a result of local plan and developer led cycle infrastructure schemes. These schemes are intended to reduce the amount of traffic at the large sites by encouraging further mode shift.

4.1.2 The following items are reported:

- Impacts on the M23 and A23 Strategic Road Network
- Identification of Junctions with Capacity Impacts (using NPPF based criteria)

4.2 Impacts on the M23 and A23 Strategic Road Network

4.2.1 The highest percentage increase in the AM peak is southbound on the A23 between the B2117 and the A281, where the increase is approximately **10%**. This is a **1%** decrease from the comparison of Scenario 5M2 and 5.

4.2.2 The highest percentage increase in the PM peak is northbound on the A23 between the B2118 and the A2300, where the increase is up to approximately **12%**

4.2.3 There are some locations where the maximum vehicles per hour (as defined by the Design Manual for Roads and Bridges CD122 Geometric design of grade separated junctions) is exceeded. It should be noted that many of these are also exceeded in the Reference Case.

4.3 Identification of Junctions with Capacity Impacts

4.3.1 **Table 4** shows how many junctions are forecast to be impacted significantly or severely in **Scenario 5m4** when compared to the Reference Case.

Table 4. Scenario 5m4: ‘Severe’ and ‘Significant’ Junction Impacts

| SCENARIO | ‘SEVERE’ IMPACTS | ‘SIGNIFICANT’ IMPACTS |
|---------------------------------------|------------------|-----------------------|
| Scenario 5 vs Reference Case | 12 | 41 |
| Scenario 5m4 vs Reference Case | 3 | 39 |

4.3.2 In **Scenario 5m4** there are ‘severe’ impacts at **3** junctions and ‘significant’ impacts at **39** junctions. Similarly to the previous comparison (Scenario 5 vs. Scenario 5m2), there are again 9 fewer ‘severe’ impact junctions than in Scenario 5. The junctions with ‘severe’ impacts in Scenario 5m4 are shown below in **bold**. The Scenario 5 junctions are listed again below with a strikethrough for those that are not ‘severe’ in Scenario 5m4.

- **N8** **B2110 / B2028 Turners Hill**
- **C7** **A272 / B2036 Ansty**
- ~~C12~~ ~~A273 / Isaac’s Lane / Traustein Way~~
- ~~S2~~ ~~A23 / A2300 Eastern Roundabout~~
- ~~S3~~ ~~A2300 / Cuckfield Road~~

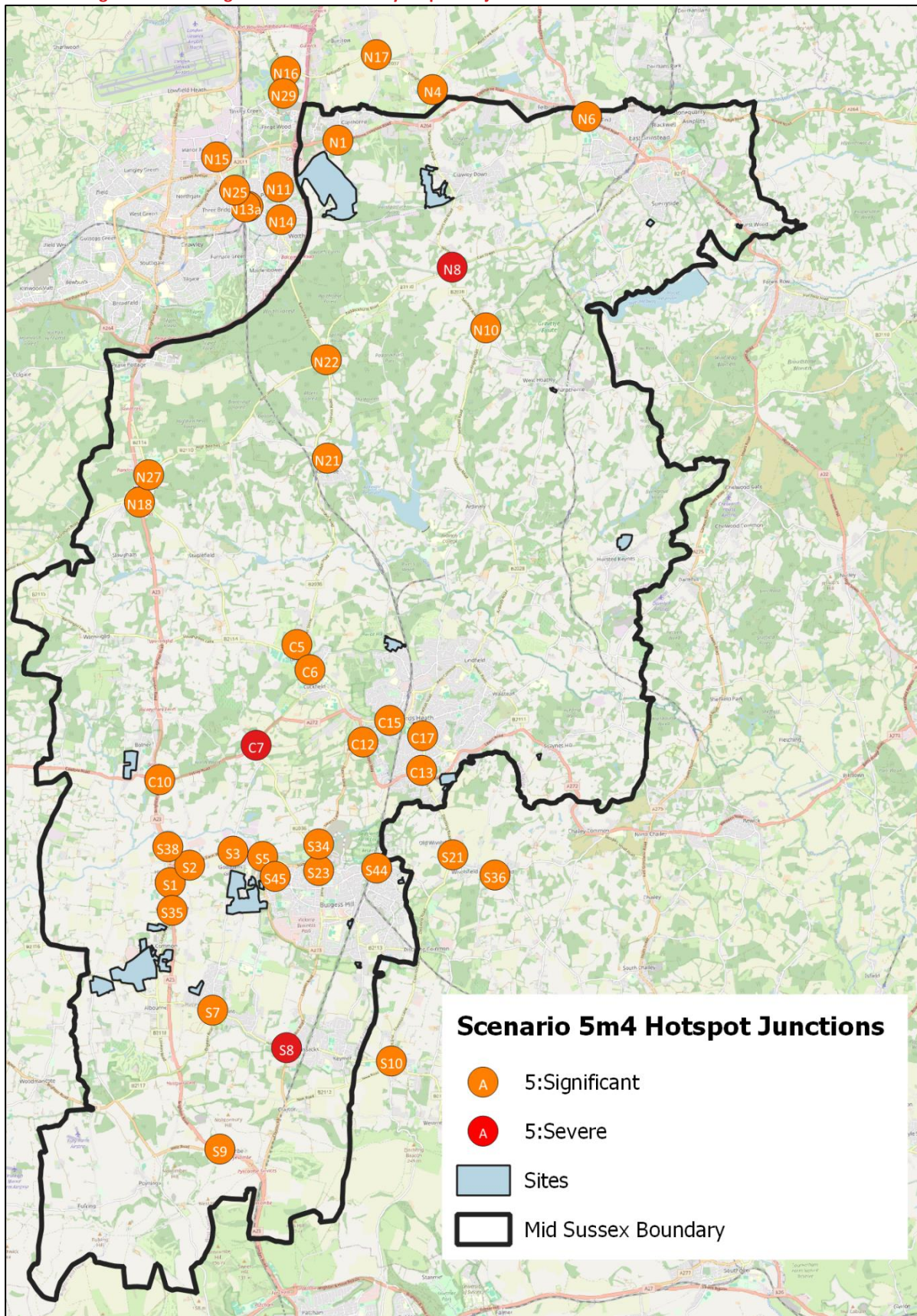
- S6 — Junction Road / B2113, Burgess Hill
- **S8 — A273 / B2116 Hassocks (Stonepound)**
- S21 — B2112 / Green Road (LEWES DISTRICT)
- S22 — Valebridge Road / Junction Road / Leylands Road
- S35 — A23 / B2118 Sayers Common
- S38 — A23 / A2300 Western Roundabout
- S45 — A2300 / A273 Jane Murray Way

