



Horsham Transport Study

Local Plan 2040 Transport Assessment

June 2026

On behalf of **Horsham District Council**

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Executive Summary

Introduction

Stantec has been commissioned by Horsham District Council to produce a transport assessment to support the emerging Local Plan 2040. The assessment has been undertaken using a SATURN highway model. SATURN is an industry standard modelling package, which has been used to assess the impact of a number of development scenarios on the local highway network managed by West Sussex County Council, along with assessing impacts on the Strategic Road Network, managed by Highways England.

The modelling work is also used to inform more detailed junction modelling, using industry standard modelling packages, where required and to inform the mitigation strategy required to support the Local Plan. Models have been developed to represent potential impacts at the end of the Local Plan period (2039), for the AM (0800-0900) and PM (1700-1800) peak hours.

The assessment is undertaken as per MHCLG Planning Practice Guidance, Transport Evidence Bases in Plan Making and Decision Taking (March 2015)¹. The mitigation strategy will be required to mitigate the impact of the Local Plan development and as per the guidance the emphasis on mitigation should be delivery of a sustainable transport strategy, which will enable growth, whilst also considering environmental impacts and climate change targets.

The modelling undertaken is based on the most unbiased and realistic set of assumptions. Background forecasts only include schemes where the likelihood of them going ahead is near certain, or more than likely.

The following are not included directly within the modelling, but may have an influence on future traffic conditions:

- Peak spreading and change of travel time – The model is a peak hour only and does not reflect behaviour seen where people will change the time of their journey to avoid the worst congested parts of the peak.
- Autonomous Vehicles and other future innovations - the impact of 'disruptive' technologies such as autonomous (i.e. 'driverless') vehicles is unknown at this time.

Local Plan Development

A number of scenarios have been taken through the modelling process and outputs of these used to inform the development of a preferred development scenario. More detailed modelling has then been undertaken on the preferred scenario to inform the mitigation strategy required to demonstrate that the Local Plan can be delivered, in the context of transport.

The developments included within the preferred scenario are shown in the table below, split into the strategic sites and non-strategic sites.

Transport Modelling Overview

The transport model used to inform the impact of the Local Plan, is a SATURN highway model. SATURN is an industry recognised modelling package, used widely in the assessment of developments and schemes. During the process of model development, West Sussex County Council and National Highways have been engaged and have agreed the use of the modelling tool and the process for developing the forecast models to assess the Local Plan impacts.

¹ <https://www.gov.uk/guidance/transport-evidence-bases-in-plan-making-and-decision-taking>
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A base year model was developed to represent traffic conditions in 2019. This model uses independent traffic count and journey time data to validate the model to a standard as set out within guidance produced by the Department for Transport. A recent exercise has been undertaken to compare 2019 traffic flows with more recent 2025 data. This has informed adjustments made to the modelling to produce a 2025 proxy model, from which forecast models have been developed. This process is detailed further in *TN01 - Horsham Local Plan 2026 - Traffic Data Review v2 0*, Stantec, April 2026.

The impacts of COVID have led to lower traffic growth being included within the forecast models for the Local Plan Assessment, than would have been included within the previous modelling exercise back in 2022. Traffic levels in 2025 are found to be similar or in some instances lower than they were in 2019, therefore the six years of growth that would have been included previously, is not within the latest forecasts.

Forecast Development Trip Rates

For all developments added to the models (Reference Case and Local Plan), vehicle trip rates have been derived using the industry standard TRICS software. A trip rate is produced by land use type and provides the number of trips entering or leaving a development based on a rate per specified measure e.g. for residential this is per household and for employment per 100 square metres. These trip rates were agreed with WSCC.

For the strategic development sites, where housing, jobs, schools and other ancillary uses are provided together, a reduction in vehicle trip rates was made to represent trip internalisation (i.e. trips that would take place between the uses provided). The factor used – a 12% reduction on all trips both arriving at and leaving the respective sites – was based upon a figure agreed by a planning inspector to support the North Horsham development at the planning application stage.

Reference Case Forecast Model

A Reference Case forecast model has been developed to represent future traffic conditions at the end of the plan period (2040), without the consideration of the Local Plan development. The development of the Reference Case model is detailed within *Horsham Local Plan - 2040 Reference Case Model Update v2 0*, Stantec, May 2026.

The latest forecast models use the latest DfT growth factors to record background growth for traffic associated with trips originating from neighbouring authorities. These growth factors are lower than the ones previously used in the 2022 modelling, which results in some differences within the model outputs.

Local Plan Forecast Model

The Local Plan model builds upon the Reference case model by adding the Horsham Local Plan development information provided by HDC.

The outputs from the Local Plan model are then compared to the Reference Case model outputs to show the impact of the Local Plan scenario. From this an evaluation is made to determine the requirements of further highway mitigation.

Sustainable Transport Mitigation

Consideration has been given to sustainable travel measures that could impact on how people travel in the future and achieve a mode shift from car use.

The local plan development sites are proposed to comprise of sustainable transport measures that promote and encourage more sustainable active travel modes. This includes enhanced public transport, cycling and walking facilities compared with what might normally be expected from development.

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A number of the site promoters have indicated the need for improving bus services between Horsham and Crawley, in order to provide more attractive alternatives to the private car. This would include provision of bus priority at Moorhead and Faygate roundabouts, in order to improve journey times and bus reliability on this section of the corridor.

Further Local Plan strategic off-site sustainable mitigation measures have been discussed. These would be led by WSCC and supported by funding from the strategic developments and potentially general CIL monies. The ideas are used to inform a level of car trip reduction in addition to the internalisation and the soft measures outlined previously. The car trip reduction rates are input within the Local Plan Forecasts.

Junctions initially identified as requiring further mitigation were analysed to understand whether the capacity shortcomings could be addressed through further sustainable mitigation measures (i.e. those likely to reduce car trips) connected with the Horsham Transport Strategy and to minimise as far as possible the need for physical mitigation. The unmet demand was also determined for each junction.

The proposed measures at the junctions listed below included the prioritisation of active modes and public transport measures, where specifically feasible to reduce localised car trips further, and the general projection of virtual mobility (i.e. increased opportunity to work from home, due to technological advances reducing need to commute and reduce face to face meetings). The effect was to reduce car trips.

In addition, where junctions are signalised and only just over the threshold for requiring mitigation, the signal timings and Volume to Capacity ratio (V/C) on all arms were examined, to explore whether there would be an opportunity to alter the signal timings. This typically involved looking at where the worse performing movement could be given more green time, without unduly impacting upon opposing movements which had plenty of spare capacity.

The following junctions were seen to be only just over the threshold based on the preferred strategy and could be dealt with through the measures above. The junction locations are highlighted within the figure at the end of this Executive Summary.

1. A283 /A29 Roundabouts, Pulborough (Sustainable Measures)
2. A272/A281 Roundabout (Sustainable Measures)
3. A281 Albion Way/Springfield Road Junction (Optimisation of traffic signals)
4. Bar Ln/A24 SB Approach to Buck Barn (Sustainable Measures)
5. Southwater Street/Worthing Rd (Sustainable Measures)
6. Five Oaks Rd/A264 WB Approach (Sustainable Measures)
7. Stane St/New Rd Roundabout (Sustainable Measures)
8. Moorhead Roundabout A264 Approach (Optimisation of traffic signals)

Highway Mitigation

Where it has been demonstrated that sustainable travel measures would not be enough to fully mitigate the impacts of the Local Plan, further mitigation measures have been assessed. It is noted that the mitigation requirements are shown to be lower than the previous 2022 modelling, despite Local Plan developments being higher. This is due to lower levels of growth within the modelling due to COVID impacts and lower DfT growth factors as noted earlier.

The following junctions are shown to require physical mitigation (i.e. some degree of upgrade) within Horsham District (note junctions on the Strategic Road Network (SRN) are looked at separately). The junction locations are highlighted within the figure at the end of this Executive Summary.

1. A24 / A272 Buck Barn
2. A24 / B2237 Hop Oast Roundabout
3. A24/A283 Washington Roundabout

At the A24 Hop Oast roundabout, signalising the roundabout is proposed.

The schemes provided and high-level scheme costs (including 20% Risk and Contingency and 44% Optimism Bias²), are provided within the table below.

High Level Scheme Costs

Scheme	High Level Cost (Including Optimum Bias)
A24 / A272 Buck Barn	£6,044,000
A24 / B2237 Hop Oast Roundabout	£3,629,000
A24/A283 Washington Roundabout	£4,450,000

Strategic Road Network

The assessment of the impacts of the Local Plan on the SRN, has indicated that the A23 is already over capacity within the Reference Case model, due to the amount of additional traffic being added from the south coast towns, travelling north towards the M25 and London, as well as growth from Mid Sussex and Crawley. This additional traffic is resultant from background growth of traffic not related to the Horsham Local Plan developments and therefore the majority of impacts arise due to increases in background growth from elsewhere.

This has made the assessment of the Local Plan impacts difficult, notwithstanding that such impacts are minor compared with background traffic growth. It is therefore recommended that further discussion be held with National Highways to discuss what further means there are to quantify impacts that would specifically arise from Local Plan developments, which in practical terms will mean exploring options for mitigation in a future Road Improvement Strategy (RIS) or other multi-body delivery routes, likely to also include consideration of combined impacts from this Plan and the emerging Mid Sussex Local Plan.

Summary and Conclusions

Modelling has been undertaken to inform this Transport Assessment for the local plan preferred strategy (i.e. the preferred scenario). The work has considered, at a high level, the sustainable travel mitigation and impact on traffic levels across Horsham District and any impacts within neighbouring authorities and on the Strategic Road Network, which in this case is the A23 and M23.

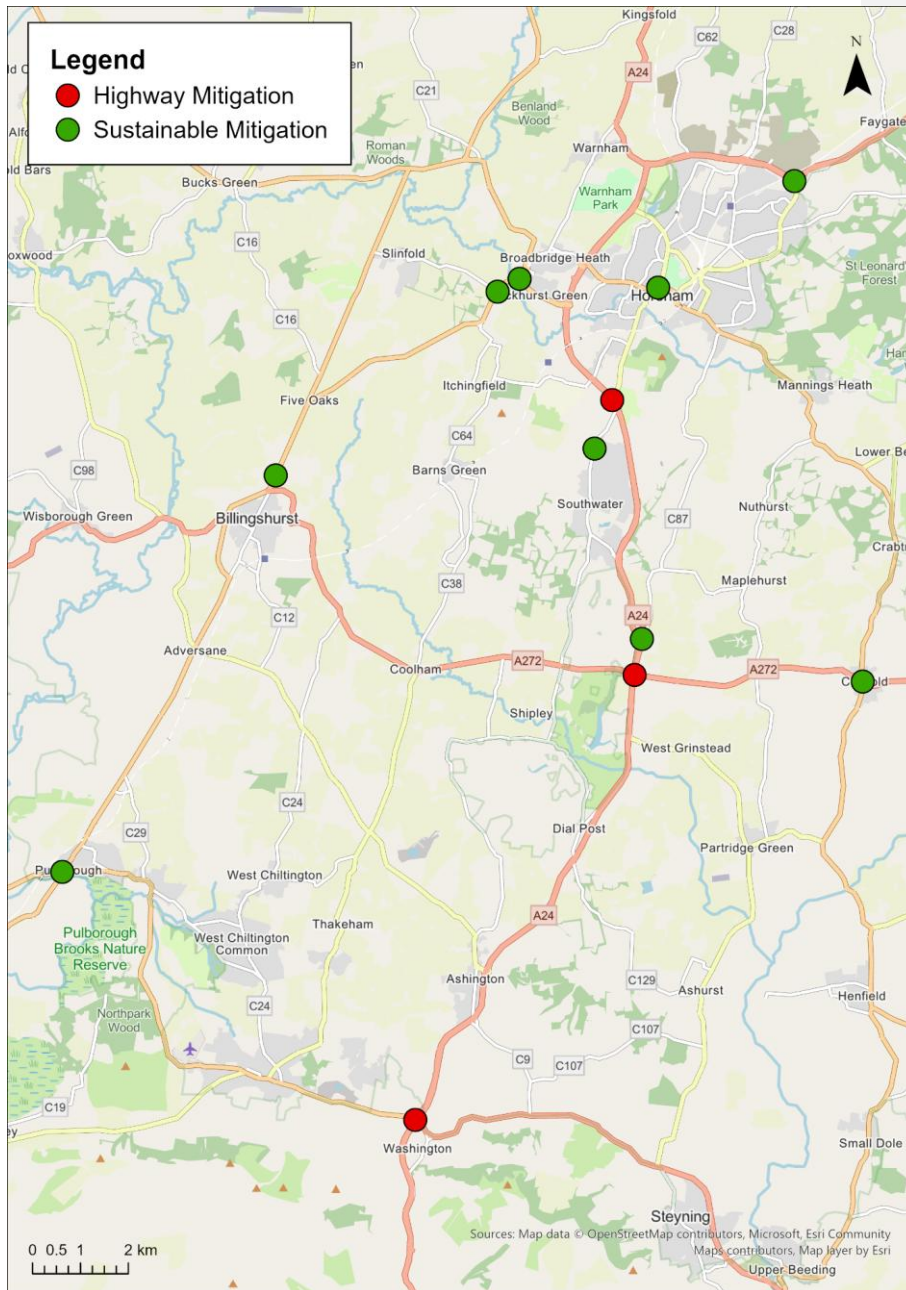
Based on the capacity metrics used within this assessment, the specific mitigation measures implemented ensure that congestion hotspots earmarked within the reference case do not worsen, nor flag any additional junctions as a congestion hotspot. Furthermore, the relative impacts of Local Plan

² Optimism Bias is the recognised inherent bias in underestimating costs, particularly at early stages of projects when risks are unknown. 44% is the figure used by DfT in early stages of projects. See Transport Appraisal Guidance Unit A1.2 Section 3.5 ([TAG UNIT A1.2 Scheme Costs \(publishing.service.gov.uk\)](#))
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growth on the Strategic Road Network against general traffic growth are minor, with no stand-alone Local Plan mitigation currently proposed (further discussion recommended with National Highways).

Limited physical highway mitigation is proposed, with four junctions on the A24 corridor being shown to require mitigation, which is deemed to be deliverable through the Local Plan process.

Proposed sustainable travel measures (physical and non-physical) and highway physical mitigations are shown to alleviate significant increases of congestion which result from the Local Plan preferred scenario. Furthermore, the sustainable travel mitigation measures which have been included within the modelling assessment are deemed to be conservative in terms of the mode shift away from cars, and therefore the physical mitigation requirements shown may be reduced if more ambitious sustainable transport measures and targets proposed by individual site promoters are realised.



Junction Mitigation Locations

1 Introduction

1.1 Background

- 1.1.1 Stantec has been commissioned by Horsham District Council (HDC) to undertake a transport study to inform the emerging Horsham Local Plan. This updates and supersedes the Horsham Transport Study published in December 2022 which accompanied the Regulation 19 Horsham District Local Plan.
- 1.1.2 The purpose of the study was to develop a strategic highway model to underpin the assessment of the Local Plan impacts. This model was then used to undertake testing of the Local Plan developments and evaluate the impact of proposed development scenarios on the strategic and local highway network up to 2040 within Horsham District. The highway impacts in neighbouring authorities and on the Strategic Road network managed by National Highways as a result of Local Plan development within Horsham is also assessed as part of the study.
- 1.1.3 The modelling work will then be used to inform a mitigation strategy that will assist in facilitating development going forward and inform any infrastructure requirements for delivery of the plan.
- 1.1.4 The assessment is undertaken as per DLUHC Planning Practice Guidance, Transport Evidence Bases in Plan Making and Decision Taking (March 2015)³. The mitigation strategy will be required to mitigate the impact of the Local Plan development and as per the guidance the emphasis on mitigation should be delivery of a sustainable transport strategy, which will enable growth, whilst also considering environmental impacts and climate change targets.

1.2 Local Context

- 1.2.1 Horsham is a local government district in West Sussex, the district borders Crawley, Mid Sussex, Mole Valley and Waverley districts (both Surrey), Chichester, Arun and Adur. The Office for National Statistics 2024 population estimate for the district was just above 151,500.
- 1.2.2 Horsham is the main settlement within the district, other major areas of population within being Billingshurst, Storrington & Sullington, Pulborough, Henfield, Southwater, Broadbridge Heath and the Steyning/Bramber/Upper Beeding cluster of villages.
- 1.2.3 The main routes through the district are the A24 travelling north to south from the M25 to Worthing on the south coast, the A272 running through the centre of the Horsham District East to West and the A264 from the A23 to the south west of Crawley, to the A24 to the north east of Horsham.
- 1.2.4 To the south of Horsham is the A27, the main route for east-west traffic along the south coast and to the east of the district is the A23. This is one of the main north-south routes from the south coast (Brighton) to London and, along with the A27, forms part of the National Highways -controlled Strategic Road Network (SRN).
- 1.2.5 Within Horsham itself, the A24 and A264 forms an outer ring road to the West and North. The A264 specifically accommodates traffic movement to/from Horsham and Crawley and traffic onwards to/from Horsham onto the M23.
- 1.2.6 The Horsham District is situated within the Gatwick Diamond, which is a key area of economic growth within West Sussex. Major areas of employment are located within Horsham Town centre. Outside of Horsham, Gatwick airport is a major employment area.

³ <https://www.gov.uk/guidance/transport-evidence-bases-in-plan-making-and-decision-taking>
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1.3 Local Plan Review

- 1.3.1 The Horsham District Planning Framework (Local Plan) was adopted on 27 November 2015. The Framework sets out development proposals and policies to guide and bring forward new development in the district up to 2031.
- 1.3.2 As part of the background evidence base to underpin the District Planning Framework, the “Horsham District Transport and Development Study” was published on 1 April 2014. The study was updated following the publication of the Inspector’s report into the Examination in Public in December 2014. The Inspector’s findings included a requirement for Horsham District Council (HDC) to assess whether the housing level planned in the district could be increased to 15,000 houses over the 20-year Plan period, i.e. an annual housing growth target of 800 dwellings (up from 750 dwellings per year). This Technical Transport Note was published in April 2015.
- 1.3.3 Horsham District Council is now preparing a new Local Plan to replace the current adopted Horsham District Planning Framework (November 2015). The Local Plan Review will set out the vision, spatial strategy policies and new development allocations for the district to meet development needs up to 2040. It will establish the overall amount of new development needed over this period of time and indicate the broad locations for new development, including new strategic-scale development sites. The Council submitted the Horsham District Local Plan 2023-40 to Government in July 2024. The Inspector currently appointed to examine the Plan has made clear that more sites than was included in the submitted Plan, accommodating a significant uplift in housing growth, must be allocated to make the Plan ‘sound’, and the Council has now proposed these changes as main modifications to the submitted Local Plan. This study tests the modified version of the Plan which includes additional site allocations.

1.4 Report Purpose

- 1.4.1 The purpose of this report is to provide a high level, non-technical review of the work undertaken to develop a suitable modelling tool to assess the impact of Local Plan development (including main modifications) and to inform the Transport Evidence Base as part of the Local Plan process and assessment of the Council’s recommended development strategy (the ‘preferred scenario’). This report is supported by Technical Appendices setting out in more detail, the development of the modelling tools and the modelling approach to assess the impacts of the wider development scenarios assessed. This report details the outcomes from the Preferred Local Plan Scenario. Previous work has looked at alternative scenarios, which are referenced within this report and detailed in associated appendices, which sit alongside this report.
- 1.4.2 It should be noted that the quantity and timing of development assumed for this stage of modelling is based at the Council’s best estimate at the time the stage commenced; as strategy emerges, the sites and capacity for development may change as a result of the evolving evidence base or the outcomes of the ongoing examination. It should also be noted that this stage of modelling tests impacts up until 2040.

1.5 Report Structure

- 1.5.1 Following this introduction, the report is set out as follows:
- Section 2 details the Local Plan Scenarios that have been assessed and detailing the preferred scenario.
 - Section 3 provides a high-level overview of the model used within the assessment.
 - Section 4 sets out the sustainable transport measures considered within the assessment.

- Section 5 sets out the initial results of the modelling to identify areas of concern.
- Section 6 sets out the highway mitigation requirements on the West Sussex highway network.
- Section 7 provides commentary on impacts on the Highway's England Strategic Road Network.
- Section 8 provides an overall summary and conclusions from the study.

2 Local Plan Scenario

2.1 Introduction

- 2.1.1 As part of the overall study, a preferred development scenario has been modelled. This preferred scenario has been developed by HDC based on a number of factors, including data from extensive previous transport modelling exercises.
- 2.1.2 For the updated 2040 Local Plan the development of the preferred scenario took into consideration the transport modelling test previously conducted, taking into consideration transport constraints as well as issues relating to water neutrality.
- 2.1.3 Outputs from previous modelling work were published by HDC as part of the Local Plan Review Evidence base⁴. The evidence base included a number of Transport Modelling Reports produced by Stantec in 2021.