4.3.3 **Figure 4** is a map showing the locations of the significant and severely impacted junctions.

4.4 Cross Boundary Impacts

4.4.1 There are no junctions in neighbouring authorities which experience a 'severe' impact.

Figure 4. 'Significant' and 'severely' impacted junctions - Scenario 5m4 versus Reference Case



5. SCENARIO 5 WITH HIGHWAY MITIGATION PACKAGE (5M5) CAPACITY IMPACTS

5.1 Introduction

5.1.1 This chapter describes the results of **Scenario 5m5** which, informed by submissions made by the significant site promoters, tests the potential impact(s) on junction operational performance as a result of development related traffic growth in Scenario 5m5 with mitigation compared to the Reference Case.

5.1.2 Scenario 5m5 include improvements at 3 junctions, listed below:

- Hickstead Junction (A2300 j/w A23)
- Dukes Head Roundabout (A264 j/w B2028)
- Copthorne Hotel Roundabout (A264 j/w A2220)

5.1.3 The following 3 key committed schemes are included in Scenario 5m5:

- A264 / Brookhill Rd / A2220 Roundabout (Copthorne Hotel Roundabout)
- A264 Dukes Head Roundabout
- A23/A2300 Hickstead Eastern Roundabout – Science Park Scheme

5.1.4 The following items are reported:

- Impacts on the M23 and A23 Strategic Road Network
- Identification of Junctions with Capacity Impacts (using NPPF based criteria)

5.2 Impacts on the M23 and A23 Strategic Road Network

5.2.1 The highest percentage increase in the AM peak is southbound on the A23 between the A272 and the A2300, where the increase is approximately **11%**. This is a **5%** increase from the comparison of Scenario 5M4 and 5.

5.2.2 The highest percentage increase in the PM peak is northbound on the A23 between the B2118 and the A2300, where the increase is approximately **12%**, which is the same as the change from Scenario 5 to 5M4.

5.2.3 There are some locations where the maximum vehicles per hour (as defined by the Design Manual for Roads and Bridges CD122 Geometric design of grade separated junctions) is exceeded. It should be noted that many of these are also exceeded in the Reference Case.

5.3 Identification of Junctions with Capacity Impacts

5.3.1 **Table 5** shows how many junctions are forecast to be impacted significantly or severely in **Scenario 5m5** when compared to the Reference Case.

Table 5. Scenario 5m5: ‘Severe’ and ‘Significant’ Junction Impacts

| SCENARIO | ‘SEVERE’ IMPACTS | ‘SIGNIFICANT’ IMPACTS |
|---------------------------------------|------------------|-----------------------|
| Scenario 5 vs Reference Case | 12 | 41 |
| Scenario 5m5 vs Reference Case | 4 | 40 |

5.3.2 In **Scenario 5m5** there are ‘severe’ impacts at **4** junctions and ‘significant’ impacts at **40** junctions. There are 8 fewer ‘severe’ impact junctions than in Scenario 5. The Scenario 5 junctions are listed again below with a strikethrough for those that are not ‘severe’ in Scenario 5m5:

- **N8** **B2110 / B2028 Turners Hill**
- **C7** **A272 / B2036 Ansty**
- ~~C12~~ — ~~A273 / Isaac's Lane / Traustein Way~~
- ~~S2~~ — ~~A23 / A2300 Eastern Roundabout~~
- ~~S3~~ — ~~A2300 / Cuckfield Road~~
- ~~S6~~ — ~~Junction Road / B2113, Burgess Hill~~
- **S8** **A273 / B2116 Hassocks (Stonepound)**
- ~~S21~~ — ~~B2112 / Green Road (LEWES DISTRICT)~~
- ~~S22~~ — ~~Valebridge Road / Junction Road / Leylands Road~~
- **S35** **A23 / B2118 Sayers Common**
- ~~S38~~ — ~~A23 / A2300 Western Roundabout~~
- ~~S45~~ — ~~A2300 / A273 Jane Murray Way~~

5.3.3 **Figure 5** is a map showing the locations of the significant and severely impacted junctions.