2.2 Preferred Scenario

- 2.2.1 The Preferred Scenario strategic development sites modelled and reported within this report are summarised within Table 2-1 and the neighbourhood plan sites summarised within Table 2-2. It is understood that these numbers are interim whilst other evidence is finalised, but are reflective of the scale and distribution of development across the District proposed through the Local Plan Main Modifications.

Table 2-1: Preferred Scenario Strategic Sites

Development Location	Plan Period (Dwellings)	Overall (Dwellings)	Employment - B1 (Plan Period) (M2)	Employment - B2 & B8 (Plan Period) (M2)
Land West of Ifield (SA101)	1,600	3,000	2,700	6,300
Land West of Southwater (SA119)	950	1,000	8,000	16,000
Land at Adversane	1,500	3,200	3,000	11,400
Land East of Billingshurst (SA118)	805	1,000	660	1,540
North Horsham densification (SA296)	500	500	11,000	8,500
TOTAL	5,355	8,700	25,360	43,740

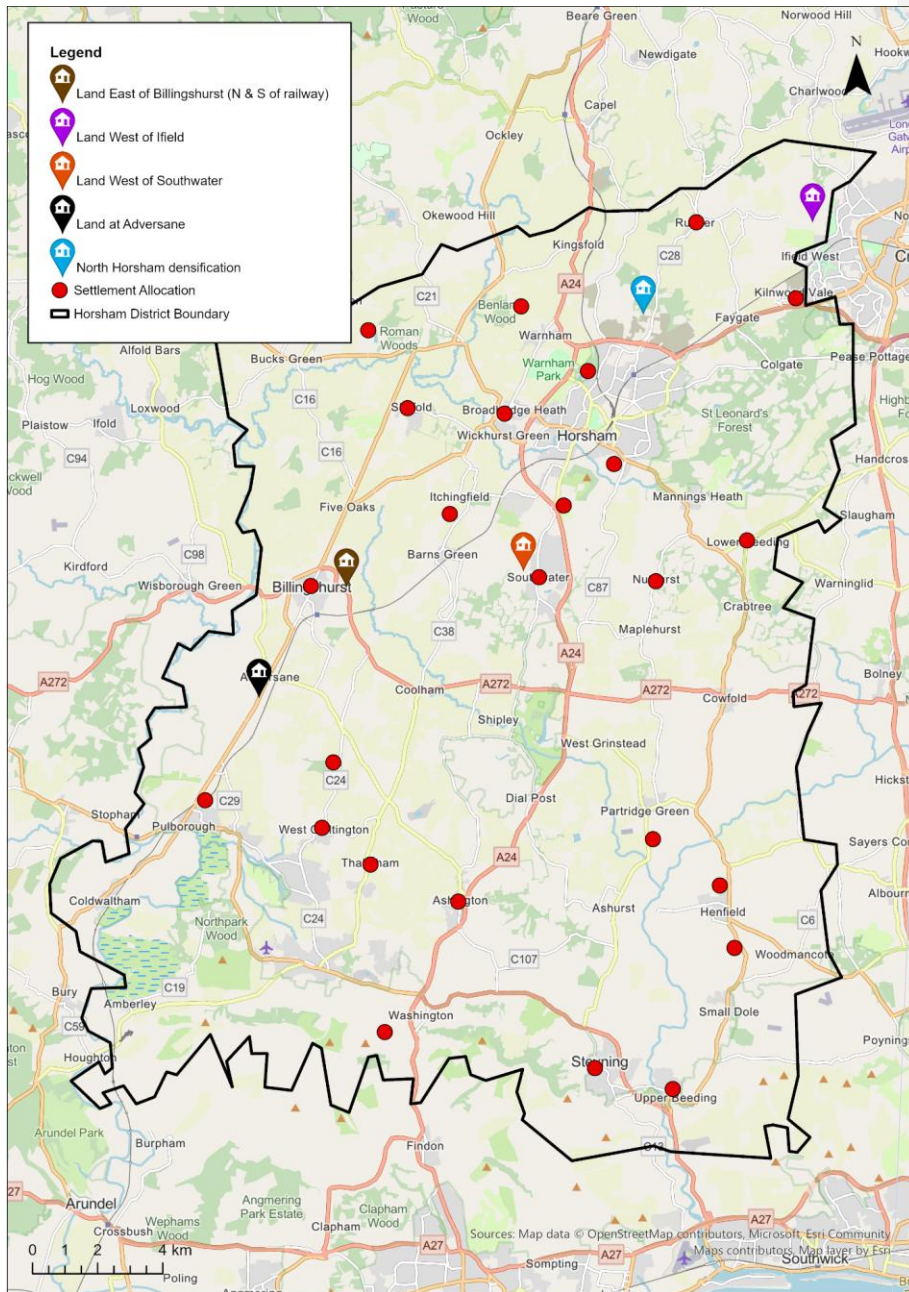
- 2.2.2 Since undertaking the modelling, the number of dwellings planned for the LP period have increased and the numbers could change further. However, the change in numbers would not have a material impact on the modelling at the strategic level undertaken to support the Plan.

⁴ [Local Plan review evidence base | Horsham District Council](#)
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Table 2-2: Preferred Scenario Settlement Sites (non-strategic)

Development Location	Local Plan Allocations delivered in Plan Period (Dwellings)	Neighbourhood Plan Allocations (Dwellings)	Employment - B1 (Plan Period) (M2)	Employment - B2 & B8 (Plan Period) (M2)
Ashington	525	0		
Barns Green	105	0		
Billingshurst	100	0		
Broadbridge Heath	0	0		
Cowfold	100	0		
Henfield	690	34		
Horsham - Forest ward	100	0		
Kilnwood Vale West (Colgate parish)	350	0		
Lower Beeding	43	13		
North Horsham parish	424	0		
Nuthurst	0	9		
Partridge Green	80	0	1,000	8,000
Pulborough	25	48	1,000	6,000
Rudgwick and Bucks Green	105	0		
Rusper	0	0		
Slinfold	0	38		
Small Dole	10	0		
Southwater village	100	0		
Southwater (land to north)	0	0	0	3,000
Steyning	0	0		
Storrington & Sullington	195	30		
Thakeham	0	0		
Upper Beeding	0	19		
Warnham	20	59		
West Chiltington	15	0		
TOTAL	2,987	250	2,000	17,000

2.2.3 Figure 2-1 shows the location of the strategic sites and the neighbourhood allocations within the preferred scenario.



Commented [PG1]: Needs updated - Adversane to be added, settlement allocations to be checked, numbers checked

Commented [SA2R1]: Updated

Figure 2-1: Preferred Scenario Development Locations

3 Transport Modelling

3.1 Overview

- 3.1.1 The modelling tool takes the form of a highway assignment model, known going forward as the Horsham Highway Model (HHM). The HHM has been designed to adequately replicate traffic conditions in order to provide a basis for forecasting future impacts of the local plan.
- 3.1.2 To inform the impact of the Local Plan developments a transport modelling package known as SATURN⁵ has been used. SATURN is a widely used and industry respected software package for highway assignment modelling.
- 3.1.3 One of the main benefits of using SATURN for the assignment process is that it is applicable to both urban and rural networks and can model peak hour congestion in sufficient detail. As a combined simulation and assignment model, SATURN also has the advantage that it enables detailed junction modelling.
- 3.1.4 The model in question is a highway assignment model only and uses a fixed trip matrix approach, as such the simulation only focuses on vehicle route choice change only. By using a fixed trip matrix, this means the model does not consider changes in travel behaviour or change in mode (i.e. to public transport, cycling or walking) as a result of increased car costs caused by congestion.
- 3.1.5 The fixed trip matrix approach is seen to be proportionate for the purposes of the Local Plan study, which is strategic in nature and concerned with the overall impacts of development across Horsham district.
- 3.1.6 During the process of model development, West Sussex County Council and Highways England have been regularly engaged. They have provided feedback on the modelling process and outputs from the modelling process, which have been taken on board throughout the model development process.

3.2 Base Year Model Development

Model Area

- 3.2.1 The HHM covers the entire Horsham District, along with some additional network in the immediate surrounding area, including the M23/A23 Strategic Road Network, which is managed by National Highways and any areas outside of Horsham, but within the model area. The model will be able to provide additional Local Plan flows in neighbouring areas. The model area is shown in Figure 3.1.

⁵ <https://saturnsoftware2.co.uk/>
Horsham Local Plan 2040 Transport Assessment v4 0.docx

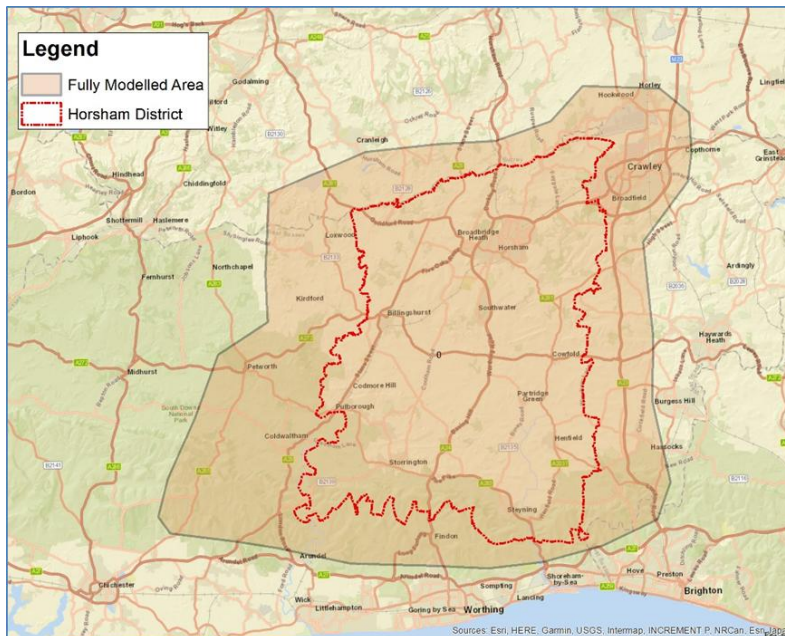


Figure 3-1: Horsham Highway Model Area

Data

3.2.2 In order to develop the model a lot of data is required. This is used to develop the trip matrices. This includes existing and newly collected data. The types of existing and new collected data comprise:

- Automatic Traffic Counts (ATC)
- Manual Classified Turning Counts (MCTC)
- Journey Time data
- Mobile network data for matrix building
- Traffic Signal Data

3.2.3 More detail and analysis of the data that has been used in developing the HHM is reported in the Horsham Transport Study, Horsham Transport Model Data Report, Stantec, (29/06/2020). This report is attached as Appendix A.

Model Development and Validation - Overview

3.2.4 An overview of the model build process is provided below. More technical detail on the model development and the model validation is provided within the *Horsham Transport Study, Local Model Validation Report*, Stantec, (29/06/2020), which is attached as Appendix B.

3.2.5 The model is made up of a highway network (supply) and a matrix of trips (demand). In broad terms the network is made up of a series of junctions (known as nodes) and sections of road

between junctions (known as links) and represents the roads and junctions within the study area shown in figure 3.1.

- 3.2.6 The model has been developed with a base year of 2019 as the majority of the data used in the model development was collected in May 2019. A proxy base of 2025 was created as per TAG to account for the impact of COVID which was shown to have reduced the level of trips in Horsham. This is noted further in Section 3.3.
- 3.2.7 Models have been developed to reflect the worst traffic conditions on a typical weekday. This would represent a period during school term time and avoid large scale events or periods within the year, where traffic conditions may not be typical i.e. Christmas. No weekend modelling has been undertaken. Two weekday time periods have been represented within the model:
- AM Peak hour (0800-0900).
 - PM Peak hour (1700-1800).
- 3.2.8 The peak hours modelled were confirmed using count data.
- 3.2.9 The following vehicle types have been included within the model:
- Car;
 - Light Goods Vehicles; and
 - Heavy Goods Vehicles.
- 3.2.10 Vehicle trips are further classified by travel or trip purpose resulting in five user classes in the model:
- Car Commuting (CarCom)
 - Car Other (CarOth)
 - Car Employer Business (CarEB)
 - Light Goods Vehicles (LGV);
 - Heavy Goods Vehicles.
- 3.2.11 The model area is split into a number of zones, and a matrix is developed to represent all trips between each of these zones, using the mobile network data as a starting point. The zones are based on census geography as this simplifies the use of available data including existing and future population data available from the Office for National Statistics. Within the main study area, zones are smaller, with larger zones further away from the study area. Figure 3.2 shows the zoning in Horsham District and Figure 3.3 shows the wider zoning. Several zones have been further disaggregated in order to provide refined geographically constraint to zone loading choice, i.e., the initial Lower Super Output Areas (LSOA's)⁶ were judged too large and zone loading was judged too geographically coarse. This is particularly the case in built up areas, such as Horsham.

⁶ Office for National Statistics reports data and statistics in the UK at different levels, which includes Output Areas. Lower Super Output Areas are the lowest level (smallest areas) that the data is broken down into. The next level is Middle Super Output Areas (MSOA's)
Horsham Local Plan 2040 Transport Assessment v4 0.docx

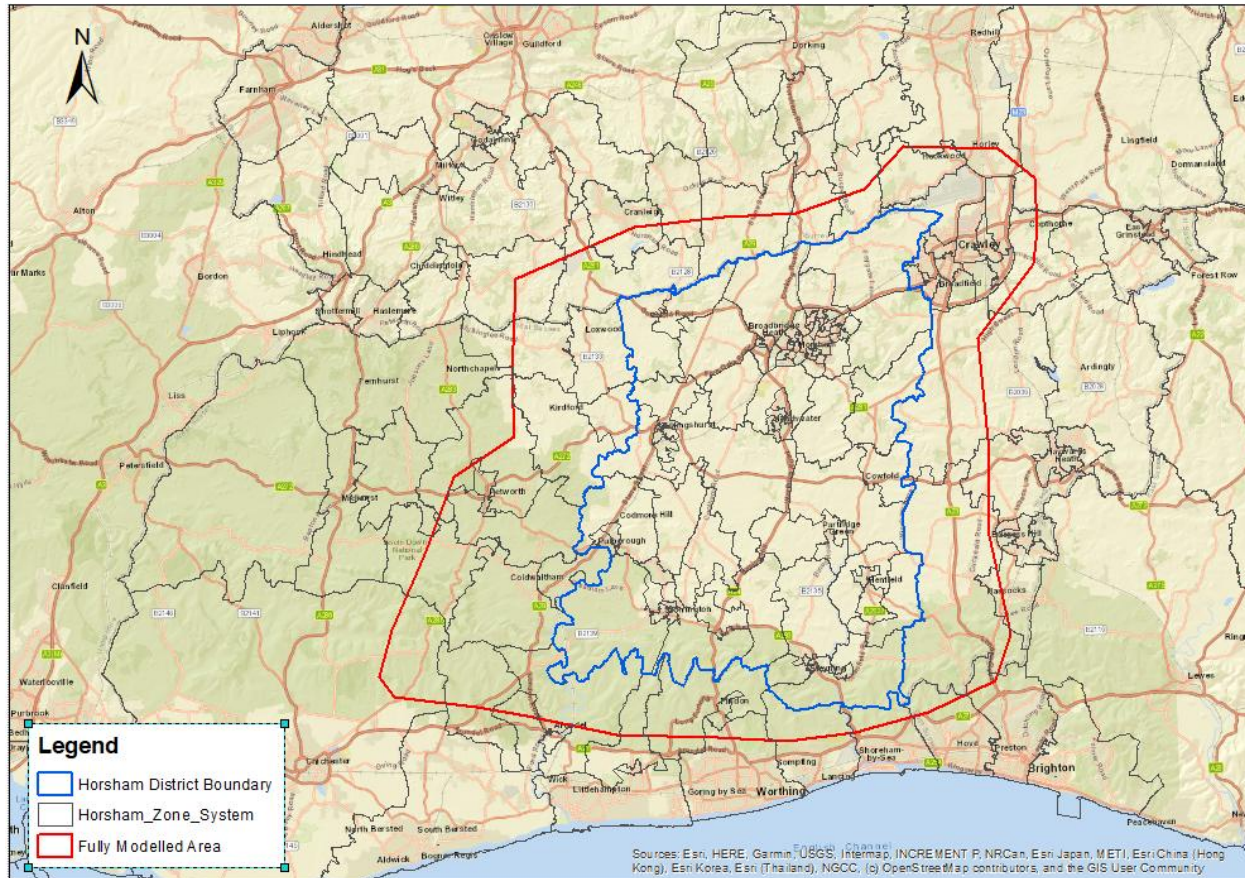


Figure 3-2: Horsham District Zones
Horsham Local Plan 2040 Transport Assessment v4 0.docx

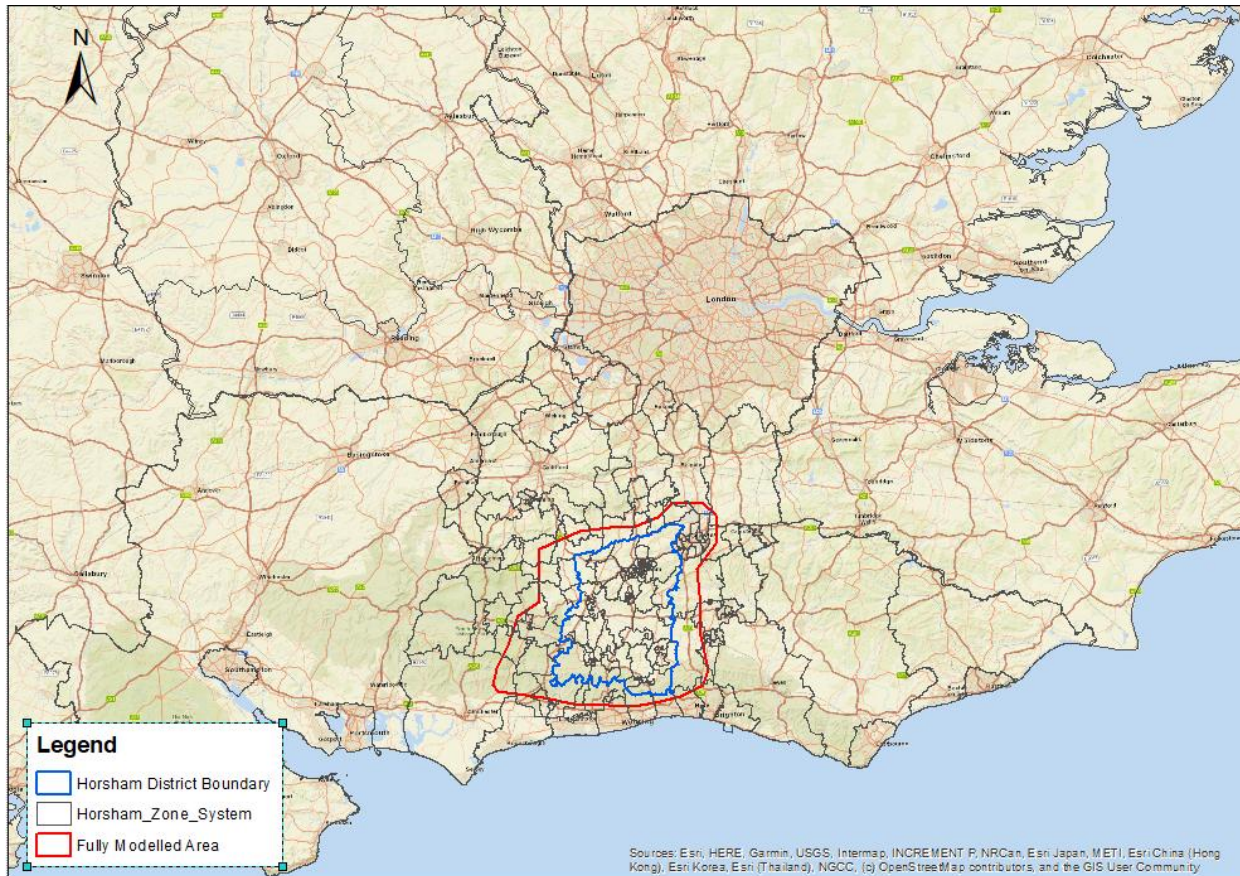


Figure 3-3: Wider Area Model Zones
Horsham Local Plan 2040 Transport Assessment v4 0.docx

- 3.2.12 Zones are connected to the network using a series of connectors, otherwise known as zone centroid connectors, which reflect points where trips from a zone are loaded on to the network. The trip matrix is then assigned to the network.
- 3.2.13 Once the trips are assigned to the network a process of calibration and validation is undertaken. The process for this follows best practice and guidance produced by Department for Transport, known as Transport Appraisal Guidance (TAG).
- 3.2.14 The criteria of achieving an adequate replication or validation of traffic conditions for the base year model are provided within TAG Unit M3.17. In addition to validation, model convergence is important. This demonstrates the stability of a model, such that the model reaches a point of relative equilibrium between changes in cost of travel and changes in trip route choice (assignment).
- 3.2.15 As reported within the Local Model Validation Report, the model is shown to be adequately validated when comparing the modelled flows and journey times against observed data. The model is also shown to converge within the relevant criteria provided within the TAG guidance. The base year model development process and validation have been agreed with West Sussex County Council and National Highways and is therefore deemed suitable for undertaking the testing of the Local Plan Scenarios.

3.3 Reference Case Forecast Model Development

- 3.3.1 This section provides an overview to the development of the Reference Case Models.
- 3.3.2 Given the age of the model and the impact of COVID on travel behaviour, an initial modelling step was undertaken to reflect observed changes in traffic conditions within the district. A comparison of observed 2019 data with 2025 data was undertaken and a set of factors developed, which were applied to the 2019 matrices, to create a proxy 2025 model. The 2025 model is then used as the basis for development of the Reference Case Forecast Model. This is detailed further in *TN01 - Horsham Local Plan 2040 - Traffic Data Review v2 0*, Stantec, April 2026 attached as Appendix C.
- 3.3.3 This exercise highlighted that there has been no real growth in traffic between 2019 and 2025, and in some instances, there has been a fall in traffic levels in the peak hours. This has meant that the six years of growth between 2019 and 2025 included within the modelling undertaken in 2022, will no longer be included within the models and will explain why the results between the two sets of assessment are not directly comparable, despite the current iteration of modelling, including higher levels of Local plan growth.
- 3.3.4 The technical detail pertained to the development of the 2040 Reference Case model is covered within the *Horsham Local Plan - 2040 Reference Case Model Update v2 0*, Stantec, May 2026 attached as Appendix D.
- 3.3.5 In order to inform the Local Plan Review transport evidence base, Reference Case models have been produced to represent a forecast year of 2040. These consider committed growth in Horsham up to 2040, committed growth in neighbouring authorities and background growth.
- 3.3.6 Traffic growth has been applied to the 2025 Model to account for forecast changes in traffic demand that is projected to occur regardless of the additional development now being considered as part of the Local Plan scenario testing.
- 3.3.7 The Reference Case Forecasting is set out by establishing predicted changes between the base year model and a future year scenario or conditions. In order to establish robust traffic forecasts the Reference case model has been developed in accordance with DfT TAG forecasting guidance. The guidance helps limit and define uncertainty around assumptions

7

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/427124/webtag-tag-unit-m3-1-highway-assignment-modelling.pdf

and traffic growth forecasts that feed into the reference case. This includes guidance on the development of an uncertainty log which summarises all known assumptions that feed into the model and the level of certainty of each assumption. Also, DfT TAG provides guidance on the application of background growth assumptions stemming from the National Trip End Model (NTEM).

- 3.3.8 The Reference Case model is used as the basis of comparison with emerging Local Plan scenarios and will inform the transport mitigation that would be required to deliver the Local Plan growth in transport terms. The Reference Case therefore includes all growth up to 2040 which results from development in neighbouring authorities and growth in Horsham District, excluding likely growth associated with emerging Local Plan. The Reference Case presents a picture of highway conditions, prior to the addition of the emerging Local Plan developments. The growth included within the Reference Case model is described below. Full details of the developments included within the Reference Case are also provided in the report Appendix D.
- 3.3.9 Information feeding into the reference case assumptions includes data (housing numbers, employment size) on developments and highway infrastructure schemes that are either committed through the planning system or have a high probability that the outcome will happen as they are within adopted Local Plans or within Neighbourhood Plans, and trip rates associated with new developments.
- 3.3.10 The trip rates are used to derive the number of trips which each development included will produce. These are represented by trips to and from developments and are included within the model at a zonal level. Trips rates are derived for different land use types, and these are shown in Tables 3-1. These are derived from TRICS, which is an industry standard tool used for such purposes. The derivation of the trip rates is provided within Appendix E.

Table 3-1: Trips Rates

Land Use	AM Peak (0800-0900)			PM Peak (0800-0900)		
	In	Out	Total	In	Out	Total
Residential (Trips per Household)	0.172	0.405	0.577	0.355	0.155	0.51
Business (B1) (Trips per 100sqm)	1.534	0.159	1.693	0.168	1.296	1.464
Storage or Distribution (B8) (Trips per 100sqm)	0.074	0.059	0.133	0.044	0.092	0.136

- 3.3.11 The trip rates used have also been reviewed against trip rates used within the transport assessments undertaken for Land North of Rectory Lane (Ashington), West of Southwater (first phase) and Land South of Marringden, Billingshurst and the trip rates are shown to be consistent.
- 3.3.12 Due to the limited data available of internalisation rates for large mixed land use “garden village” type sites within the TRICS database, the recently approved North Horsham ‘Mowbray’ development has been used to inform a level of internalisation. The Transport Assessment study for the ‘Mowbray’ development concluded an internalisation car trip reduction rate of 12%. The manual calculation of internalisation is deemed acceptable and the rate of internalisation of 12% is deemed to be a conservative (i.e. worst-case) estimate. Data from initial build outs is not available,

- 3.3.13 As each of the strategic sites are expected to have an element of employment, as well as housing and ancillary land uses (education, local shops, etc), it is felt that applying the 12% internalisation rate to all Local Plan strategic sites is appropriate.
- 3.3.14 Trips from committed development sites have been distributed between zones based on existing zones within the model. This is standard practice and assumes that trip making patterns for new developments will be similar to existing trip making patterns.
- 3.3.15 As well as incorporating any committed development within the Horsham district into the reference case scenario, further committed developments within neighbouring authorities are also included. Developments within neighbouring authorities have been reviewed at a case-by-case basis and have only been included if assumed to have a perceptible impact to the Horsham highway network. Only developments of 20 or more dwellings are included explicitly, both within Horsham and in neighbouring authorities.
- 3.3.16 In addition, background growth assumptions have been applied to neighbouring authorities through growth rates. These growth rates are derived from national assumptions providing background growth in travel demand, produced by the DfT through the National Trip End Model (NTEM) dataset and extracted using the DfT TEMPro software. This dataset provides growth rates for any given year, based on housing growth, increases in job numbers and demographic changes at a District/Borough level and is a recognised source of data for the purposes of producing forecast transport models of this nature. Any known committed developments plus adopted Local Plan developments are included in neighbouring authorities. The growth is then compared to NTEM, within these areas and any additional growth then added on top, such that the growth matches that included within NTEM.
- 3.3.17 It should be noted that the latest version of NTEM has been used and supersedes the version used in the previous modelling exercise. This latest version has lower growth factors.

3.4 Committed Highway Schemes

- 3.4.1 The following highway schemes have been included within the Reference Case Models:

Committed Highway Schemes
A24 Robin Hood Roundabout (Horsham)
A281 Newbridge Roundabout, Broadbridge Heath (Horsham)
Horsham Enterprise Park Access (Horsham)
A23 / A2220 Cheals Roundabout (Crawley)
A29 / Brinsbury Fields access, Adversane (Horsham)
New Road, East Billingshurst (Horsham)
North Horsham Development Committed Infrastructure (Horsham)
A2011 Crawley Avenue / A2004 Northgate Avenue / Hazelwick Avenue Proposed Improvements (Crawley)
Ifield Avenue / Ifield Drive (Crawley)
M23 Smart Motorway
M23 J11 improvements (Crawley)
A264 / Calvert Link, Kilnwood Vale Main Access (Crawley)
A2300 Dualling (Mid Sussex)
A264 Cophorne Way roundabout development access (Mid Sussex)
B2114 Brighton Road Pease Pottage (Mid Sussex)
Access improvements at A2037 Henfield Road
A283/B2135/Horsham Road, Steyning
A23 Bolney Slip Rd / A272 Cowfold Road Improvements (Mid Sussex)

3.4.2 The model performance is demonstrated by the level of model convergence. It can be confirmed that model performance is acceptable, with model converging to acceptable criteria as set within DfT guidance. As such impacts of congestion and re-routing through the iterative model convergence process is stable and therefore can be concluded to be rational. The convergence statistics can be found within Appendix D.

3.5 Local Plan Scenario Modelling

- 3.5.1 Each Local Plan site has its own zone within the model and zone loading added, such that traffic is assigned on to the network appropriately. The zone loading has been agreed with WSCC.
- 3.5.2 As with the Reference Case developments, trip rates for Local Plan sites utilises TRICS. The same rates have been used as provided in Table 3-1. TRICS was reviewed to understand the differences in trip generation characteristics between each location type. From this review and edge of town data was deemed to be the most appropriate in the context of the Local Plan modelling. TRICS does not include data for standalone residential sites and therefore these edge of town sites were also deemed as the most appropriate rates for the strategic sites modelled. Further reduction in trips will be applied for trip internalisation and when sustainable transport mitigation is considered later in the study.
- 3.5.3 Where there are large strategic sites which include both residential and employment allocations, trip internalisation has been considered and a reduction in trips has been applied of 12%, which is consistent with the reduction agreed as part of the planning application for North Horsham development, which is included as a committed development. The use of the North Horsham site was previously discussed in paragraph 3.3.10. This reduction is applied at this early stage and is deemed to reflect the fact that some trips which may normally go off site would be made solely on site e.g. education trips where it would be expected that schools would be provided and some employment trips, where the strategic sites would include a level of employment.
- 3.5.4 Trip distribution has been applied utilising existing zones with a similar land use, close to the Local Plan development sites. The zones used for this process are tabulated in Appendix F.
- 3.5.5 At this stage, no changes were made to the highway network, apart from any essential infrastructure associated with developments e.g. a new access road into the site. The essential infrastructure has been agreed with HDC and WSCC.
- 3.5.6 A sensitivity test has been carried out to understand the impacts of the current traffic signals in Pulborough as a result of the landslip. It has been assumed for the main test that the signals will be removed, and the sensitivity test has the signals remaining.

4 Application of Sustainable Mitigation Measures

4.1 Overview

- 4.1.1 This chapter provides an overview of the methodology for modelling the impact of sustainable travel measures and strategies used within the "With Mitigation" scenario testing for the Preferred Local Plan scenario.
- 4.1.2 Mitigation considerations are formed by sustainable transport measures, as well as physical highway mitigation. The mitigation measures aim to ensure that the positive impacts of developments in Horsham are not undermined by adverse impacts arising from additional traffic.
- 4.1.3 The primary focus is on reducing the need to travel in the first place, prioritising sustainable transport and ensuring the effective and efficient operation of the Horsham transport network.
- 4.1.4 The initial strategic transport modelling forecasting of the strategic developments have been carried out based on DfT assumptions about vehicle trip growth in the future (NTEM) and strategic development trip rate assumptions based on available observed information stemming from the TRICS database, as detailed in Section 3. The outputs at that stage accounted for a 12% internalisation reduction factor which was applied to the strategic development mixed used sites, where there is expected to be a mix of housing, employment, schools and other local services, which would reduce the need to travel out of the immediate site. The internalisation rate is based on previous evidence gathered for the North Horsham development. The internalisation rate is also in line with that seen in TRICS for a mixed-use site located at Camborne to the west of Cambridge (noting that this is the only mixed-use site with data available within TRICS database).
- 4.1.5 Beyond this, further reductions have been applied to account for sustainable transport measures which may have an impact on trips outside of the development sites and the methodology set out below is based on a recognised approach, using empirical evidence from Department for Transport (DfT) studies and has been used by Stantec for similar Local Plan Transport Modelling projects for Chichester District Council and Brentwood Borough Council. This approach has also been agreed with National Highways in both instances. The sustainable travel measures align with any emerging schemes and approaches that appear within the Infrastructure Delivery Plan or are being promoted by specific site developers.
- 4.1.6 A final step has been undertaken at a site-by-site basis to include further trip reductions aligned with specific measures, associated with individual strategic sites.
- 4.1.7 Whilst there is an ambition to minimise travel outside the site through internalisation of trips and maximise sustainable modes, there is also a need to have a realistic level of trip reduction, which can be applied. The approach set out is felt to be a pragmatic and proportionate approach, given the level of uncertainty as to what sustainable mitigation could be introduced at each site and the level of reduction that could realistically be achieved.
- 4.1.8 Within the context of the modelling, the trip reduction process is undertaken manually, and the approach set out below provides conservative estimates, which will not account for the potential impacts of more ambitious measures that may be promoted by site developers.

4.2 Sustainable Transport Measures

- 4.2.1 The clear aim of a sustainable transport strategy is to promote and encourage more sustainable ways for people to move and to reduce the need for trips to be made by the private car. This will involve a mixture of hard (i.e. physical) measures and infrastructure such as improved public transport, cycling and walking facilities which link the Local Plan sites to key destinations. There will also be a need to reduce the need to travel by providing sustainable communities, which offer residents places to work, educate their children and to

utilise other facilities including shops, leisure and health facilities where applicable. These measures would be supported by softer measures, comprising packages including personal travel planning, travel awareness campaigns, cycling and walking promotion, public transport information and marketing, school travel planning, workplace travel planning and the development of a strong brand identity.

4.2.2 Research published by the DfT demonstrates that there is a benefit from implementing Travel Plans and sustainable travel measures to achieve a mode shift from car use. This includes the following research:

- 'Making Personal Travel Plans Work' (DfT, 2007) – this reports a reduction in single occupancy vehicle trips of 12% across 12 DfT areas following to implementation of Personalised Travel Planning
- 'Smarter Choices – Changing the Way We Travel' (DfT, 2005) reports a reduction of between 5% and 9% in single occupancy vehicle trips in non-urban areas for commuting journeys following the implementation of a Workplace Travel Plan. The sites considered in this research included a wide range of employers in differing locations implementing a variety of measures.
- The report on "The Effects of Smarter Choice Programmes in the Sustainable Travel Towns": Full Report (Sloman et al., 2010)

4.2.3 Some of the headline results from "The Effects of Smarter Choice Programmes in the Sustainable Travel Towns" report include:

- Car driver trips per resident of the three towns taken together fell by 9% between 2004 and 2008.
- Car driver distance per resident fell by 5% to 7% (for trips of 50km or less). Car use per head also fell nationally in comparable (medium-sized) urban areas during this period, but by a much smaller amount: a change of -1.2% for car driver trips and -0.9% for car driver distance.
- Overall reductions in car traffic (based on counts) of the order of 2%, and more substantial reductions in inner areas, of the order of 7 to 8% overall.
- Bus use grew substantially in Peterborough and Worcester during the period of the Sustainable Travel Town work, whereas it declined in Darlington. Bus trips per resident of the three towns taken together increased by 10% to 20% (for trips of 50km or over) whereas there was a national decline of bus trips in medium-sized towns of 0.5% over the same period.
- There were positive results for cycling in all three towns, with particularly substantial growth in Darlington. Cycle trips per resident of the three towns taken together increased by 26 to 30%, whereas, according to the National Travel Survey, there was a national decline of cycle trips in medium-sized towns over a similar period.
- Walking trips by residents grew in all three towns during the period of the Sustainable Travel Town work. Walk trips per resident of the three towns taken together increased by 10% to 13%, whereas, according to the National Travel Survey, there was a national decline in walk trips in medium-sized towns of at least 9% over a similar period.
- The growth in bus use, cycling and walking cannot be explained by trip generation. In fact, at the aggregate level, the total number of trips per capita by all modes, as recorded in household surveys, fell by 1.1%

4.2.4 Although the largest behaviour changes were seen in short car driver trips, the largest reductions in distance travelled as a car driver came from medium and longer distance trips. Of the reduction in distance travelled for trips of <50km, about 45% of the reduction in car

driver kilometres came from trips of 10 to 50km; about 40% from trips of 3 to 10km; and about 15% from trips of less than 3km. Table 4-1: shows the car trip reductions by distance from the Sustainable Travel Towns study.

Table 4-1: Trip Reductions Applied to Local Plan Sites

	Up to 1km	1.1 – 3km	3.1 – 5km	5.1 – 10km	10.1 – 50km	Over 50km	Total
Car Trip Reduction	-22%	-14%	-10%	-6%	-3%	0%	-9%

- 4.2.5 The above evidence indicates that through a targeted approach to promoting and providing sustainable travel options, a reduction in distance travelled by car can be achieved.
- 4.2.6 To meet the requirements of NPPF and to be consistent with the guidance for Local Plans, the emphasis needs to be on sustainable transport and its foundation. The Local Plan offers up this opportunity within Horsham to provide a comprehensive sustainable transport strategy, aligned with growth, which will provide greater opportunities for all and move away from the emphasis being on physical highway mitigation, which is shown to only provide a short-term solution if nothing else is done. This aligns with the aims of the Transport Infrastructure Monitoring Group (TIMG) which reflects the vision-led approach to plan-making and provides a means of maximising sustainable mode share. The TIMG has been set up to support delivery of the Plan.
- 4.2.7 The principles of sustainable travel have been applied through the use of the Sustainable Travel Towns study. It is noted that in the case of the sites within Horsham District, many of these are more rural in nature than the towns within the Sustainable Travel Towns and the level of trip reduction for off-site trips would be expected to be lower. The off-site trips from these sites within the model will be more focused on longer distance trips (as people will need to travel further for jobs, facilities etc. that are off-site), therefore applying the reductions at the distance-based level will mean that trip reductions will be relatively low.
- 4.2.8 The application of the distanced based reductions will reflect the nature of the site location. The proportion of short distance trips for edge of town and urban sites in comparison to sites which are more rural and further away from larger centres of employment or population will be shown to have a greater reduction within the model, as residents from edge of town and urban site areas will have, for example, more employment locations which are reasonably close by, whereas a more rural destination, commuters would have to travel further. As such it can be expected that the model will reflect the greater car trip reduction impact for urban and edge of town sites in comparison to more rural sites. By the very nature of being closer to existing facilities, sites located on the edge of existing settlement would be expected to have more short distance trips, as they will have more facilities and attractions closer by and this would be reflected within the model for these sites and the trip making patterns, when compared to the more rural sites.
- 4.2.9 Given the nature and location of the Strategic Sites within Horsham and the zone structure of the model, there are few short distance trips within the trip matrix and therefore reductions are small, however, this is off set for shorter distance trips by the previous reductions made to reflect trip internalisation. This confirms that there is not an element of double counting of reduction in these short distance trips.
- 4.2.10 Once the reductions have been made to the model, sense checks have been undertaken to analyse the variance in impacts and an exercise to cross reference the reduction with available information sent through from site promoters regarding expected mode share and mode shift will be undertaken. This will confirm that the reduction of car trips is realistic and acceptable prior to consideration of physical highway mitigation.

4.3 Site Specific Sustainable Transport Considerations

- 4.3.1 In addition to the sustainable transport measures outlined above, further physical site-specific mitigation measures have been discussed and agreed in principle with WSCC. Ideas have been set out below and these have been considered for each of the Horsham LP strategic sites. The ideas are used to inform a level of car trip reduction in addition to the internalisation and the sustainable measures outlined previously.
- 4.3.2 The sustainable measures outlined previously include the following:
- 12% internalisation reduction
 - Distance based trip reduction outline in Section 4.2 and Table 4.1
- 4.3.3 Further information of sustainable measures and potential reductions is summarised below. The level of reduction applied on a site-specific basis within the modelling is discussed in Section 4.4. The schemes highlighted below would be expected to be delivered as part of site-specific measures, in order to meet trip reduction targets.
- 4.3.4 The site-specific measures demonstrate the level of ambition put forward by site promoters and aspirations of WSCC to promote more sustainable means of travel. Some have been listed for specific sites but may be appropriate for more than one strategic location, to help alleviate the traffic impacts and promote more sustainable means of travel.
- 4.3.5 Examples of typical site-specific proposed mitigation measures that could be expected for individual developments are outlined below. These are to provide an indication of the typical measures that site promoters could bring forward, rather than a definitive list of all measure that would come forward. The measures listed for each site are proposed at this stage and not final solutions to achieve the stated objectives. Further analysis, design, negotiations and feasibility analysis are required including at pre-application and application stage to ensure delivery thereof and achieving the overall performance outcomes.
- 4.3.6 However, it should be noted that these specific bus measures are not being relied upon for the delivery of the Local Plan mitigation but are instead complementary measures that will help achieve sustainable mode share in the longer term.
- 4.3.7 The proposals are indicative potential schemes that would require further exploration as to their feasibility and prioritisation to take forward in future. This would include getting views from the current bus operator (Metrobus) about which of these would provide the greatest speed, reliability and/or efficiency benefits for their network, with a view to sifting and prioritising the schemes within the list.