5.4 Cross Boundary Impacts

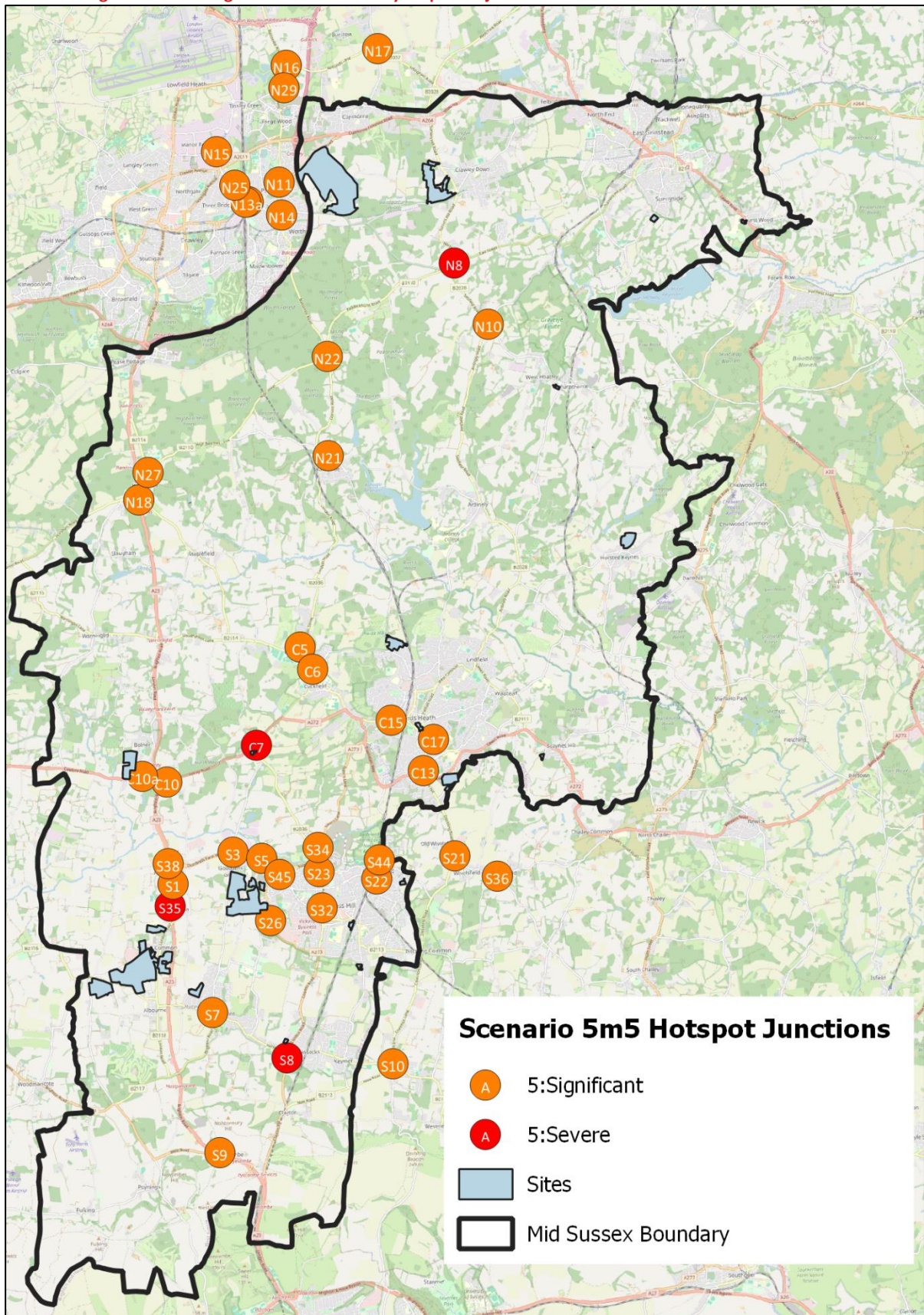
5.4.1 There are no junctions in neighbouring authorities which experience a ‘severe’ impact.

5.5 5m5 With Mitigation Scenario - Initial Conclusions

5.5.1 Initial forecasting indicates that the mitigated junctions have not resolved all issues with regards to encouraging mode shift away from the 3 ‘severe’ identified locations in Scenario 5m2 and 5m4. In addition to this, the flow changes around the Hickstead Junction have pushed traffic to the A23, ‘tipping over’ a further junction to the ‘severe’ category, the A23 Northbound on-slip at Sayers Common A23 j/w the A2118 junction. Analysis suggests that prior to introducing the proposed mitigation (Scenario 5m2), some A23 northbound trips, accessing the local area are leaving the A23 at Muddleswood to use the B2117, avoiding the Hickstead junction. With the introduction of proposed mitigation (Scenario 5m5), these trips are now staying on the A23 northbound for longer and instead exiting at the Hickstead junction.

5.5.2 The flows on Twineham Lane and Hickstead Lane which are travelling from the Henfield/Small Dole/Woodmancote area, have increased in the Local Plan scenarios when compared to the Reference Case. In Scenario 5m5, increased flow around the Hickstead Western Roundabout, caused by additional traffic circulating the roundabout from the A23 northbound off-slip and the A2300 bridge is resulting in increased delay on the Hickstead Lane approach to the roundabout. The increase in delay has then deterred the use of the rural route via Twineham Lane and Hickstead Lane for access across the A23 at the Hickstead Junction.