East of Billingshurst

- Frequent bus service to Horsham
- Local/personal mobility solutions / "MAAS" – electric buggies/vehicles – travel on demand to/from station and town centre
- Cycleway / footpath network including:
 - Cycle/pedestrian only connection to Broomfield Drive
 - Cycle/pedestrian connection to Brookers Road - employment area + cycle route to Weald School
 - Bus and cycle/pedestrian connection to Daux Rd - employment area and route to rail station
 - Cycle/ped connection to Daux Avenue

Southwater

- Pedestrian and cycle link within site to Two Mile Ash Road, enhancing access between Christ's Hospital Road and the site.
- Cycling Scheme on Two Mile Ash Road and PRoW 1639_1 to enhance access to Horsham Town Centre.
- Traffic calming measures on Two Mile Ash Road.
- Hop Oast Roundabout signalisation, with signal controlled NMU crossing facilities to be provided across the A24 arm, with additional option for bus priority measures.
- Contribution enhancements to the existing 23 bus service, improving frequency to Horsham Town Centre and rail station. Potential for the service to route through the northern part of the site, including new bus stops.
- Cycling improvement scheme on Southwater Street to connect into improvements delivered on Lovers Lane.
- Enhanced pedestrian and cycling infrastructure, including new crossing on Worthing Road.
- Active Travel connections to Downs Link / NCN223 provided within the site with a section of Downs Link upgraded as part of the development with further contributions for the wider improvements to the Downs Link.
- Comprehensive network of walking and cycling routes to be provided within the site, including a new 5km trim trail. PRoWs within the site retained and enhanced. The site spine road to be fully LTN1/20 compliant with high quality walking and cycling infrastructure. Cycle and EV car parking provision to be provided on site.
- Active Travel enhancements on Christ's Hospital Road to improve access to the rail station.
- Potential additional car parking and midi-bus turning facilities at Christ's Hospital rail station.

North Horsham Densification

- Expand upon walking / cycling network in North Horsham
- Increase frequency of buses to Horsham and Crawley – 10 mins overall
- Improve cycle/walking links across A264 and into Horsham further – cycle/bus priority at Rusper Rd / A264 junction.
- Improve cycle parking at Horsham station
- Cycle route to Crawley / West of Ifield development
- Modify junctions on A264 North Horsham Bypass.
- Contribute to major high capacity and frequency bus priority corridor scheme Horsham – Crawley & West of Ifield

West of Ifield

- Contribute to major high capacity – BRT bus routes

- Phase 1 route: into Crawley and on to Manor Royal and Gatwick Airport – via Ifield Station and Three Bridges Station – high frequency and high quality 'Fastway' service
 - Phase 2 route: uses the CWLR (Link Road) to Manor Royal and Gatwick Airport in addition to route for phase 1
 - Eventual frequencies of both services would be very high (each being 8 minutes of better)
- Bus priority in Crawley
 - Bus only – Rusper Road
 - Bus only provision Ifield Drive to Crawley Avenue
 - Bus priority in the town centre
 - Improvements to bus station
 - Bus priority at Three Bridges station
 - Interchange improvements at Three Bridges
 - High quality bus provision throughout CWLR
 - Bus lanes over the entire length
 - High bus priority at all junctions
 - High quality bus provision throughout the site
 - High bus priority at all junctions
 - Provision of segregated bus lanes
 - Full suite of supporting sustainable transport package including Transport on Demand, Shared Transport solutions, MaaS, Behaviour Change, Micromobility and Active Travel Solutions (including an extensive e-bike hire scheme)

Land at Adversane

- Provision of a new public transport bus service to service the site and Billingham, including the railway station. Bus stops are to be provided on site within 400m of all residents.

A264 Horsham to Crawley Bus Priority Measures

- 4.3.8 A number of the site promoters have indicated the need for improving bus services between Horsham and Crawley, in order to provide more attractive alternatives to the private car.
- 4.3.9 This would include provision of bus priority at Moorhead and Faygate roundabouts, in order to improve journey times and bus reliability on this section of the corridor. The modelling indicates the following level of delay at Moorhead Roundabout in the 'With Development' Model:

AM Peak

- B2195 NB approach – 43 secs delay
- A264 EB approach – 11 secs delay
- A264 WB approach – 12 secs delay

PM Peak

- B2195 NB approach – 43 secs delay

- A264 EB approach – 12 secs delay
- A264 WB approach – 67 secs delay

4.3.10 At Faygate, the A264 approaches to the roundabout could be widened to provide a bus lane. A bus pre-signal would then be provided to allow buses to return to the general carriageway prior to entering the roundabout. This would alleviate any need for widening the carriageway on the roundabout.

4.3.11 At Moorhead, buses could utilise Old Crawley Road. This would require a new traffic signal at the eastern end to allow buses to turn right on to the A264 heading towards Crawley. The signal would be vehicle activated, only allowing buses to make this turn. There may be a need to widen the carriageway at the western end to provide an improved right turn ghost island for buses (and general vehicles) to turn right from Crawley Road.

4.4 Reduction in Car Trips

4.4.1 In terms of modelling, each of the measures above is not explicitly modelled, however these have been used to inform a site-specific level of reduction in trips based on categorising the sustainable mitigation of each development into low, medium or high impact as referenced in Table 4.2.

4.4.2 The measures outlined above and the estimated percentage car trip reduction rate as a result of these measures, applied only to targeted routes (or specific origin and destination movements in the context of the modelling), are summarised within the table below. For the purposes of the modelling, the lower range of the rates has been used, the reduction rates are therefore based on a conservative estimate as to not overestimate car trip reduction and mode shift. This is applied on top of the trip internalisation and application of reduction due to soft measures, as previously discussed.

Table 4-2: Site Specific Mitigation Car Trip Reduction

Development	Estimated % car trip reduction	End Destination Reduction
East of Billingshurst	Low % car trip reduction (4%)	Horsham Town Centre
Southwater	Medium / high % car trip reduction – 7% to 10%	Horsham Town Centre & Worthing
North Horsham Densification	Medium % car trip reduction - Overall 5% to 7%	Horsham Town Centre, Crawley Town Centre
West of Ifield	Very high % car trip reduction – 12% to 15%	Crawley Town Centre
Adversane	Low % car trip reduction (4%)	Horsham Town Centre

4.4.3 Based on the current distribution of the models, car trip reduction factors are applied through a two-tiered approach.

4.4.4 Firstly, origin and destination movements within the model between the strategic site and main centres which are expected to benefit from the specific bus priority measures have been selectivity targeted and factored down, using the lower figure for car trip reduction percentage estimate highlighted within the table above (lower band used in order to test the a 'conservative case' scenario of the mitigation impacts). For example, trips from West of Ifield, with destinations in Crawley town centre will be reduced by 12%, whilst this reduction would not be applied to trips that have destinations further afield and would not be expected to benefit from the specific measures.

4.4.5 The second stage of car trip reduction will apply further reduction based on the travel distance banding brought about by the sustainable travel measure highlighted previously in Table 4-1.

4.4.6 Table 4-3 highlights the Inbound and Outbound total percentage reduction of vehicle trips to/from each site as a result of applying all the sustainable mitigation measures. This is a further reduction on trips once the internalisation factor of 12% has been applied.

Table 4-3: Development Trip Total Reduction from Sustainable Measures

Development	AM		PM	
	Outbound	Inbound	Outbound	Inbound
West of Ifield	8%	7%	6%	9%
Southwater	6%	7%	7%	8%
Billingshurst	4%	5%	5%	6%
North Horsham	8%	7%	6%	9%
Adversane	4%	5%	5%	6%

4.4.7 As the percentage totals are small and the distribution of trips from the sites widely dispersed, the sustainable mitigation measures bring about small reductions to Volume over Capacity ratios of the worst performing junctions.

4.4.8 The largest reduction is seen from the West of Ifield site due to the trips within the zone having a shorter trip distance (predominately to and from Crawley). This compares with the smaller reduction of trips at other more rural locations.

4.4.9 The proportion of reduction at each individual site is deemed to provide an accurate representation of each sites constraints in delivering sustainable mitigations.

5 Local Plan Scenario Outputs

5.1 Introduction

- 5.1.1 This section sets out the results of the modelling exercise, providing outputs for the preferred scenario and comparing the outputs against the Reference Case, thus informing the impact of the Local Plan developments on the highway network.
- 5.1.2 The outputs provide a summary of the Local Plan scenario with sustainable mitigation already in place and thus providing the trip rate reduction mentioned in Chapter 4, with shorter distance trips and site-specific origin to destination car trips being reduced.

5.2 Modelled Outputs

- 5.2.1 A set of data and key performance indicators (KPIs) have been produced from the highway model, which enable easy and direct comparisons for each option. They will also outline which junctions require mitigation as a result of the additional traffic the Local Plan development sites produce.
- 5.2.2 The highway modelling outputs include:
- Plots showing flow changes within the network, comparing the preferred scenario with the Reference Case.
 - Plots and tables showing junctions which are shown to be over capacity and where the newly generated traffic from the Local Plan sites is shown to have a detrimental impact.
- 5.2.3 The junction capacity analysis has formed the main basis for identification of the impact of the Local Plan and to inform potential mitigation requirements at this stage of the study.

Traffic Flow Changes

- 5.2.4 Traffic flow comparisons between the Reference Case and the preferred scenario are provided within Appendix G. These show where large increases in flows are seen on the network, resulting from the new developments.
- 5.2.5 The flow plots indicate that the largest changes in flows are, as expected, close to the larger strategic sites tested and these become more dispersed the further away from these you get.
- 5.2.6 As would be expected the largest flow increases are seen on the A264 and A24 around Horsham, including the A24 to the north heading into Surrey, as well as on the A272, A23 and roads on the western side of Crawley.
- 5.2.7 Some flow decreases are seen on the A264 between Crawley and Horsham as a result of the Local Plan development causing congestion at some of the junctions, in particular the A264/B2195 roundabout. As a result, traffic is diverting to use Forest Road, as a result of congestion close to Horsham at junctions on the A264. Similarly, high levels of background growth are influencing traffic and route choice on the A23.

Changes in Delay

- 5.2.8 Changes in delays on links between the Reference Case and the preferred scenario are provided within Appendix H. These show where large increases in flows are seen on the network, resulting from the new developments.
- 5.2.9 The plots show locations where there are increases in delays of more than 30 seconds per vehicle on average in the modelled peak hour.

- 5.2.10 There are junctions to the south of Horsham where delay increases are seen. This includes sections on the A272 Station Rd, Kent Street, Bolney Chapel Rd, some sections on A2300 joining the A23 in Mid Sussex District and Hop Oast roundabout.
- 5.2.11 In Horsham itself, delay increases are seen on the Wimplehurst Road approach to North Parade and the North Street/Hurst Road junction in all scenarios.
- 5.2.12 To the north of Horsham, delay increases are seen on the A264 approaching Rusper Rd approaching Rusper Rd roundabout eastbound and on the westbound approach towards the Great Daux Roundabout.

Over Capacity Junctions

- 5.2.13 The outputs of the modelling exercise have been reviewed to determine which junctions are shown to be over capacity and where the Local Plan scenario has a significant impact on the capacity at the junction.
- 5.2.14 The measure used to assess this is the volume -to- capacity ratio or V/C. This effectively indicates how arms on junctions are performing based on the flows predicted in the model and the modelled capacity of each arm at a junction. When a junction goes over capacity, there will be increases in delays experienced by travellers as flows increase. Therefore, if Local Plan development increases the flows, this will exacerbate any existing issues or lead to new issues of excessive delays at a junction.
- 5.2.15 Tables 5-1 to 5-2 provide the V/C outputs at junctions for the AM and Tables 5-4 to 5-5 provide the V/C outputs for the PM peak for junctions within Horsham District. Tables 5-3 and 5-6 provide the V/C outputs for junctions in Crawley Borough for the AM and PM, respectively.
- 5.2.16 The Local Plan scenario includes the car trip rate reduction based upon the site-specific sustainable transport considerations and the sustainable transport measures outlined in section 4 and table 4.3.
- 5.2.17 Due to the iterative process of scenario testing, the numbering of the junctions was established at an early stage using a chronological order of the worst V/C hotspots being numbered first. As the iterative process of scenario testing evolved some of the junctions did not show up to be performing badly and therefore are omitted from the table.
- 5.2.18 The figures in the tables are shown as percentages. A V/C of 100% indicates that an arm at a junction is at capacity and over 100% that it is operating over capacity and therefore will experience delays which will increase as the V/C increases. The colour coding is as follows:
 - White – V/C < 85% - The junction is operating well within capacity.
 - Amber – V/C between 85% and 100% - The junction is performing close to, but within capacity.
 - Red – V/C between 100% and 110% - At least one arm of the junction is over capacity.
 - Purple – V/C >110% - At least one arm of the junction is well over capacity.
- 5.2.19 A junction that goes from white or amber to red or purple in the tables indicates that that particular junction is within capacity in the Reference Case, but over capacity when Local Plan traffic is added. Where both the Reference Case and Local Plan are in red or purple, and the V/C increases by more than 1.5%, these junctions are deemed to be significantly worse with Local Plan traffic added.
- 5.2.20 The worst performing junctions are those which are shown to have large increases in the V/C percentage when comparing the Local Plan scenario with the Reference Case outputs.

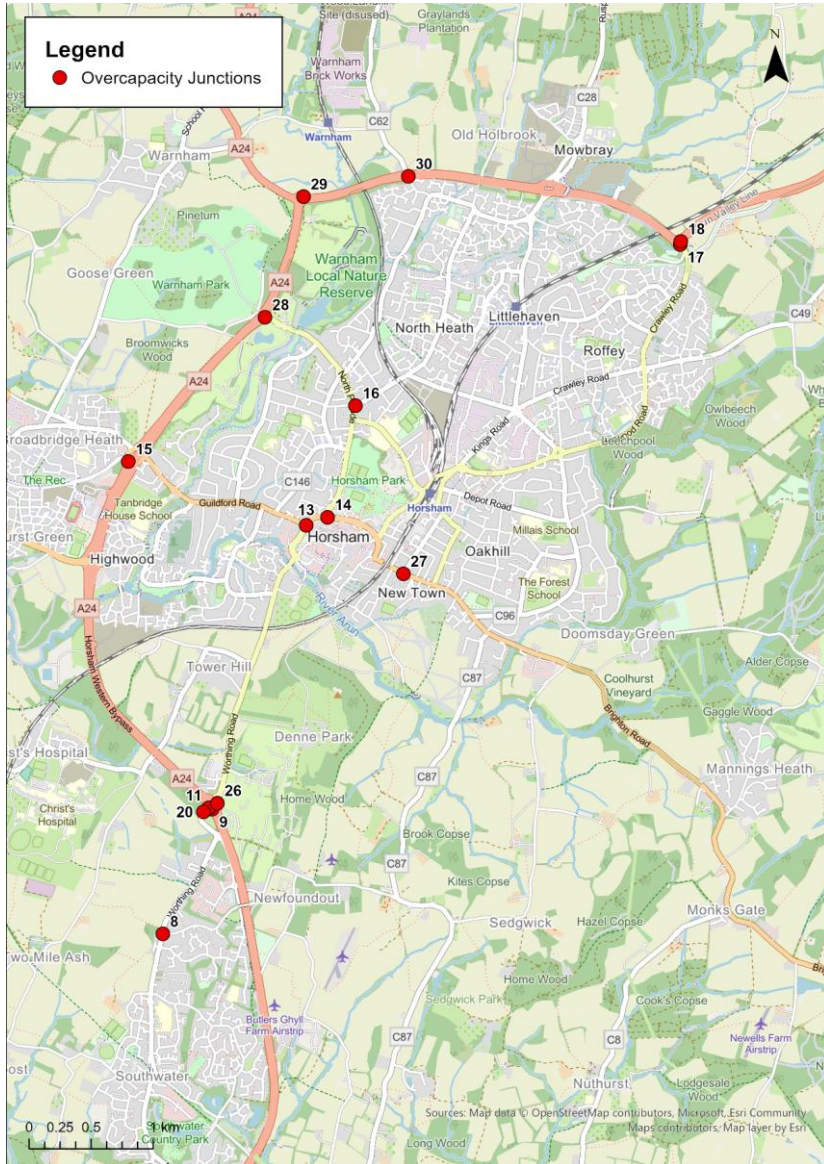
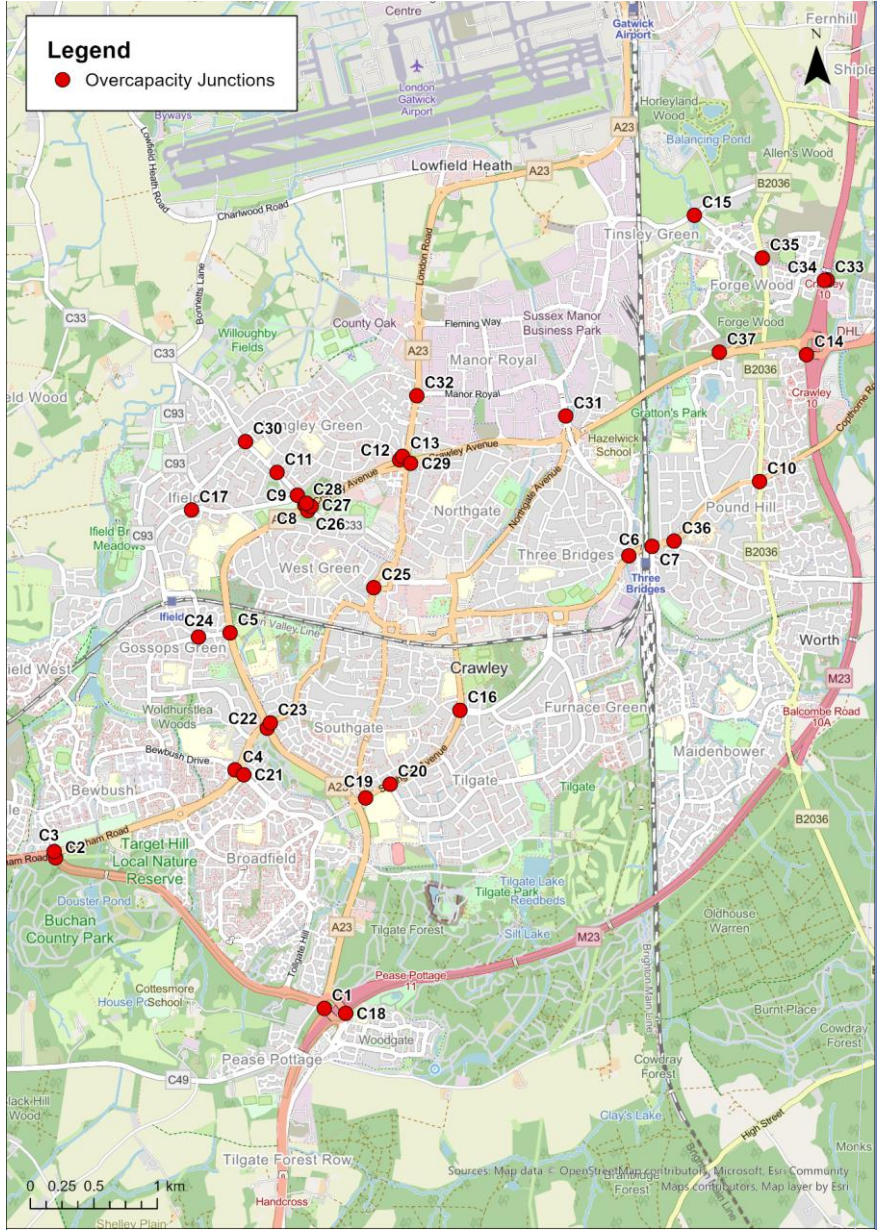


Figure 5-2: Horsham Town Centre Hotspots

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Figure 5-3: Crawley District Hotspots

Table 5-1: Horsham District Junction Capacity Outputs AM

Label	Junction Name	2040 Reference Case	2040 Local Plan Scenario
1	A24 NB approach at Washington Roundabout	128.43	128.39
2	A283 High Street/Old Mill Road	109.39	109.72
3	A283 Amberley Road Roundabout Storrington	100.54	100.6
4	Pulborough - A283/A29 Junction	101.67	103.75
5	A272/A281 roundabout north of Cowfold	101.31	102.59
8	Southwater Street/Worthing Rd	81.64	101.16
9	A24 NB Approach - Hop Oast Roundabout	90.54	101.83
10	Five Oaks Roundabout	101.65	103.64
11	Hop Oast Roundabout Exit to Worthing Rd	82.67	102.44
12	Five Oaks Rd/Lyon Rd	92.36	100.66
13	A281/B2237 junction Horsham Centre	103.04	103.52
14	A281/Springfield Road Junction	101.66	102.04
15	A24 NB Diverge/Farthings Hill Interchange	100.04	100.19
16	B2237/Wimblehurst Road	107.17	107.2
17	Crawley Rd NB Approach to Moorhead Roundabout	100.55	100.56
18	A264 WB Approach to Moorhead Roundabout	100.01	101.41
20	Hop Oast Roundabout - Worthing Road approach	108.08	101.61

Table 5-2: A24/A272 Junction Capacity Outputs - AM

Label	Junction Name	2040 Reference Case	2040 Local Plan Scenario
6	A24 Northbound signalised junction with A272	108.53	108.84
7	A24 southbound signals before A24/A272 junction	105.78	105.57
19	A272 signals over the A24/A272 junction	100.58	101.55

Table 5-3: Junction Capacity Outputs - Crawley Borough - AM

Label	Junction Name	2040 Reference Case	2040 Local Plan Scenario
C1	M23 NB Diverge/Pease Pottage Rbt	97.8	100.61
C2	A264 EB Approach Bewbush Manor Roundabout	100.72	100.19
C3	Sullivan Dr/Bewbush Manor Roundabout	97.89	100.38
C4	Broadfield Roundabout Bewbush Dr Northbound Approach	101.22	102.18
C5	A283 /A29 South Roundabout Pulborough	104.28	106.22
C6	Bewbush Manor Roundabout Sullivan Drive exit	102.74	102.99
C7	A2300 northbound slip to A23	100.43	100.2
C8	Ifield Roundabout/Ifield Avenue Exit	101.14	101.5
C9	A283 High Street/Old Mill Road	105.84	105.85
C10	A272/A281 roundabout north of Cowfold	100.04	100.2

Label	Junction Name	2040 Reference Case	2040 Local Plan Scenario
C11	Ifield Ave/Stagelands	100.18	101.56
C12	A272 Wineham Lane Junction	102.69	102.11
C13	A264 Eastbound exit at Bewbush Manor Roundabout	100.7	100.29
C14	A24 Southbound Exit at Flindon/A280 roundabout	102.09	102.2
C15	Steers Ln/Radford Rd	100.8	101.04
C16	B2195 Exit at Moorhead Roundabout	105.21	105.13
C17	A24 approach at Washington Roundabout	102.93	103.35

Table 5-4: Horsham District Junction Capacity Outputs PM

Label	Junction Name	2040 Reference Case	2040 Local Plan Scenario
2	A283 High Street/Old Mill Road	100.88	101.68
3	A283 Amberley Road Roundabout Storrington	101.44	101.41
4	Pulborough - A283/A29 Junction	100.11	100.28
12	Five Oaks Rd/Lyon Rd	100.25	100.76
13	A281/B2237 junction Horsham Centre	101.36	102.34
14	A281/Springfield Road Junction	98.05	100.33
16	B2237/Wimblehurst Road	102.5	102.75
17	Crawley Rd NB Approach to Moorhead Roundabout	100.34	100.46
18	A264 WB Approach to Moorhead Roundabout	99.41	102.84
21	A283 approach at Washington Roundabout	104.79	104.47
22	A24 SB London Road approach at Washington Roundabout	104.64	104.23
23	A272/A281 roundabout south of Cowfold	95.86	101.85
24	Bar Ln/A24 SB Approach to Buck Barn	89.23	100.2
25	Stane St/New Rd Roundabout	88.52	100.33
26	B2237 exit at Hop Oast Roundabout	105.17	111.84
27	A281/New Street Junction Horsham Town Centre	101.95	101.19
28	Robin Hood Rbt	100.38	101.61
29	Great Daux Roundabout/A264 Exit	100.91	101.32
30	Langhurst Wood Rd/A264	103.88	104.13
34	Five Oaks Rd/A264 WB Approach	99.23	101.24
35	A283 /A29 South Roundabout Pulborough	101.51	102.4

Table 5-5: A24/A272 Junction Capacity Outputs PM

Label	Junction Name	2040 Reference Case	2040 Local Plan Scenario
6	A24 Northbound signalised junction with A272	108.57	110.24
7	A24 southbound signals before A24/A272 junction	105.21	104.38

Label	Junction Name	2040 Reference Case	2040 Local Plan Scenario
31	A272 SB Merge with Worthing Road - Buck Barn	100	100
32	A272 westbound signals at the A24/A272 junction	114.56	117.55
33	A24 eastbound approach to A24/A272 junction	100.08	102.14

Table 5-6: Junction Capacity Outputs - Crawley Borough - PM

Label	Junction Name	2040 Reference Case	2040 Local Plan Scenario
C5	A283 /A29 South Roundabout Pulborough	100.94	101.26
C6	Bewbush Manor Roundabout Sullivan Drive exit	101.47	101.48
C7	A2300 northbound slip to A23	102.63	103.25
C9	A283 High Street/Old Mill Road	108.62	109.87
C11	Ifield Ave/Stagelands	101.12	101.07
C15	Steers Ln/Radford Rd	101.17	101.38
C16	B2195 Exit at Moorhead Roundabout	105.24	105.29
C17	A24 approach at Washington Roundabout	101.88	100.47
C18	Pease Pottage Interchange WB Diverge	102.13	102.67
C19	Brighton Rd/Southgate Ave	119.87	119.94
C20	Southgate Ave/Ashdown Dr	105.47	105.62
C21	Broadfield Roundabout Broadfield Dr WB Approach	94.76	100.14
C22	A23 Crawley Ave NB Approach - Cheals Roundabout	105.42	106.56
C23	Horsham Rd WB Approach - Cheals Roundabout	133.36	134.53
C24	Gossops Dr/Crawley Avenue Junction	105.41	104.8
C25	Peglar Way/High St	93.62	100.82
C26	Ifield Ave WB Approach - Ifield Roundabout	106.6	107.51
C27	Crawley Ave SB Approach - Ifield Roundabout	108.17	108.28
C28	Ifield Ave SB Approach - Ifield Roundabout	102.19	102.22
C29	Crawley Ave WB Approach - Tushmore Gyratory	108	107.94
C30	Ifield Ave/Warren Dr	97.32	102.23
C31	Hazlewick Roundabout/Gawick Rd/Hazlewick Ave Merge	101.16	100.24
C32	London Rd/Manor Royal	104.85	104.6
C33	Crawley Interchange M23 SB Diverge	100.76	100.96
C34	Crawley Ave NB Merge with M23 Crawley Interchange	99.95	100.00
C35	Balcombe Rd/Steers Ln	101.9	101.8
C36	Worth Rd/Haslett Avenue	101.93	101.79
C37	A2011/Crawley Ave Signal	110.3	110.78

5.2.22 Where junctions are shown to be over-capacity in the Local Plan Case and have a v/c at least 1.5% higher than the reference case, they have been analysed further and are detailed below.

Junctions Congestion Hotspots in Horsham District Summary

- 5.2.23 **A283/A29 Pulborough Roundabouts (35)** - The junctions are shown to be overcapacity in the Reference Case and only gets slightly worse ~2.5% in the AM peak only with the Local Plan development. There is limited opportunity to provide physical highway mitigation within Pulborough, due to lack of space and constraints created by building located close to the roadside. Sustainable measure along corridor could be potential mitigation. **No further mitigation required.**
- 5.2.24 **A272/A281 Roundabout (23)** – southern roundabout, Cowfold - The junction is forecasted to operate over capacity by ~1.8% in the local plan scenario only. This issue is limited to the PM peak period. Opportunities for physical mitigation are constrained; therefore, sustainable transport measures along the corridor are considered a suitable form of mitigation. **No further mitigation required.**
- 5.2.25 **A281 Albion Way/Springfield Road Junction (14)** - The junction is already operating over capacity in the Reference Case and experiences a further increase of approximately 0.4% in the AM peak and increases by ~2.4% from 98% capacity in the PM peak. However, with signal optimisation, the V/C ratio can be reduced below the mitigation threshold. **No further mitigation required.**
- 5.2.26 **Bar Ln/A24 SB Approach to Buck Barn (24)** - The junction is forecasted to operate over capacity in the local plan scenario by ~0.2%. This issue is limited to the AM peak period. Opportunities for physical mitigation are constrained; therefore, sustainable transport measures along the corridor are considered a suitable form of mitigation. **No further mitigation required.**
- 5.2.27 **Southwater Street/Worthing Rd (8)** – Under the Local Plan scenario, the junction is forecast to operate slightly over capacity in the AM peak, with an increase of approximately 1.2%. Given the marginal nature of the impact, physical mitigation is unlikely to be proportionate to the cost; therefore, sustainable transport measures are considered sufficient. **No further mitigation required.**
- 5.2.28 **Five Oaks Rd/A264 WB Approach (34)** - South of Newbridge Roundabout - The junction is forecasted to operate over capacity in the local plan scenario by ~1.3%. This issue is limited to the PM peak period. Opportunities for physical mitigation are constrained; therefore, sustainable transport measures along the corridor are considered a suitable form of mitigation. **No further mitigation required.**
- 5.2.29 **Five Oaks Rd/Lyon Rd Junction (12)** - The junction surpasses the mitigation threshold in the AM peak only and operates over capacity by ~0.7%. Opportunities for physical mitigation are constrained; therefore, sustainable transport measures along the corridor are considered a suitable form of mitigation. **No further mitigation required.**
- 5.2.30 **Stane St/New Rd Roundabout (25)** - Under the Local Plan scenario, the junction is forecast to operate slightly over capacity in the PM peak, by approximately 0.3%. Given the marginal nature of the impact, physical mitigation is unlikely to be proportionate to the cost; therefore, sustainable transport measures are considered sufficient. **No further mitigation required.**
- 5.2.31 **A24 Hop Oast Roundabout (11/20)** – The Worthing Road approaches and the A24 northbound approach are forecast to operate over capacity under the Local Plan scenario. There is potential to mitigate these impacts through the signalisation or partial signalisation of the roundabout. This junction was shown to require mitigation in the last version of the report and a scheme was designed. **Mitigation required.**
- 5.2.32 **Moorhead Roundabout A264 Approach (18)** - The A264 westbound approach is forecast to operate slightly over capacity in the Reference Case, with further deterioration beyond the 1.5% threshold in the AM and PM peaks under the Local Plan scenario. However, with signal optimisation, the V/C ratio can be reduced to below the mitigation threshold in the AM and PM

peaks. As mentioned earlier in the report bus priority is proposed at this junction. **No further mitigation required**

5.2.33 **A272/A24 Buck Barn (6/7/19/31/32/33)** - The staggered crossroads junction is well over capacity in the reference case and the situation exacerbated in the Preferred Scenario. Signal optimisation may be sufficient to negate the impact of the Local Plan, however as stated the junction is still well over capacity. This junction was shown to require mitigation in the last version of the report and a scheme was designed. **Mitigation required.**

5.2.34 Junction mitigation is discussed further in Section 6.

5.3 Pulborough Sensitivity Test

5.3.1 Due to a landslip on Church Road in Pulborough traffic lights have been in place. It has been assumed that for the main test reported above the traffic lights will be removed and that two-way traffic can flow freely. A sensitivity test has been undertaken to understand the impact on the Local Network, should the shuttle working signals remain in place. Figures 5-4 and 5-5 show the outcome of the modelling comparing model traffic flows, with and without signal tests, for the AM Peak, for the Reference Case and Local Plan models, respectively. Figures 5-6 and 5-7 show the equivalent outputs for the PM peak.

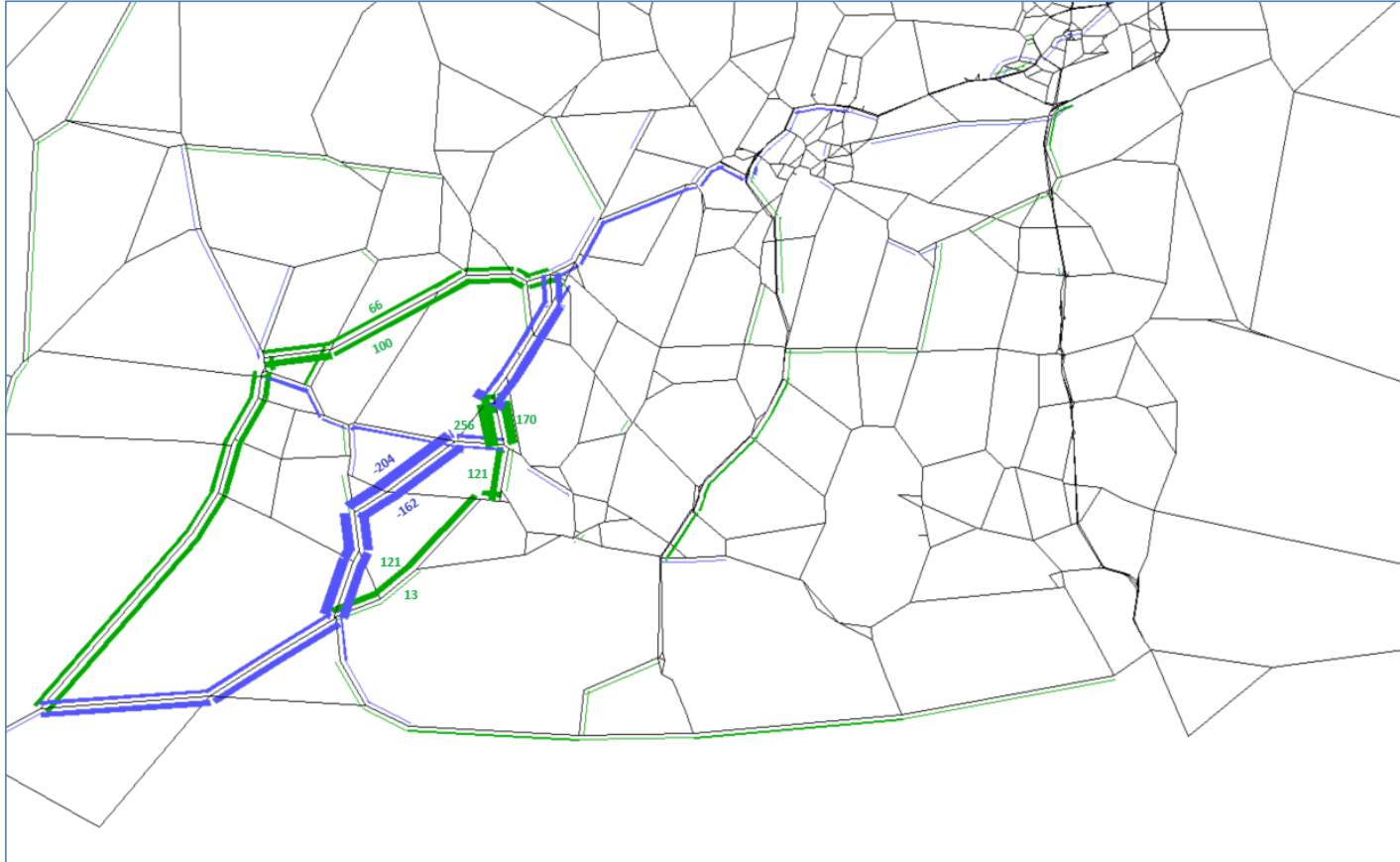


Figure 5-3: Ref. Case Flow Differences – With and Without Pulborough Shuttle Signal (AM Peak)

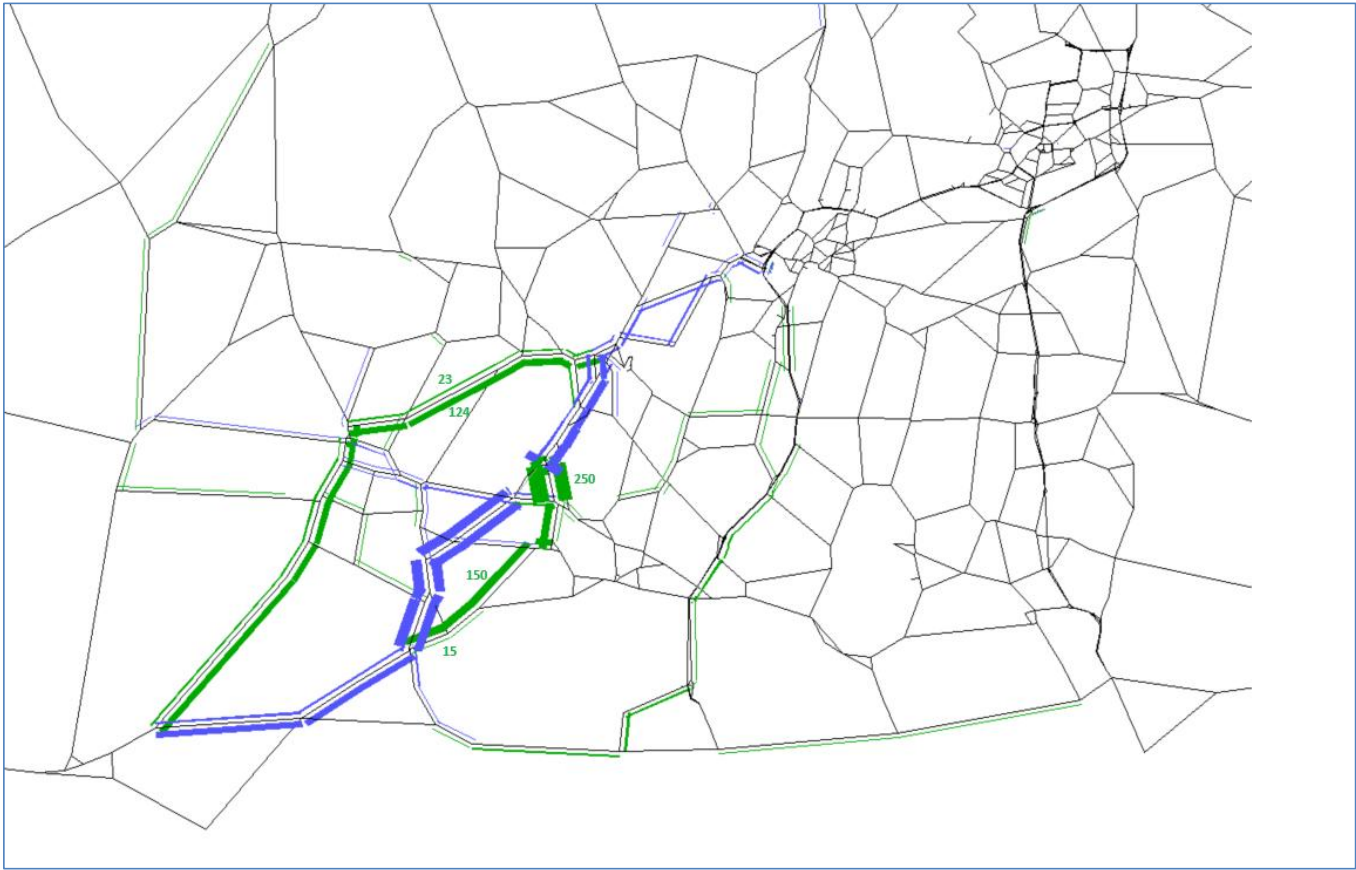


Figure 5-4: Local Plan Flow Differences – With and Without Pulborough Shuttle Signal (AM Peak)