Figure 5. 'Significant' and 'severely' impacted junctions - Scenario 5m5 versus Reference Case



6. LOCAL JUNCTION MODELLING METHODOLOGY

6.1 Local Junction Assessments

6.1.1 The scope of the junction assessments was agreed with MSDC and WSCC, informed by a junction impact identification spreadsheet to identify areas with a “severe” impact from surrounding development. The locations identified accounted for local knowledge of key strategic routes; and local policies are considered with the overarching aim of encouraging flow of traffic along these routes, and away from more minor roads across the network.

6.1.2 As a result, the following junctions have been taken forward for local junction modelling assessment:

- **Hickstead Interchange** – Hickstead Lane/ A2300/A23 SB off-slip/Service Station Access/ A23 SB on-slip
- **Copthorne Roundabout** - A264 Copthorne Way/Brookhill Road/A264 Copthorne Common Road/Copthorne Hotel Access/ A2220 Copthorne Road Roundabout
- **Dukes Head Roundabout** – A264 Copthorne Common Road, B2028 Turners Hill Road, A264 Snowhill.

6.2 Local Junction Modelling Methodology

Model Scenarios

6.2.1 The following Scenarios have been assessed in the local junction models:

- **2019 Baseline** – MSSHM model base year;
- **2039 Reference Case** – Includes any committed development in the district, including the development sites and associated infrastructure modelled in the Site Allocations Development Plan Document (Sites DPD), the committed highway infrastructure and background growth;
- **2039 Scenario 5m4** – Includes the full targeted Local Plan growth and is informed by submissions made by significant site promoters considering mode shift potential due to LCWiP improvements and site specific sustainable corridor improvements.

Local Junction Modelling Software and Validation

6.2.2 Priority-controlled (non-signalised) junctions have been modelled using Junctions 10, whilst LinSig V3.2.44 has been used for modelling the signal-controlled junctions, and the partially signalised junctions. These software packages reflect the industry standard for assessing junction capacity.

6.2.3 In the absence of queue length survey data, the local junction models have been validated using the 2019 Baseline outputs from the MSSHM modelling. The methodology of the validation exercise is to use the outputs from the validated MSSHM model to ensure that the 2019 baseline results from the strategic model are comparable with the 2019 baseline local junction model outputs. By achieving the required model validation criteria, the Baseline models can be used to forecast the future scenarios to assess the impact of local growth and the Local Plan development allocations.

7. LOCAL JUNCTION IMPACT ASSESSMENT

7.1.1 The results of the local junction assessment are presented below for the agreed three locations taken forward for local junction modelling assessments.

7.2 Hickstead Interchange – Junction Model Results

The A23 Hickstead Interchange is a grade-separated dumbbell arrangement junction providing access between the A23, the A2300 and Hickstead Lane. The western roundabout is a four arm non-signalised roundabout with uncontrolled crossings and associated tactile paving on the north (A2300) and west arms (Hickstead Lane), with Hickstead Lane just having a dropped kerb and no tactile paving. The eastern roundabout is a six arm non-signalised roundabout, consisting of the A23 on and off slip roads, the A2300 (east and west arms), a service station access road and a curtailed access road connecting to adjacent farmland.

Existing Model Results

7.2.1 From the existing model results, it is evident that the A2300 East arm is operating above capacity in the 2019 Baseline AM peak scenario. All remaining arms across both the eastern and western roundabout operate within capacity during the AM peak scenario. Both roundabouts operate within capacity during the PM peak scenario.

2039 Reference Case and Do Minimum Junction Model Results

7.2.2 As part of the Site Allocations Development Plan Document (DPD), allocation SA9 allocated land to the north of the A2300 for a Science and Technology Park. Mitigation was proposed to support this allocation during the plan making process, including improvements to the Hickstead Interchange. **Figure 6** and **Figure 7** below shows the mitigation sketch designs of junction improvements at Hickstead Interchange included within the Reference Case and Do Minimum model runs as part of the Science Park proposals.

Figure 6. Science Park Mitigation, Hickstead Interchange – Eastern Roundabout

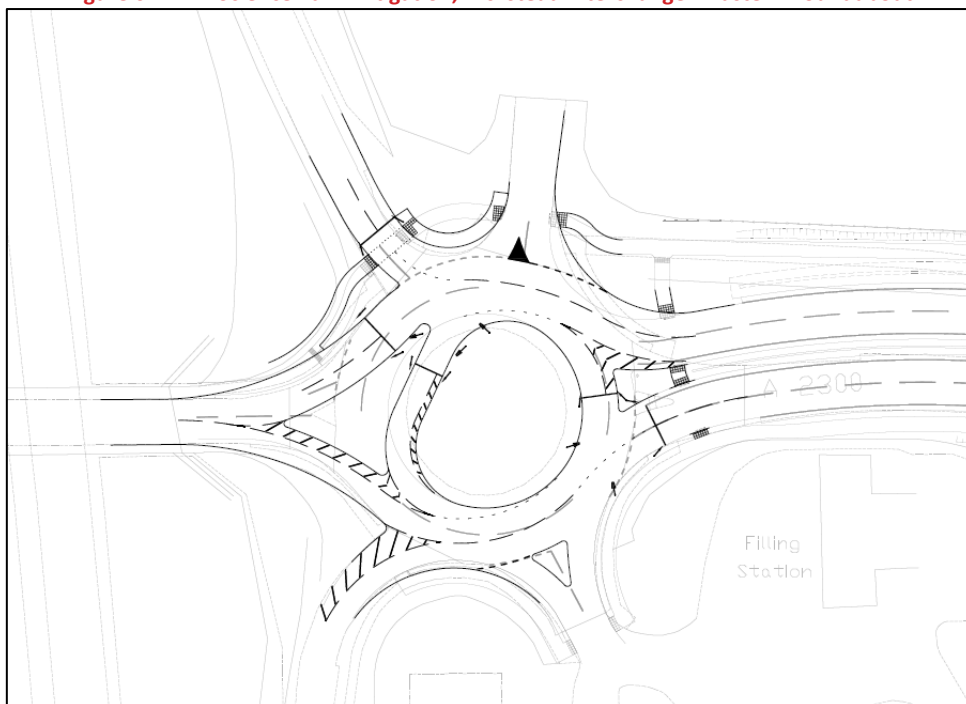
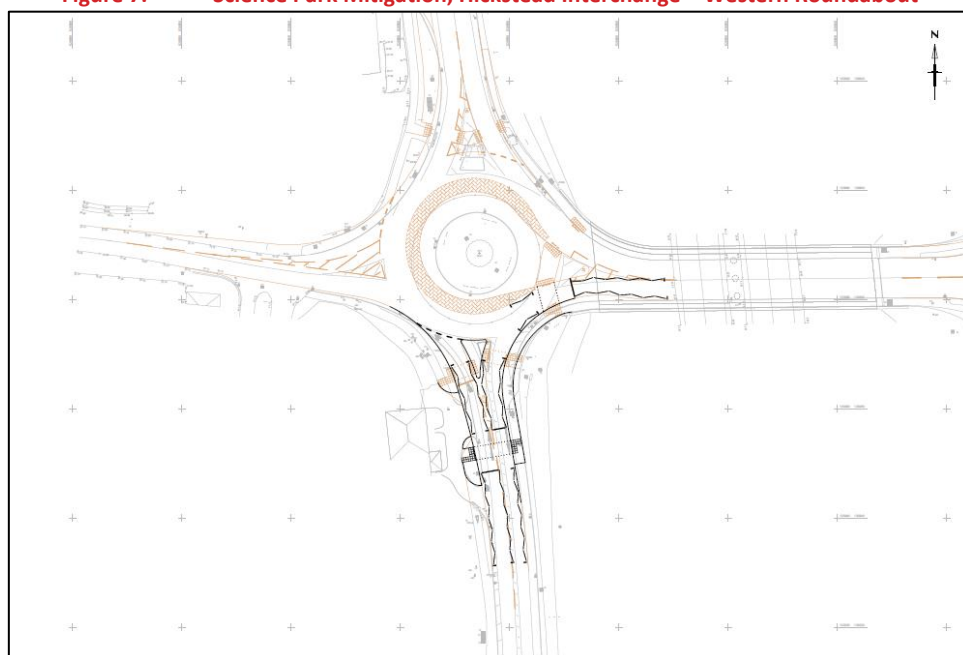


Figure 7. Science Park Mitigation, Hickstead Interchange – Western Roundabout



7.2.3 From the model results of the Science Park mitigation, it is evident that the western roundabout operates within capacity across all scenarios. It is noted however that the A2300 Overbridge is nearing capacity in all scenarios. The eastern roundabout is shown to operate above capacity on the A2300 East arm in both 2039 Reference Case and Do Minimum scenarios, for both AM and PM peaks.

2039 Do Minimum with SYSTRA Mitigation Junction Model Results

7.2.4 SYSTRA has reviewed the mitigation associated with the Science and Technology park and considered whether any further junction improvements can be made to support the full

development of the Local Plan and traffic volumes associated with the targeted levels of growth. Due to the low frequency of vehicles turning right from the service station, it is expected that the removal of the newly added green phase would have a positive impact on performance. The proposed east and west roundabout designs are shown in **Figure 8** and **Figure 9** below.