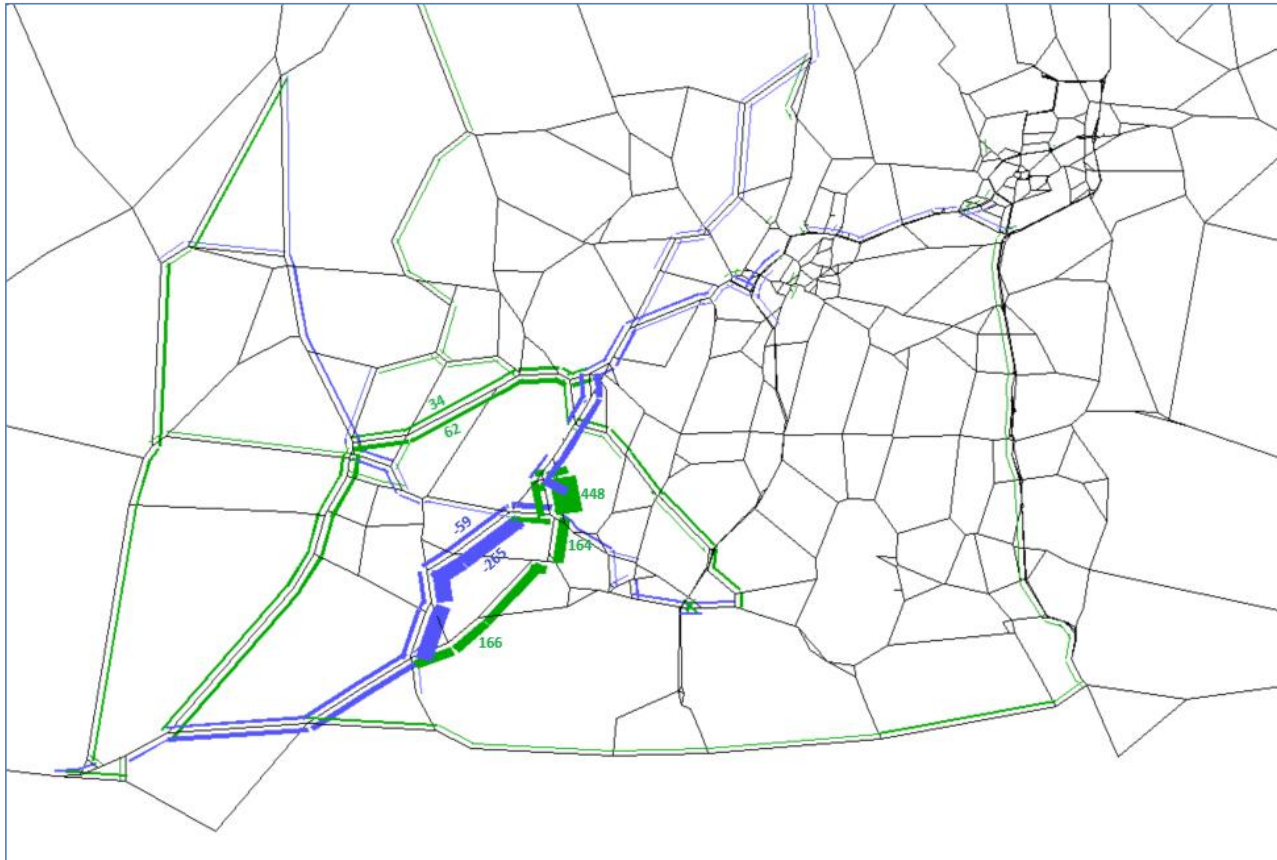


Figure 5-5: Ref. Case Flow Differences – With and Without Pulborough Shuttle Signal (PM Peak)

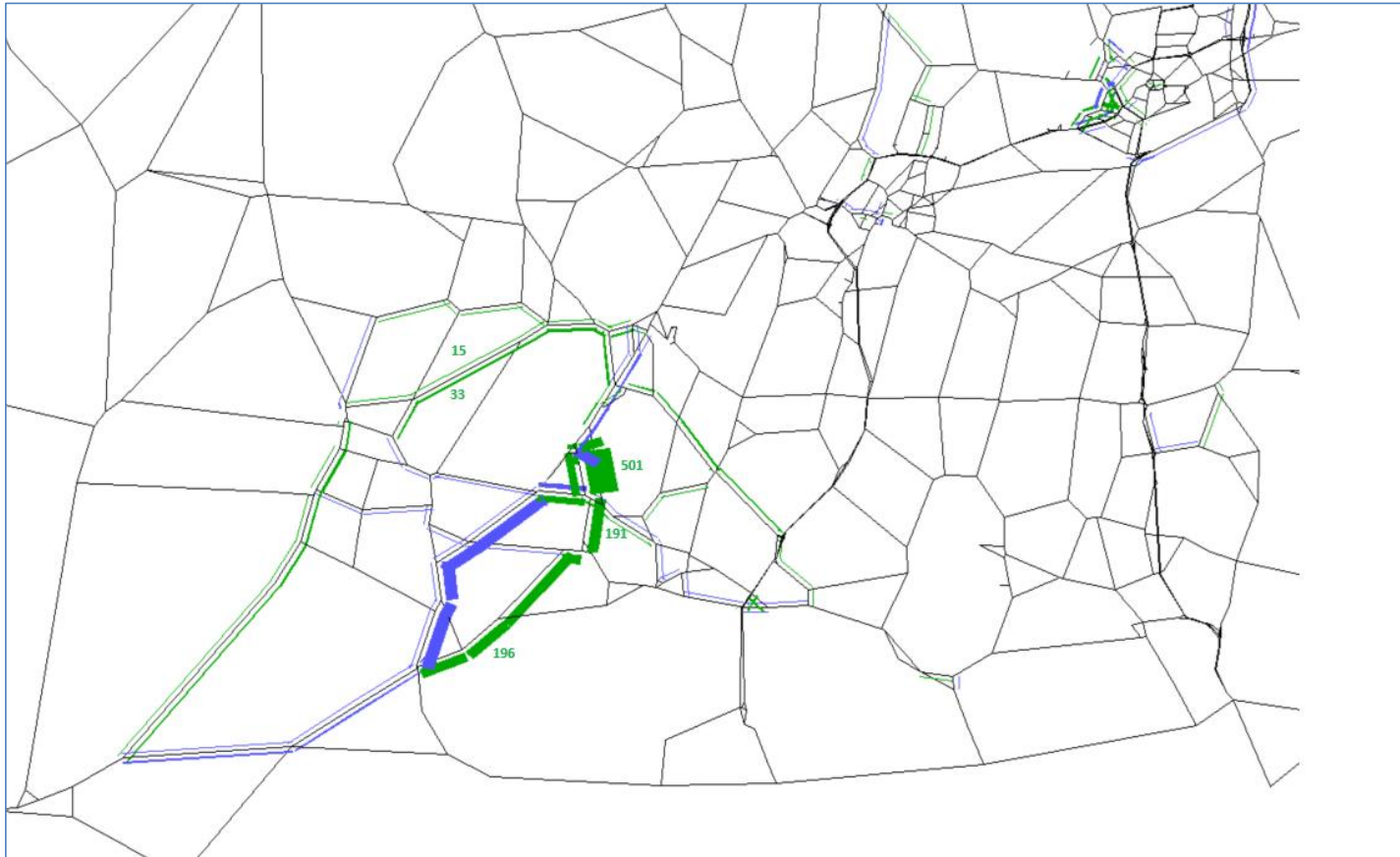


Figure 5-6: Local Plan Flow Differences – With and Without Pulborough Shuttle Signal (PM Peak)

- 5.3.2 The test shows that for longer distance trips they avoid Pulborough and instead use the A285 and A272 to the west. For more localised trips they switch to the west using Broomers Hill Lane, A283, Rackham Street and the B2139, returning to the A29 at Whiteways Lodge Roundabout. The diversions do not cause any additional capacity related issues, however some of the alternative routes are unlikely to be suitable for increased traffic (particularly Broomers Hill Lane and Rackham Street).
- 5.3.3 Overall, the Local Plan flow differences do not differ greatly from the Reference Case flow differences.
- 5.3.4 In addition there is a further local route within Pulborough which may pick up additional through traffic, for which it is unsuited, using New Place Road and Rectory Lane to link from the A29 London Road to the A283 Lower Street. This route has a width restriction with permanent signage of 6'6" and since the installation of temporary signals on the A29 has had additional temporary "Unsuitable for HGV's" signs in place. New Place Road and Rectory Lane are not included in the strategic model network, so the extent to which additional traffic could use this route instead of the two routes detailed above cannot be modelled without an amendment to the base model network which could potentially affect its calibration and validation.

6 Highway Mitigation (WSCC Network)

6.1 Introduction

- 6.1.1 Following the identification of junction congestion hotspots, additional modelling has been conducted in order to provide analysis of where additional mitigation could be provided to increase capacity and reduce over capacity queuing and delays. This is with the aim of achieving the V/C below 100 or similar to those in the reference case. The analysis also looks at the knock-on impacts elsewhere in the study area as a result of potential reassignment due to the provision additional capacity.
- 6.1.2 The further mitigation strategy has been assigned with the preferred scenario forecast demand.
- 6.1.3 The following junctions have been looked at within the modelling:
- Hop Oast Roundabout
 - Buck Barn Junction
- 6.1.4 From the above, physical mitigation has been proposed at the following junctions:
- Hop Oast Roundabout
 - Buck Barn Junction

6.2 Reassignment Impact of Mitigation – SATURN Modelling

- 6.2.1 An iterative process has been created where proposed mitigations has been tested and modelled within SATURN. This enables a further understanding of any reassignment impact as a result of the changes proposed at the junctions, due to the alleviation of congestion and increased capacity.

AM Model Reassignment

- 6.2.2 Figure 6-1 below shows the modelled representation of the highway network within the Horsham District region. The diagram outputs compare traffic flow difference between the local scenario and the mitigated local scenario. The green links represent an increase in flow within the mitigated preferred scenario, whilst the blue represent a decrease. The thicker the colour shading on the road network the greater the flow difference is.
- 6.2.3 The mitigation shows that by improving the Buck Barn junction, trips that would otherwise have avoided the junction and re-routed elsewhere, are now using the junction as a result of increased capacity.
- 6.2.4 With the additional capacity at Hop Oast allowing more trips to route through the roundabout, likewise the addition of the improvements at Buck Barn are now providing more capacity for journeys on the A24 previously queued up within the Local Plan un-mitigated scenario.

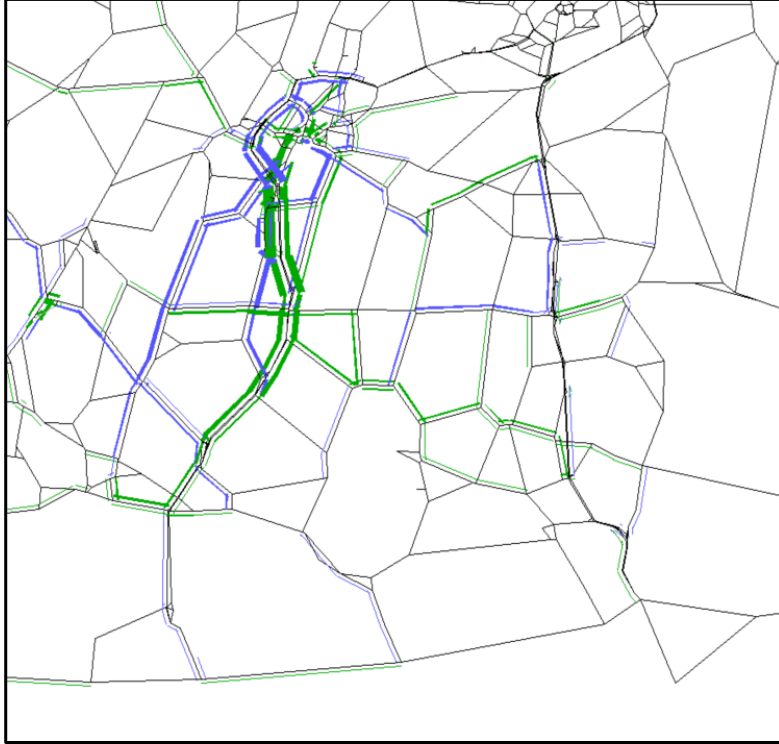


Figure 6-1:AM Flow Reassignment with Mitigation

PM Model Reassignment

- 6.2.5 As with the AM analysis there is wider reassignment to the A24. With the introduction of the mitigation at Hop Oast roundabout, and Buck Barn, trips leaving Horsham travelling south use the A24 via Hop Oast or via the A272. This is shown in Figure 6-2.

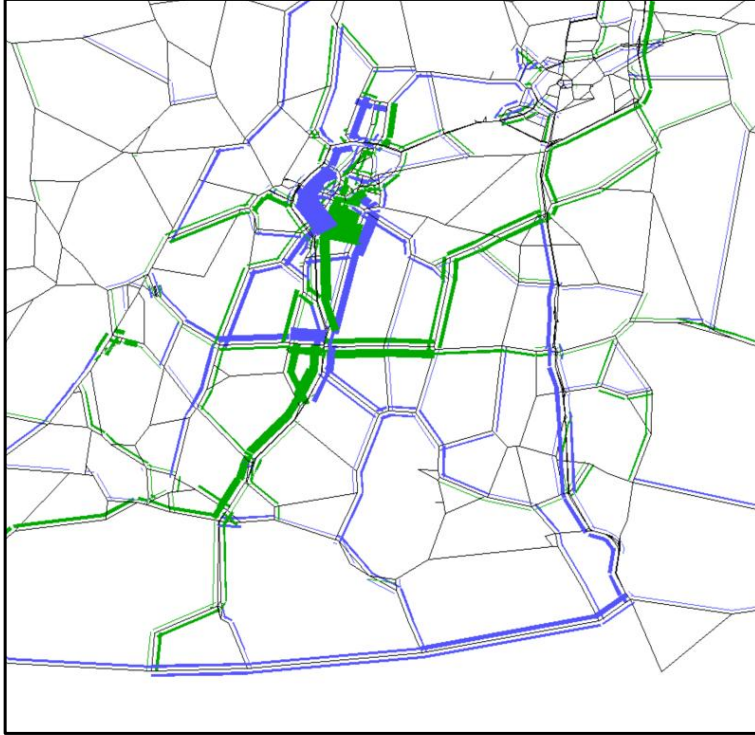


Figure 6-2: PM Flow Reassignment with Mitigation

- 6.2.6 Table 6-1 to Table 6-6 highlight the V/C of the junctions with the further physical mitigation against the preferred scenario with no mitigation. The outputs show the worst performing arm. The modelling only included highway capacity mitigation at Hop Oast roundabout, Great Daux roundabout and the Buck Barn junction. Commentary has previously been provided for the other junctions in section 5.2.
- 6.2.7 The PM peak model shows a wider reassignment impact, both in terms of volume and geographical extent. This is due to higher levels of traffic within the PM peak models.

Table 6-1: Junction Capacity Outputs – Horsham District - AM Peak

Label	Junction Name	2040 Reference Case	2040 Local Plan Scenario	2040 Local Plan with Mitigation
1	A24 NB approach at Washington Roundabout	128.43	128.39	130.66
2	A283 High Street/Old Mill Road	109.39	109.72	111.24
3	A283 Amberley Road Roundabout Storrington	100.54	100.6	100.6
4	Pulborough - A283/A29 Junction	101.67	103.75	103.72
5	A272/A281 roundabout north of Cowfold	101.31	102.59	102.65
8	Southwater Street/Worthing Rd	81.64	101.16	102.53
9	A24 NB Approach - Hop Oast Roundabout	90.54	101.83	89.55
10	Five Oaks Roundabout	101.65	103.64	103.6
11	Hop Oast Roundabout Exit to Worthing Rd	82.67	102.44	70.75
12	Five Oaks Rd/Lyon Rd	92.36	100.66	99.13
13	A281/B2237 junction Horsham Centre	103.04	103.52	103.28
14	A281/Springfield Road Junction	101.66	102.04	102.34
15	A24 NB Diverge/Farthings Hill Interchange	100.04	100.19	100.17
16	B2237/Wimblehurst Road	107.17	107.2	107.05
17	Crawley Rd NB Approach to Moorhead Roundabout	100.55	100.56	100.57
18	A264 WB Approach to Moorhead Roundabout	100.01	101.41	101.14
20	Hop Oast Roundabout - Worthing Road approach	108.08	101.61	53.34

Table 6-2: Junction Capacity Outputs – A24/A272 Junction - AM Peak

Label	Junction Name	2040 Reference Case	2040 Local Plan Scenario	2040 Local Plan with Mitigation
6	A24 Northbound signalised junction with A272	108.53	108.84	92.27
7	A24 southbound signals before A24/A272 junction	105.78	105.57	100.08
19	A272 signals over the A24/A272 junction	100.58	101.55	40.38

Table 6-3: Junction Capacity Outputs – Crawley Borough - AM Peak

Label	Junction Name	2040 Reference Case	2040 Local Plan Scenario	2040 Local Plan with Mitigation
C1	M23 NB Diverge/Pease Pottage Rbt	97.8	100.61	100.63
C2	A264 EB Approach Bewbush Manor Roundabout	100.72	100.19	100.26
C3	Sullivan Dr/Bewbush Manor Roundabout	97.89	100.38	100.42
C4	Broadfield Roundabout Bewbush Dr Northbound Approach	101.22	102.18	101.86
C5	A283 /A29 South Roundabout Pulborough	104.28	106.22	105.96

Label	Junction Name	2040 Reference Case	2040 Local Plan Scenario	2040 Local Plan with Mitigation
C6	Bewbush Manor Roundabout Sullivan Drive exit	102.74	102.99	102.98
C7	A2300 northbound slip to A23	100.43	100.2	100.21
C8	Ifield Roundabout/Ifield Avenue Exit	101.14	101.5	101.51
C9	A283 High Street/Old Mill Road	105.84	105.85	105.85
C10	A272/A281 roundabout north of Cowfold	100.04	100.2	100.18
C11	Ifield Ave/Stagelands	100.18	101.56	101.5
C12	A272 Wineham Lane Junction	102.69	102.11	102.16
C13	A264 Eastbound exit at Bewbush Manor Roundabout	100.7	100.29	100.23
C14	A24 Southbound Exit at Flindon/A280 roundabout	102.09	102.2	102.17
C15	Steers Ln/Radford Rd	100.8	101.04	101.06
C16	B2195 Exit at Moorhead Roundabout	105.21	105.13	105.11
C17	A24 approach at Washington Roundabout	102.93	103.35	103.34

Table 6-4: Junction Capacity Outputs – Horsham District - PM Peak

Label	Junction Name	2040 Reference Case	2040 Local Plan Scenario	2040 Local Plan with Mitigation
2	A283 High Street/Old Mill Road	100.88	101.68	102.31
3	A283 Amberley Road Roundabout Storrington	101.44	101.41	101.4
4	Pulborough - A283/A29 Junction	100.11	100.28	100.27
12	Five Oaks Rd/Lyon Rd	100.25	100.76	105.09
13	A281/B2237 junction Horsham Centre	101.36	102.34	102.29
14	A281/Springfield Road Junction	98.05	100.33	100.02
16	B2237/Wimblehurst Road	102.5	102.75	102.05
17	Crawley Rd NB Approach to Moorhead Roundabout	100.34	100.46	100.47
18	A264 WB Approach to Moorhead Roundabout	99.41	102.84	102.26
21	A283 approach at Washington Roundabout	104.79	104.47	104.03
22	A24 SB London Road approach at Washington Roundabout	104.64	104.23	103.74
23	A272/A281 roundabout south of Cowfold	95.86	101.85	102.53
24	Bar Ln/A24 SB Approach to Buck Barn	89.23	100.2	54.79
25	Stane St/New Rd Roundabout	88.52	100.33	100.71
26	B2237 exit at Hop Oast Roundabout	105.17	111.84	87.78
27	A281/New Street Junction Horsham Town Centre	101.95	101.19	101.97
28	Robin Hood Rbt	100.38	101.61	93.5
29	Great Daux Roundabout/A264 Exit	100.91	101.32	101.49
30	Langhurst Wood Rd/A264	103.88	104.13	103.16
34	Five Oaks Rd/A264 WB Approach	99.23	101.24	101.23
35	A283 /A29 South Roundabout Pulborough	101.51	102.4	102.47

Table 6-5: Junction Capacity Outputs – A264/A272 Junction - PM Peak

Label	Junction Name	2040 Reference Case	2040 Local Plan Scenario	2040 Local Plan with Mitigation
6	A24 Northbound signalised junction with A272	108.57	110.24	101.08
7	A24 southbound signals before A24/A272 junction	105.21	104.38	106.09
31	A272 SB Merge with Worthing Road - Buck Barn	100	100	100
32	A272 westbound signals at the A24/A272 junction	114.56	117.55	114.08
33	A24 eastbound approach to A24/A272 junction	100.08	102.14	105.65

Table 6-6: Junction Capacity Outputs – Crawley Borough – PM Peak

Label	Junction Name	2040 Reference Case	2040 Local Plan Scenario	2040 Local Plan with Mitigation
C5	A283 /A29 South Roundabout Pulborough	100.94	101.26	101.56
C6	Bewbush Manor Roundabout Sullivan Drive exit	101.47	101.48	101.5
C7	A2300 northbound slip to A23	102.63	103.25	103.03
C9	A283 High Street/Old Mill Road	108.62	109.87	110.09
C11	Ifield Ave/Stagelands	101.12	101.07	100.95
C15	Steers Ln/Radford Rd	101.17	101.38	101.46
C16	B2195 Exit at Moorhead Roundabout	105.24	105.29	105.16
C17	A24 approach at Washington Roundabout	101.88	100.47	100.25
C18	Pease Pottage Interchange WB Diverge	102.13	102.67	102.74
C19	Brighton Rd/Southgate Ave	119.87	119.94	118.99
C20	Southgate Ave/Ashdown Dr	105.47	105.62	105.95
C21	Broadfield Roundabout Broadfield Dr WB Approach	94.76	100.14	100.18
C22	A23 Crawley Ave NB Approach - Cheals Roundabout	105.42	106.56	106.93
C23	Horsham Rd WB Approach - Cheals Roundabout	133.36	134.53	134.25
C24	Gossops Dr/Crawley Avenue Junction	105.41	104.8	105.63
C25	Peglar Way/High St	93.62	100.82	100.56
C26	Ifield Ave WB Approach - Ifield Roundabout	106.6	107.51	107.27
C27	Crawley Ave SB Approach - Ifield Roundabout	108.17	108.28	108.18
C28	Ifield Ave SB Approach - Ifield Roundabout	102.19	102.22	102.23
C29	Crawley Ave WB Approach - Tushmore Gyratory	108	107.94	107.94
C30	Ifield Ave/Warren Dr	97.32	102.23	101.97
C31	Hazlewick Roundabout/Gatwick Rd/Hazlewick Ave Merge	101.16	100.24	100.21
C32	London Rd/Manor Royal	104.85	104.6	104.79
C33	Crawley Interchange M23 SB Diverge	100.76	100.96	100.71
C34	Crawley Ave NB Merge with M23 Crawley Interchange	99.95	100.00	100.06
C35	Balcombe Rd/Steers Ln	101.9	101.8	101.8
C36	Worth Rd/Haslett Avenue	101.93	101.79	101.95
C37	A2011/Crawley Ave Signal	110.3	110.78	111

6.2.8 The outputs from the modelling indicate that the mitigation put forward mitigate the impact of the additional Local Plan development traffic.