Figure 8. SYSTRA Proposed Mitigation – Eastern Roundabout

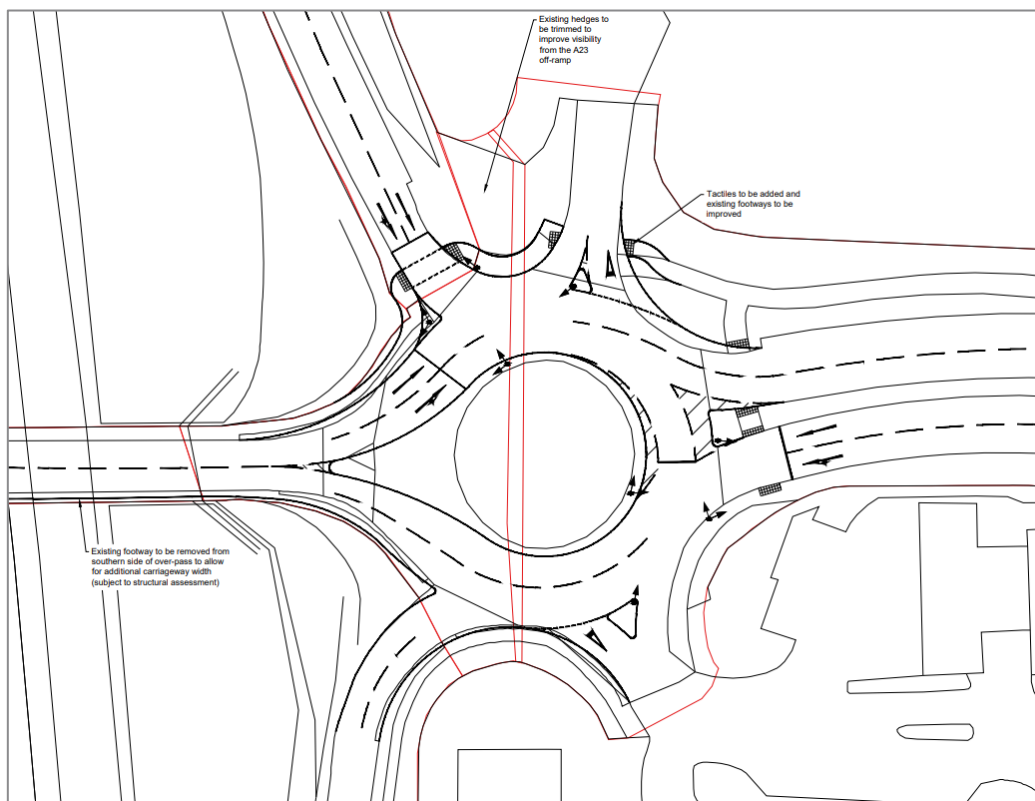
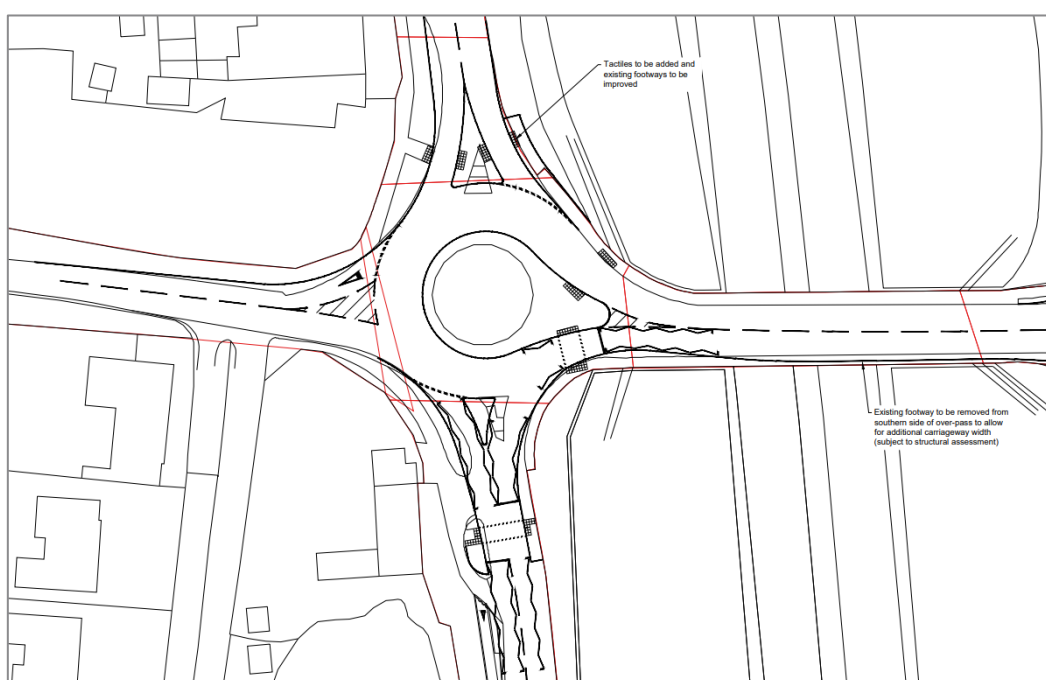


Figure 9. SYSTRA Proposed Mitigation – Western Roundabout



7.2.5 The western roundabout is shown to operate above capacity in both AM and PM peak periods. Congestion on this arm is caused by the pedestrian crossing being called every cycle, resulting in queues building up on the overbridge. The eastern roundabout is shown to operate within capacity within both AM and PM peak periods. A sensitivity test to change the demand of the pedestrian crossing has been undertaken to establish if this queue can be mitigated such that it no longer impacts the eastern roundabout operation.

Sensitivity Testing – Pedestrian Crossing Demand

7.2.6 SYSTRA has undertaken a sensitivity test based on the pedestrian crossing on the western roundabout of the junction being called every third cycle rather than every cycle, which is considered more reflective of forecast pedestrian crossing demand.

7.2.7 Calling the proposed pedestrian crossing every third cycle on the western roundabout of the Hickstead Interchange leads to significant improvement on the A2300 overbridge (westbound) in to the western roundabout in the AM peak. The reported AM queues is within the available stacking space for the bridge. However in the PM peak, whilst there is a marked improvement on the level of queuing, issues of queues exceeding the available stacking space on the A2300 Overbridge (westbound) could still materialise on occasion.

7.2.8 The A2300 East approach arm operates within capacity in the AM and PM peak.

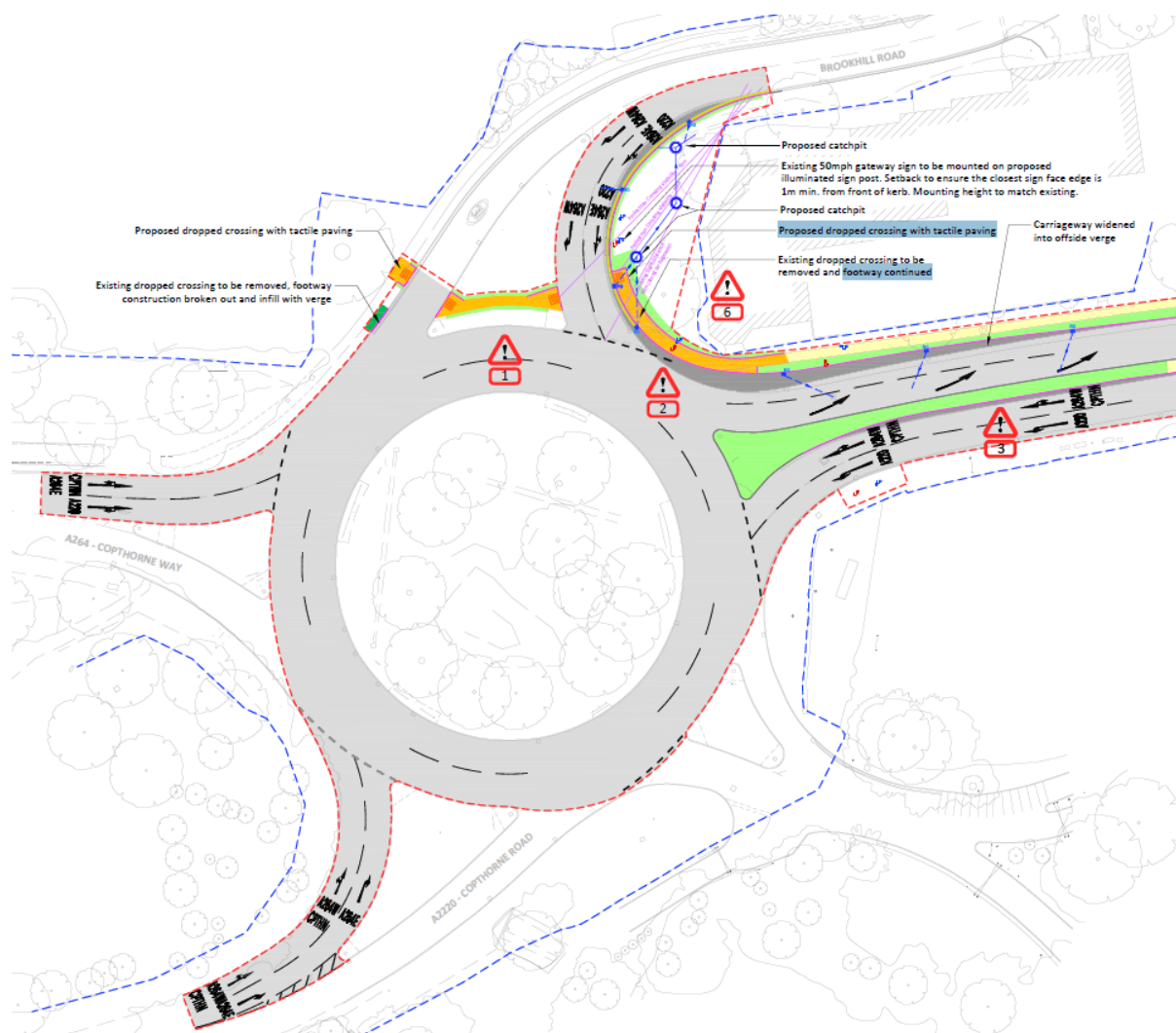
7.3 Copthorne Roundabout – Junction Model Results

7.3.1 The Copthorne Roundabout is a non-signalised five arm roundabout located at the junction of the A264, A2220 Copthorne Road and Brookhill Road, which provides access to the village of Copthorne. The fifth arm provides access to the Copthorne Hotel complex.

7.3.2 It is noted that Copthorne Roundabout has been subject to recent upgrade works which were completed in Summer 2023. The proposed improvements include widening of Brookhill Road approach arm, widening of the eastbound A264 Copthorne Common Road exit arm and improved pedestrian crossing facilities.

7.3.3 A plan showing the completed ‘as-built’ layout of these works is shown in **Figure 10**.

Figure 10. Cophthorne Roundabout 'as-built' Improvement Scheme (Completed Summer 2023)



7.3.4 Due to the timing of the modelling work, the local junction model results presented in this section have been assessed based on the pre-existing layout (with no improvement works as per the description in paragraph 7.3.1). Further local modelling work is to commence considering the combined benefits of the 'as-built' scheme at Cophthorne Roundabout as well as proposed Local Plan mitigation identified.

Pre-existing Layout Junction Model Results

7.3.5 Modelling of the 2019 base case has shown that all roundabout arms operate within theoretical capacity in both the AM and PM scenarios.

7.3.6 The 2039 reference case shows the roundabout to experience increased congestion in both AM and PM peak hours, with the A264 Cophthorne Way western arm exceeds capacity in the AM peak. The PM peak sees all arms increase in congestion however remain within theoretical capacity.