6.2.9 The modelling outputs show that with the two mitigation schemes in place, the A24 northbound approach at Washington Roundabout (1) is observed to exceed the mitigation threshold in the AM, increasing by approximately 2% from an already over-capacity base of 128% in both the Reference Case and Local Plan scenarios. This is due to more traffic arriving at the roundabout, as a result of capacity relief at Buck Barn junction. Therefore, a scheme at Washington Roundabout will also be required to mitigate the impacts of the Local Plan.

6.3 Proposed Mitigation Schemes

A24/A272 Buck Barn junction

6.3.1 A refined signalised junction has been tested; the design aims to reduce the staggered signal stages by providing closer approaches and increased capacity for vehicles travelling eastbound through the junction along the A272. This involves adjusting the eastern approach from the A272 slightly further north, thus creating a crossroads, rather than the current staggered junction arrangement.

6.3.2 The proposed scheme is shown in Figure 6-3.

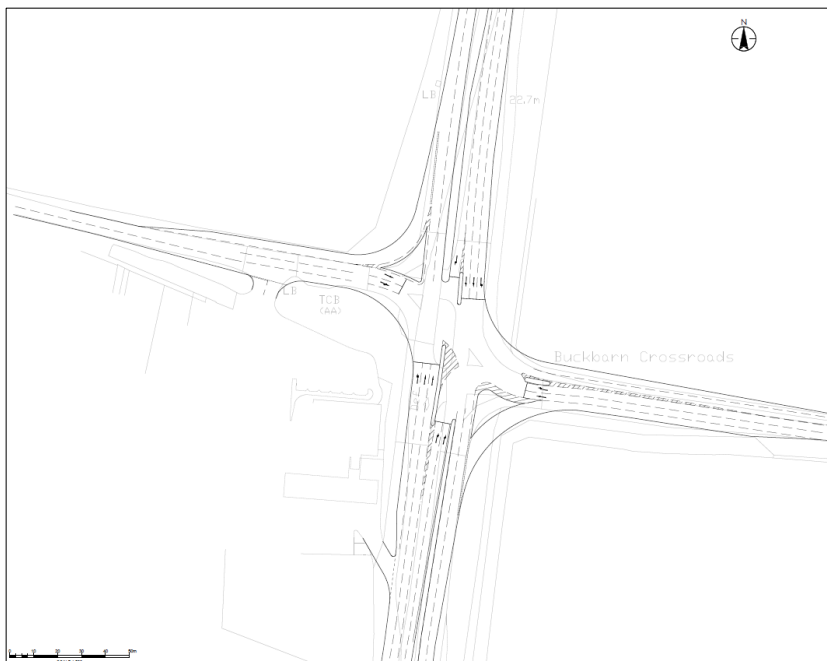


Figure 6-3: Buck Barn Junction Mitigation Scheme

6.3.3 A high-level cost for the design has been produced for the scheme. The estimated cost is £5.176 million including risk, contingency and optimism bias in 2022 prices which equates to £6.044 million in 2026 prices when applying inflation. A breakdown of the high-level scheme costs is provided within Appendix I.

A24 Hop Oast Roundabout

- 6.3.4 Two variations of the roundabout have been proposed, option 1 includes a Bus priority lane and through the circulatory of the junction, and one aims to increase throughput capacity without a dedicated bus lane prioritisation. Both options include signalisation of the roundabout.
- 6.3.5 The proposed schemes with and without the bus priority are shown in Figure 6-4.



Figure 6-4: Hop Oast Junction Mitigation Schemes (With/Without Bus Priority)

- 6.3.6 A high-level cost for the design has been produced for the scheme. The estimated cost is £3.108 million including risk, contingency and optimism bias in 2022 prices which equates to £3.629 million in 2026 prices when applying inflation. A breakdown of the high-level scheme costs is provided within Appendix I.

A24/A283 Washington Roundabout

- 6.3.7 To reduce delays and queueing, in particular on the A24 northbound approach, a mitigation scheme has been developed with additional left turning lanes on the A24 northbound and southbound approach as well as the A283 eastbound approach. The mitigation also includes the widening of the circulatory from 2 lanes to 3 in order to accommodate the left turn movements. The mitigation scheme has been tested within Junction 10. The proposed scheme is shown in Figure 6-5.

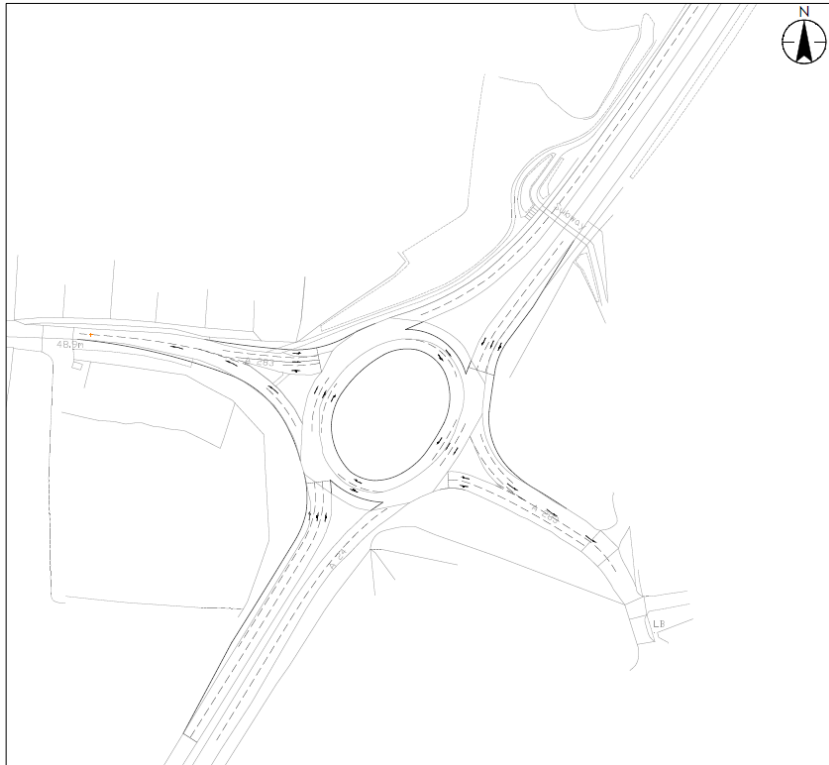


Figure 6-5: Washington Roundabout Mitigation Scheme

6.3.8 A high-level cost for the design has been produced for the scheme. The estimated cost is £3.811 million including risk, contingency and optimism bias in 2022 prices which equates to £4.450 million in 2026 prices when applying inflation. A breakdown of the high-level scheme costs is provided within Appendix I.

6.4 Remaining Unmitigated Hot-Spots

- 6.4.1 All other remaining junctions that showed the mitigated scenario V/C to be worse than the reference case and where V/C is still greater than 100 have been analysed for unmet demand and capacity shortcomings.
- 6.4.2 It has been assumed that capacity shortcomings and unmet demand can be addressed through further sustainable mitigation measures (i.e. those likely to reduce car trips) connected with the Horsham Transport Strategy and to minimise as far as possible the need for physical mitigation.
- 6.4.3 The proposed sustainable mitigation measures at the junctions listed below included the prioritisation of active modes and public transport measures, where specifically feasible to reduce localised car trips further, and the general projection of virtual mobility (i.e. increased opportunity to work from home, due to technological advances reducing need to commute and reduce face to face meetings). The effect was to reduce car trips.
- 6.4.4 In addition, where junctions are signalised and only just over the threshold for requiring mitigation, the signal timings and Volume to Capacity ratio (V/C) on all arms were examined,

to explore whether there would be an opportunity to alter the signal timings. This typically involved looking at where the worse performing movement could be given more green time, without unduly impacting upon opposing movements which had plenty of spare capacity.

- 6.4.5 The following junctions were seen to be only just over the threshold based on the preferred strategy, and could be dealt with through the measures above:

A29 Five Oaks Roundabout

- 6.4.6 Due to the land constraints surrounding the junction there is limited scope for widening the junction or altering the junction to a signalised arrangement.
- 6.4.7 Within the Local Plan scenario nearly all additional trips increases are related to trips to/from the East of Billingshurst and Adversane sites travelling to/from Horsham Town. It is recommended that sustainable transport measures, in particular improved bus services and increased bus frequency from these sites to/from Horsham would provide a sustainable alternative and reduce the traffic impacts at the junction. It could also be possible to improve active travel links to Billingshurst station or demand responsive public transport services.

6.5 Neighbouring Authorities

- 6.5.1 It has been identified that a number of junctions within Crawley are shown to increase in congestion within the Preferred Scenario (both mitigated and un-mitigated), primarily due to the West of Ifield Site.
- 6.5.2 Sustainable transport mitigation on the Ifield Avenue route may reduce the need for highway mitigation at the level of development at the West of Ifield Site included within the model.
- 6.5.3 Furthermore, Junctions within Crawley identified as requiring mitigation, are all likely to be impacted on with the proposed Crawley Western Multi-modal Corridor (CWMMC), with a resultant reduction of traffic and congestion along the A2220 Horsham Road, the A23 Crawley Avenue and Ifield Avenue. However, it is noted that there is currently no funding or timeline for the southern and eastern sections the CWMMC. Therefore, this will not be realised within the Plan period through the West of Ifield allocation within the Plan but will require to be funded by extensive further phases to West of Ifield which will generate their own traffic which will join the network, reducing the net relief effect.
- 6.5.4 It has been discerned from the modelling outputs that aside from within Crawley, there are no further Neighbouring Authority junctions (excluding the Strategic Road Network) that are flagged as showing detrimental impact due to the Horsham Local Plan.

7 Impacts on Strategic Road Network

7.1 Overview of Traffic Flows on Strategic Road Network

- 7.1.1 This section provides an overview of the impacts of the local plan forecasts modelled on the National Highways Strategic Road Network (SRN).
- 7.1.2 Within the base year model high level of traffic and congestion are shown within the AM and PM Peak Horsham models along the A23 SRN corridor.
- 7.1.3 The 2040 Forecast Traffic growth, based upon the NTEM forecasts, predicts relatively high level of car trip growth between the new proxy base year of 2025 and the forecast year of 2040.
- 7.1.4 With the large proportion of long-distance trips along the A23 and M23 corridor between the Sussex / Brighton & Hove conurbation along the south coast and areas to the north including Crawley, Burgess Hill, Haywards Heath and London predicted significant growth in car travel demand by 2040, the predicted background growth from these regions is increasing demand along the corridor.
- 7.1.5 As such, some sections of the A23 corridor are at or above capacity within the Reference Case, specifically the 2-lane section of the A23 south of Hickstead, is showing up to be close to capacity within the Reference Case forecast models.
- 7.1.6 The level of growth and capacity issues on the A23 is therefore having an influence on how trips from Horsham are getting to and using the A23, including any traffic growth associated with the Local Plan.
- 7.1.7 At the time of the forecast model build process, aside from the scheme referenced in the paragraph below there were no known committed plans to provide additional capacity on the A23 and therefore no network changes are made within the Reference Case models.
- 7.1.8 However, it should be noted that National Highways has approved a scheme to improve the A23 Hickstead junction in order to mitigate the impacts of the proposed new business park north of Burgess Hill in Mid Sussex District. This forms part of the Local Plan strategy and will be funded by development in Mid Sussex District.

7.2 Merge and Diverge DMRB Layout Requirement Assessment

- 7.2.1 This section reports on the potential impacts of the proposed Local Plan development on National Highways Strategic Road Network (SRN) in the context of the merge/diverge layout requirements. This has been undertaken in light of National Highways requesting this level of analysis, and to ensure any impacts on the SRN have been fully understood.
- 7.2.2 The merge and diverge assessment layout requirement have been undertaken in accordance with 'CD122 Geometric design of grade separated junctions, Revision 1, January 2020'. The approach has been to consider whether current merge and diverge layouts at SRN junctions with the Horsham model are able to accommodate future flows, for the Reference Case and Preferred Scenario, in their current configuration or whether alternative configurations are required.
- 7.2.3 The merge/diverge design classifications are categorised in alphabetical order based on the relationship between mainline volume of traffic against the merge/diverge volume of traffic. With Category A being the simplest design, accommodating minor merge/diverge flows, whilst layout H is designed to incorporated high levels of merge/diverge flows.

7.2.4 The results of the assessments are now summarised for each junction by direction and by particular merge and diverge assessed. All flows are provided in total vehicles. Detailed results and outputs are provided in Appendix J.

M23 Junction 9 Gatwick Airport

7.2.5 Table 7-1 shows the flows for the M23 J9 merge & diverges. In general, the local plan has minor changes in flow compared to the reference case in both peak periods on the mainline. However, there are more notable increases in merge flows, particularly on the SB merge in the PM peak reporting approximately 30% increase.

Table 7-1: M23 Junction 9 Merge Assessment Flows

Approach		Reference Case		LP		Difference	
		AM	PM	AM	PM	AM	PM
NB Merge	Mainline	5344	4490	5417	4548	72	58
	Merge	155	260	205	266	49	6
SB Merge	Mainline	5042	5622	5050	5599	9	-23
	Merge	43	590	51	785	8	195
NB Diverge	Mainline	5344	4490	5417	4548	72	58
	Diverge	95	62	108	63	13	1
SB Diverge	Mainline	5042	5622	5050	5599	9	-23
	Diverge	862	364	864	371	2	7

7.2.6 The results of the assessment for the M23 J9 merge/diverge layout requirements are summarised in Table 7-2.

Table 7-2: M23 Junction 9 Merge/Diverge Layout Analysis

Approach	Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
		AM	PM			
NB Merge	Current Layout	E	E	3	4	2
	Reference Case	D	A	4	4	1
	Local Plan	A	A	4	4	1
SB Merge	Current Layout	E	E	4	4	2
	Reference Case	A	A	4	4	1
	Local Plan	A	A	4	4	1
NB Diverge	Current Layout	D	D	4	4	4
	Reference Case	A	A	4	4	4
	Local Plan	A	A	4	4	4
SB Diverge	Current Layout	D	D	4	3	2
	Reference Case	C	A	4	4	1
	Local Plan	C	A	4	4	1

7.2.7 The current layout at junction 9 on all merges and diverges is sufficient to facilitate traffic with Horsham Local Plan.

M23 Junction 10 Copthorne Junction

7.2.8 Table 7-3 shows the flows for the M23 J10 merge & diverges. In general, the local plan has minor changes in flow compared to the reference case in both peak periods on the mainline.

Table 7-3: M23 Junction 10 Merge/Diverge Assessment Flows

Approach		Reference Case		LP		Difference	
		AM	PM	AM	PM	AM	PM
NB Merge	Mainline	3819	2485	3931	2522	112	37
	Merge	1620	2067	1593	2088	-27	21
SB Merge	Mainline	3379	4267	3405	4435	26	168
	Merge	573	1003	579	975	6	-28
NB Diverge	Mainline	3819	2485	3931	2522	112	37
	Diverge	1291	650	1279	688	-12	38
SB Diverge	Mainline	3379	4267	3405	4435	26	168
	Diverge	1706	1930	1696	1930	-9	0

7.2.9 The results of the assessment for the M23 J10 merge/diverge layout requirements are summarised in Table 7-4.

Table 7-4: M23 Junction 10 Merge/Diverge Layout Analysis

Approach	Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
		AM	PM			
NB Merge	Current Layout	E	E	3	4	2
	Reference Case	E	E	3	4	2
	Local Plan	E	E	3	4	2
SB Merge	Current Layout	A	A	3	3	2
	Reference Case	D	B	3	4	2
	Local Plan	D	B	3	4	2
NB Diverge	Current Layout	A	A	3	3	2
	Reference Case	A	A	3	3	1
	Local Plan	A	A	3	3	1
SB Diverge	Current Layout	D	D	4	3	2
	Reference Case	D	D	4	3	2
	Local Plan	D	D	4	3	2

7.2.10 The southbound merge is shown to require a layout type D with Reference case traffic added.

It is currently a type A. The Local Plan does not exacerbate this further.

M23 Junction 10 a

7.2.11 Table 7-5 shows the flows for the M23 J10a merge & diverges. In general, the local plan has minor changes in flow compared to the reference case in both peak periods on the mainline.

Table 7-5: M23 Junction 10a Merge/Diverge Assessment Flows

Approach		Reference Case		LP		Difference	
		AM	PM	AM	PM	AM	PM
M23 J9 NB Merge	Mainline	4592	2874	4691	3010	98	136
	Merge	517	261	519	201	2	-61
M23 J9 SB Diverge	Mainline	3783	4463	3801	4571	17	108
	Diverge	168	807	183	840	15	33

7.2.12 The results of the assessment for the M23 J10a merge/diverge layout requirements are summarised in Table 7-6. The results indicate that no further requirements of merge layout changes in comparison to the reference case are required.

Table 7-6: M23 Junction 10a Merge/Diverge Layout Analysis

Approach	Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
		AM	PM			
NB Merge	Current Layout	C	C	3	3	2
	Reference Case	A	A	3	3	1
	Local Plan	A	A	3	3	1
SB Diverge	Current Layout	B	B	4	3	2
	Reference Case	A	A	4	3	1
	Local Plan	A	A	4	3	1

7.2.13 The current layouts are sufficient to facilitate traffic flows with Local Plan traffic.

M23 Junction 11 Pease Pottage

7.2.14 Table 7-7 shows the flows in the AM and PM peak period for the M23 J11 merge & diverges. In general, the local plan has minor changes in flow compared to the reference case in both peak periods on the mainline. The SB merge flow has increases within the LP scenario of up to 104 vehicles in the AM and up to 190 vehicles in the PM peak.

Table 7-7: M23 Junction 11 Merge Assessment Flows

Approach		Reference Case		LP		Difference	
		AM	PM	AM	PM	AM	PM
NB Merge	Mainline	3022	1983	3067	2125	45	142
	Merge	1571	890	1624	884	54	-6
SB Merge	Mainline	2313	3017	2308	3207	-5	190
	Merge	1480	1626	1584	1498	104	-128
NB Diverge	Mainline	3022	1983	3067	2125	45	142
	Diverge	1930	1105	1930	1149	0	44
SB Diverge	Mainline	2313	3017	2308	3207	-5	190
	Diverge	1470	1446	1493	1364	23	-82

7.2.15 The results of the assessment for the M23 J11 merge/diverge layout requirements are summarised in Table 7-8.

Table 7-8: M23 Junction 11 Merge/Diverge Layout Analysis

Approach	Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
		AM	PM			
NB Merge	Current Layout	A	A	3	3	2
	Reference Case	E	A	2	3	1
	Local Plan	E	A	2	3	1
SB Merge	Current Layout	A	A	3	3	2
	Reference Case	E	E	2	3	2
	Local Plan	E	E	2	3	2
NB Diverge	Current Layout	A	B	3	3	2
	Reference Case	D	A	3	3	2
	Local Plan	D	A	3	3	2
SB Diverge	Current Layout	A	A	3	3	2
	Reference Case	D	D	3	2	2
	Local Plan	D	D	3	2	2

7.2.16 The outputs indicate that at a number of the merges and diverges, the current layouts are inadequate with Reference Case traffic flows. However, the Horsham Local Plan does not exacerbate this.

A23 southbound / B2114 Brighton Road Junction, Handcross

7.2.17 Flow outputs for the A23 / Brighton Road merge/diverge layout requirements are summarised in Table 7-9. Increase on the mainline are shown within both AM and the PM peak.

Table 7-9: A23 / Brighton Road Junction Merge Assessment Flows

Approach		Reference Case		LP		Difference	
		AM	PM	AM	PM	AM	PM
SB Diverge	Mainline	3388	4211	3480	4255	92	44
	Merge	405	432	412	450	6	18

7.2.18 The increase in flow does not change the junction merge requirement of the LP scenario in comparison to the reference case, as shown within Table 7-10 below.