7.3.7 The 2039 Do Minimum scenario shows further increases in congestion, albeit the greatest increases are associated with the background growth to 2039 rather than the Local Plan

8. SUMMARY AND NEXT STEPS

8.1 Work Undertaken

8.1.1 Mid Sussex District Council (MSDC) commissioned SYSTRA to build and apply a strategic highway model to underpin the Mid Sussex Transport Study (MSTS). The work stages are:

- 2019 Base Year Highway Model Production and Validation
- 2039 Reference Case Scenario;
- 2039 District Plan Review (DPR) Scenarios
- 2039 District Plan Review (DPR) Scenarios including potential mitigation

Highway Model

8.1.2 The Mid Sussex Strategic Highway Model (MSSHM) was produced in accordance with standard good practice as set out in the Department for Transport's (DfT) transport analysis guidance (TAG). The model's base year is 2019.

Transport Study

8.1.3 The impacts on the highway network of the agreed Development Scenarios were assessed based on the National Planning Policy Framework (NPPF) using criteria agreed by MSDC and West Sussex County Council (WSCC). Where junctions or roads sections are assessed to be adversely impacted by the developments, the potential impact of sustainable transport mitigation will be assessed after which potential highway mitigation schemes will be tested. These mitigations will aim to remove all 'severe' impacts.

8.1.4 Parallel work will include environmental impact to comply with National Planning Practice Guidance on transport evidence bases in plan making and air quality modelling and ecological interpretation for Habitats Regulations Assessment to test the impact of traffic on the Ashdown Forest Special Area of Conservation.

8.2 Scenarios Tested

2039 Reference Case

8.2.1 The 2039 Reference Case represents a benchmark against which the development scenarios are tested and compared. This enables separation of impacts resulting from the scenarios from impacts due to background growth, committed development and infrastructure.

2039 Scenario 5

8.2.2 Scenario 5 builds on the Reference Case and assesses proposed Local Plan development and supporting infrastructure in 2039.

2039 Scenario 5m2

8.2.3 Building off Scenario 5, Scenario 5m2 tests the potential impact of initial car trip rate reductions as a result of home working, internalisation, future employment distribution, access and proximity to existing services, and mode share assumptions for trips to and from the scenario's site developments.

2039 Scenario 5m4

- 8.2.4 Building off Scenario 5m2, Scenario 5m4 tests the potential impact of additional car trip rate reductions as a result of proposed LCWIP cycle improvement and site specific sustainable travel improvements.

2039 Scenario 5m5

- 8.2.5 Building off Scenario 5m2, Scenario 5m5 includes testing of an initial Highway Mitigation package.

Junctions

- 8.2.6 The number of junctions experiencing ‘severe’ and significant impacts is as follows:

- **Scenario 5** has **12** junctions with ‘severe’ impacts and **41** ‘significantly’ impacted.
- **Scenario 5m2** has **3** junctions with ‘severe’ impacts and **40** ‘significantly’ impacted.
- **Scenario 5m4** has **3** junctions with ‘severe’ impacts and **39** ‘significantly’ impacted.
- **Scenario 5m5** has **4** junctions with ‘severe’ impacts and **40** ‘significantly’ impacted.

Mitigations

- 8.2.7 The following junctions have been taken forward for local junction modelling assessment and mitigation designs (as per Figure 8,9,11 and 12) at these three locations are proposed to support the Local Plan growth:

- **Hickstead Interchange** – Hickstead Lane/ A2300/A23 SB off-slip/Service Station Access/ A23 SB on-slip
- **Copthorne Roundabout** - A264 Copthorne Way/Brookhill Road/A264 Copthorne Common Road/Copthorne Hotel Access/ A2220 Copthorne Road Roundabout
- **Dukes Head Roundabout** – A264 Copthorne Common Road, B2028 Turners Hill Road, A264 Snowhill.

8.3 Next Steps

- 8.3.1 Where junctions or road sections are assessed to be adversely impacted by the developments, the potential impact of sustainable transport mitigation (on mode shift from car) will be assessed before highway mitigation schemes are devised and tested. These mitigations will aim to remove all ‘severe’ impacts.
- 8.3.2 To assess the potential impact of **sustainable mitigation** targets for the number of trips shifting mode from car to sustainable modes will be considered. The mode shift targets will reflect site size, location and proximity to employment, PT and cycle/walk routes.
- 8.3.3 MSDC has provided information submitted by the significant site promoters, which will be used to further assess sustainable travel and links to services/employment and to inform a more developed sustainable mitigation scenario.
- 8.3.4 Following completion of the sustainable mitigations analysis, **highway mitigations** may be considered for locations where ‘severe’ impacts remain in the with-sustainable-mitigation scenario(s), especially for main inter-urban routes. Capacity may not be increased for secondary routes where this could encourage short cuts/ rat runs.

8.3.5 A **safety review** will also be undertaken to provide a junction and road-section based assessment of accident clusters, cross-referenced to national accident rates available from the DfT and forecast traffic flow changes as a result of the scenarios compared to the Reference Case.

SYSTRA provides advice on transport, to central, regional and local government, agencies, developers, operators and financiers.

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The SYSTRA logo is rendered in a bold, red, sans-serif typeface. The letters are thick and closely spaced, with a distinctive design where the 'S' and 'Y' have a slightly irregular, blocky appearance. The 'A' at the end is also bold and red, matching the rest of the brand name.