Table 7-10: A23 / Brighton Road Junction Merge/Diverge Layout Analysis

Approach	Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
		AM	PM			
SB Diverge	Current Layout	A	A	3	3	1
	Reference Case	A	A	3	3	1
	Local Plan	A	A	3	3	1

7.2.19 From the above table the impacts of the Horsham Local plan on the junction indicate no additional requirement of lane changes in comparison to the reference case.

A23 / B2110 Junction, Handcross

7.2.20 Flow outputs for the assessment for the A23 / Brighton Road merge/diverge layout requirements are summarised in Table 7-11. Increase on the mainline are shown within the NB AM and both the AM and PM for the SB mainline (carried through from the A23 / Brighton Road junction).

Table 7-11: A23 / B2110 Junction Merge Assessment Flows

Approach		Reference Case		LP		Difference	
		AM	PM	AM	PM	AM	PM
NB Merge	Mainline	4434	2682	4485	2843	51	160
	Merge	645	406	650	432	5	25
SB Merge	Mainline	3388	4211	3480	4255	92	44
	Merge	22	28	22	21	0	-7
NB Diverge	Mainline	4434	2682	4485	2843	51	160
	Diverge	195	141	185	140	-10	-1

7.2.21 The increase in flow does not change the junction merge requirement of the LP scenario in comparison to the reference case, as shown within Table 17-2 below.

Table 7-12: A23 / B2110 Junction Merge/Diverge Layout Analysis

Approach	Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
		AM	PM			
NB Merge	Current Layout	A	A	3	3	1
	Reference Case	D	A	3	3	1
	Local Plan	D	D	3	3	1
SB Merge	Current Layout	B	B	3	3	1
	Reference Case	A	A	3	3	1
	Local Plan	A	A	3	3	1
NB Diverge	Current Layout	A	A	3	3	1
	Reference Case	A	A	3	3	1
	Local Plan	A	A	3	3	1

7.2.22 The results in Table 7-12 indicate that, whilst some variation in merge layout classification is observed for the northbound merge between the Reference Case and Local Plan scenario (AM vs PM), there are no changes to the required number of lanes. Overall, the Local Plan does not result in any additional mitigation requirements beyond those identified in the Reference Case.

A23 / B2115 Junction, Warninglid

7.2.23 Flow outputs for the assessment for the A23 / Brighton Road merge/diverge layout requirements are summarised in Table 7-13. Increase on the mainline are shown within the NB AM and both the AM and PM for the SB mainline.

Table 7-13: A23 / B2115 Junction Merge/Diverge Assessment Flows

Approach		Reference Case		LP		Difference	
		AM	PM	AM	PM	AM	PM
NB Merge	Mainline	4453	2751	4511	2908	59	158
	Merge	177	72	159	74	-18	2
SB Merge	Mainline	3132	4168	3218	4199	86	31
	Merge	451	936	470	785	19	-151
NB Diverge	Mainline	4453	2751	4511	2908	59	158
	Diverge	483	259	567	262	84	3
SB Diverge	Mainline	3132	4168	3218	4199	86	31
	Diverge	278	71	284	77	6	6

7.2.24 The increase in flow does not change the junction merge requirement of the LP scenario in comparison to the reference case, as shown within Table 7-14 below.

Table 7-14: A23 / B2115 Junction Merge/Diverge Layout Analysis

Approach	Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
		AM	PM			
NB Merge	Current Layout	A	A	3	3	1
	Reference Case	A	A	3	3	1
	Local Plan	A	A	3	3	1
SB Merge	Current Layout	A	A	3	3	1
	Reference Case	D	D	3	4	1
	Local Plan	D	D	3	4	1
NB Diverge	Current Layout	A	A	3	3	1
	Reference Case	C	C	4	3	1
	Local Plan	C	C	4	3	1
SB Diverge	Current Layout	A	A	3	3	1
	Reference Case	A	A	3	3	1
	Local Plan	A	A	3	3	1

7.2.25 The outputs indicate that at a number of the merges and diverges, the current layouts are inadequate with Reference Case traffic flows. However, the Horsham Local Plan does not exacerbate this.

A23 northbound / London Road Junction

7.2.26 Flow outputs for the assessment for the A23 / London Road merge/diverge layout requirements are summarised in Table 7-15.

Table 7-15: A23 / London Road Junction Merge/Diverge Assessment Flows

A23 / London Road		Reference Case		LP		Difference	
		AM	PM	AM	PM	AM	PM
NB Merge	Mainline	4936	3009	5078	3171	142	161
	Merge	0	0	0	0	0	0
NB Diverge	Mainline	4936	3009	5078	3171	142	161
	Diverge	0	0	0	0	0	0

7.2.27 The increase in flow does not alter the junction merge requirement of the LP scenario in comparison to the reference case, as shown within Table 7-16 below.

Table 7-16: A23 / London Road Junction Merge/Diverge Layout Analysis

Approach	Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
		AM	PM			
NB Merge	Current Layout	A	A	3	3	1
	Reference Case	A	A	3	3	1
	Local Plan	A	A	3	3	1
NB Diverge	Current Layout	A	A	3	3	1
	Reference Case	A	A	4	4	1
	Local Plan	A	A	4	4	1

7.2.28 From the above table the impacts of the Horsham Local plan on the junction indicate no change in layout requirements

A23 southbound exit slip / Broxmead Lane Junction

7.2.29 Flow outputs for the assessment for the A23 / Broxmead Lane merge/diverge layout requirements are summarised in Table 7-17.

Table 7-17: A23 / Broxmead Junction Diverge Assessment Flows

A23 / Broxmead Lane		Reference Case		LP		Difference	
		AM	PM	AM	PM	AM	PM
SB Diverge	Mainline	3512	4983	3592	4888	80	-95
	Diverge	71	122	96	96	25	-25

7.2.30 The increase in flow does not alter the junction merge requirement of the LP scenario in comparison to the reference case, as shown within Table 7-18 below.

Table 7-18: A23 / Broxmead Junction Merge/Diverge Layout Analysis

Approach	Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
		AM	PM			
SB Diverge	Current Layout	A	A	3	3	1
	Reference Case	A	A	4	4	1
	Local Plan	A	A	4	4	1

7.2.31 The table above shows that 4 lanes are required on the upstream and downstream in both the reference case and local plan. Further discussions with National Highways will be required.

A23 / A272, Bolney

7.2.32 Flow outputs for the assessment for the A23 / A272 merge/diverge layout requirements are summarised in Table 7-19. Increase on the mainline are shown within the NB AM and SB PM models.

Table 7-19: A23 / A272 Junction Merge Assessment Flows

Approach		Reference Case		LP		Difference	
		AM	PM	AM	PM	AM	PM
NB Merge	Mainline	3939	2610	3961	2842	21	232
	Merge	997	399	1118	328	121	-71
SB Merge	Mainline	3512	4653	3592	4430	80	-223
	Merge	253	663	402	573	149	-90
NB Diverge	Mainline	3939	2610	3961	2842	21	232
	Diverge	258	322	236	262	-21	-60
SB Diverge	Mainline	3512	4653	3592	4430	80	-223
	Diverge	0	330	0	458	0	128

7.2.33 The increase in flow does not alter the junction merge requirement of the LP scenario in comparison to the reference case, as shown within Table 7-20 below.

Table 7-20: A23 / A272 Junction Merge/Diverge Layout Analysis

Approach	Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
		AM	PM			
NB Merge	Current Layout	A	A	3	3	1
	Reference Case	D	A	3	4	1
	Local Plan	D	A	3	4	1
SB Merge	Current Layout	A	A	3	3	1
	Reference Case	A	D	3	4	1
	Local Plan	A	D	3	4	1
NB Diverge	Current Layout	A	A	3	3	1
	Reference Case	A	A	3	3	1
	Local Plan	A	A	3	3	1
SB Diverge	Current Layout	B	B	3	3	1
	Reference Case	A	C	4	3	1
	Local Plan	A	C	4	3	1

7.2.34 The assessment results in Table 7-20 indicate that the merge and diverge layout requirements, including the need for four upstream lanes on the southbound diverge and a D merge layout, are consistent between the Reference Case and Local Plan scenarios.

A23 / A2300 Junction, Hickstead

7.2.35 Flow outputs for the assessment for the A23 / A2300 merge/diverge layout requirements are summarised in Table 7-21. Increase on the mainline are shown along the SB mainline within both the AM and PM peak models and the NB PM models.

Table 7-21: A23 / A2300 Junction Merge/Diverge Assessment Flows

A23 / A2300		Reference Case		LP		Difference	
		AM	PM	AM	PM	AM	PM
NB Merge	Mainline	4159	2403	4164	2482	5	78
	Merge	52	529	46	623	-5	93
SB Merge	Mainline	2476	3348	2692	3709	216	360
	Merge	846	66	639	105	-207	39
NB Diverge	Mainline	4159	2403	4164	2482	5	78
	Diverge	1	30	0	181	-1	151
SB Diverge	Mainline	2476	3348	2692	3709	216	360
	Diverge	1289	1930	1302	1295	13	-635

7.2.36 The increase in flow does not alter the junction merge requirement of the LP scenario in comparison to the reference case, as shown within Table 7-22 below.

Table 7-22: A23 / A2300 Junction Merge/Diverge Layout Analysis

Approach	Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
		AM	PM			
NB Merge	Current Layout	D	D	2	3	1
	Reference Case	A	A	3	3	1
	Local Plan	A	A	3	3	1
SB Merge	Current Layout	B	B	2	2	1
	Reference Case	D	A	3	3	2
	Local Plan	D	A	3	3	1
NB Diverge	Current Layout	A	A	2	2	1
	Reference Case	A	A	3	3	1
	Local Plan	A	A	3	3	1
SB Diverge	Current Layout	C	C	3	2	2
	Reference Case	D	D	4	3	2
	Local Plan	D	D	4	3	2

7.2.37 From the above table the impacts of the Horsham Local plan on the junction indicate no change in lane requirements from the Reference Case to the Local Plan.

A23 / B2118 Junction, Sayers Common

7.2.38 Flow outputs for the assessment for the A23 / B2118 merge/diverge layout requirements are summarised in Table 7-23.

Table 7-23: A23 / B2118 Junction Merge/Diverge Assessment Flows

Approach		Reference Case		LP		Difference	
		AM	PM	AM	PM	AM	PM
NB Merge	Mainline	3707	2263	3757	2396	49	133
	Merge	562	171	522	267	-40	96
SB Diverge	Mainline	2724	3132	2738	3273	14	141
	Diverge	597	283	593	541	-4	258

7.2.39 The results of the assessment for the A23 / B2118 merge/diverge layout requirements are summarised in Table 7-24 below.

Table 7-24: A23 / B2118 Junction Merge/Diverge Layout Analysis

Approach	Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
		AM	PM			
NB Merge	Current Layout	B	B	2	2	1
	Reference Case	D	D	3	3	1
	Local Plan	D	A	3	3	1
SB Diverge	Current Layout	B	B	2	2	1
	Reference Case	A	A	3	3	1
	Local Plan	A	A	3	3	1

7.2.40 The table shows that an additional upstream and downstream lane are required in the reference case and local plan case. The local plan scenario is shown to not require further mitigation in comparison to the Reference Case.

A23 / B2117 Junction, Muddleswood

7.2.41 Flow outputs for the assessment for the A23 / B2117 merge/diverge layout requirements are summarised in Table 7-25.

Table 7-25: A23 / B2117 Junction Merge/Diverge Assessment Flows

A23 / B2117		Reference Case		LP		Difference	
		AM	PM	AM	PM	AM	PM
NB Diverge	Mainline	3707	2263	3757	2396	49	133
	Diverge	345	499	341	512	-4	13
SB Merge	Mainline	2724	3132	2738	3273	14	141
	Merge	747	399	693	297	-54	-102

7.2.42 The results of the assessment for the A23 / B2117 merge/diverge layout requirements are summarised in Table 7-26 below.

Table 7-26: A23 / B2117 Junction Merge/Diverge Layout Analysis

Approach	Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
		AM	PM			
NB Diverge	Current Layout	B	B	2	2	2
	Reference Case	A	A	3	3	1
	Local Plan	A	A	3	3	1
SB Merge	Current Layout	B	B	2	2	2
	Reference Case	D	D	3	3	1
	Local Plan	D	A	3	3	1

7.2.43 From the above table the impacts of the Horsham Local plan on the junction indicate no change in lane requirements from the Reference Case to the Local Plan.

A23 / A281 Junction, Pyecombe north

7.2.44 Flow outputs for the assessment for the A23 / A281 merge/diverge layout requirements are summarised in Table 7-27. Increases are noted within the PM Peak, in particular for the NB Mainline and NB Diverge

Table 7-27: A23 / A281 Junction Merge/Diverge Assessment Flows

Approach		Reference Case		LP		Difference	
		AM	PM	AM	PM	AM	PM
NB Merge	Mainline	4028	2762	4068	2908	40	146
	Merge	25	0	30	0	6	0
SB Merge	Mainline	3472	3531	3431	3569	-41	39
	Merge	26	0	90	0	64	0
NB Diverge	Mainline	4028	2762	4068	2908	40	146
	Diverge	110	153	122	189	12	37

7.2.45 The results of the assessment for the A23 / A281 merge/diverge layout requirements are summarised in Table 7-28 below. The highlighted flow increase shown within the PM peak do not alter the merge layout requirements.

Table 7-28: A23 / A281 Junction Merge/Diverge Layout Analysis

Approach	Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
		AM	PM			
NB Merge	Current Layout	A	A	2	2	1
	Reference Case	A	A	3	3	1
	Local Plan	A	A	3	3	1
SB Merge	Current Layout	A	A	2	2	1
	Reference Case	A	A	3	3	1
	Local Plan	A	A	3	3	1
NB Diverge	Current Layout	A	A	2	2	1
	Reference Case	A	A	3	3	1
	Local Plan	A	C	3	3	1

7.2.46 The table shows that the junction may require extra in the Local Plan scenario. The local plan scenario is shown to not require further mitigation in comparison to the Reference Case.

A23 / South Downs Way Junction

7.2.47 Flow outputs for the assessment for the A23 / South Downs Way merge/diverge layout requirements are summarised in Table 7-29. Increases are noted within the NB mainline within both the AM and PM peak.

Table 7-29: A23 / South Downs Way Junction Merge/Diverge Assessment Flows

Approach		Reference Case		LP		Difference	
		AM	PM	AM	PM	AM	PM
NB Merge	Mainline	3983	2914	4076	3097	93	182
	Merge	154	0	114	0	-40	0
SB Diverge	Mainline	3498	3531	3520	3569	22	39
	Diverge	1	0	1	0	1	0

7.2.48 The results of the assessment for the A23 / A281 merge/diverge layout requirements are summarised in Table 7-30 below. The highlighted flow increase shown within the NB mainline do not alter the merge layout requirements.

Table 7-30: A23 / South Downs Way Junction Merge/Diverge Layout Analysis

Approach	Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
		AM	PM			
NB Merge	Current Layout	A	A	2	2	1
	Reference Case	A	A	3	3	1
	Local Plan	A	A	3	3	1
SB Diverge	Current Layout	A	A	2	2	1
	Reference Case	A	A	3	3	1
	Local Plan	A	A	3	3	1

7.2.49 The local plan scenario is shown to not require further mitigation in comparison to the Reference Case.

A23 / A273

7.2.50 Flow outputs for the assessment for the A23 / A273 merge/diverge layout requirements are summarised in Table 7-31. Increases are noted within the NB mainline within both the AM and PM peak.

Table 7-31: A23 / A273 Assessment Flows (Vehicles)

A23 / A273		Reference Case		LP		Difference	
		AM	PM	AM	PM	AM	PM
NB Diverge	Mainline	3983	2914	4076	3097	93	182
	Diverge	1023	1233	1025	1223	2	-10
SB Merge	Mainline	3498	3531	3520	3569	22	38
	Merge	1030	1122	1055	1114	25	-8

7.2.51 The results of the assessment for the A23 / A273 merge/diverge layout requirements are summarised in Table 7-32 below. The highlighted flow increase shown within the NB mainline do not alter the merge layout requirements.

Table 7-32: A23 / A273 Merge – Diverge Summary

Approach	Scenario	Merge Layouts		Upstream mainline lanes	Downstream Mainline Lanes	Connector Road Lanes
		AM	PM			
NB Diverge	Current Layout	C	C	3	2	2
	Reference Case	C	D	4	3	2
	Local Plan	C	D	4	3	2
SB Merge	Current Layout	D	D	2	3	2
	Reference Case	B	B	3	4	2
	Local Plan	B	B	3	4	2

7.2.52 The table shows that an additional upstream and downstream lane are required in the reference case and local plan case for the northbound and southbound merges. The local plan scenario is shown to not require further mitigation in comparison to the Reference Case.

7.3 Capacity & Travel Demand Analysis

7.3.1 Additional assessment has been undertaken reviewing the Volume to Capacity ratios of the SRN network and analysing impacts resulting from the LP traffic scenario on the following V/C outputs tables.

Table 7-33: Junction Capacity Outputs – SRN - AM Peak

Label	Junction Name	2040 Reference Case	2040 Local Plan Scenario	2040 Local Plan Scenario with Sus
A23 Bolney Junction	A23 Bolney Junction West Roundabout	100	100	100
A23 Hickstead Junction	A2300 northbound slip to A23	136.71	139.73	138.41
A23 Hickstead Junction	A23 northbound offslip at the roundabout at Hickstead	57.31	57.28	57.33
A23 Hickstead Junction	West Hickstead Lane Approach to HA23 Hickstead Roundabout Junction	102.09	102.14	102.22
A23 Hickstead Junction	A23 Hickstead Junction SB On Slip	75.49	76.7	76.25
A23 Pyecombe Junction	A23 at Pangdean Farm	107.8	108.96	109.15
A23 Pyecombe Junction	A23 NB Offslip to A273	94.83	97.21	97.64
A23 Pyecombe Junction	A23 Access from West Road West of Pycombe	95.9	101.42	101.44
A23 Pyecombe Junction	A23 NB On Slip Pyecombe Junction	98.78	100.52	100.37
A23 Pyecombe Junction	A23 NB Off Slip West of Pyecombe Junction	98.74	100.03	100.06

Label	Junction Name	2040 Reference Case	2040 Local Plan Scenario	2040 Local Plan Scenario with Sus
A23 Sayers Common Junction	B2118 merge onto A23 northbound	124.15	128.21	128.22
M23 J10	M23 J10 NB Off Slip Approach to Roundabout	102.09	102.28	102.22
M23 J10	M23 J10 Off Slip	88.38	88.04	87.87
M23 J10	M23 Northbound slip road merge at J10	86.79	87.08	87.28
M23 J11	A23 northbound slip road entry before M23 J11	106.6	107.2	107.36
M23 J11	Exit onto A264 WB at M23 Junction 11 roundabout	48.69	49.38	49.44
M23 J11	M23 J11 Roundabout NB Offslip Approach	97.8	100.64	100.68
M23 J11	A264 Exit at M23 Junction 11 roundabout	77.58	79.69	79.79
M23 J11	M23 southbound slip at M23 junction 11 roundabout	74.56	81.61	81.27
M23 J11	Horsham Rd/Brighton Road roundabout	76.9	81.5	81.51
M23 J9	M23 J9 Off Slip	94.91	95.11	95.17

Table 7-34: Junction Capacity Outputs – SRN - PM Peak

Label	Junction Name	2040 Reference Case	2040 Local Plan Scenario	2040 Local Plan Scenario with Sus
A23 Bolney Junction	A23 Bolney Junction West Roundabout	100	100	100
A23 Hickstead Junction	A2300 northbound slip to A23	66.32	70.4	68.2
A23 Hickstead Junction	A23 northbound offslip at the roundabout at Hickstead	102.06	105.62	105.97
A23 Hickstead Junction	West Hickstead Lane Approach to HA23 Hickstead Roundabout Junction	110.05	109.9	109.94
A23 Hickstead Junction	A23 Hickstead Junction SB On Slip	81.11	90.73	90.33
A23 Pyecombe Junction	A23 at Pangdean Farm	110.78	111.49	111.01
A23 Pyecombe Junction	A23 NB Offslip to A273	69.39	73.7	71.68
A23 Pyecombe Junction	A23 Access from West Road West of Pycombe	65.76	69.19	67.17
A23 Pyecombe Junction	A23 NB On Slip Pyecombe Junction	69.39	73.7	71.68
A23 Pyecombe Junction	A23 NB Off Slip West of Pyecombe Junction	69.71	74.1	72.08
A23 Sayers Common Junction	B2118 merge onto A23 northbound	56.37	61.23	58.82

Label	Junction Name	2040 Reference Case	2040 Local Plan Scenario	2040 Local Plan Scenario with Sus
M23 J10	M23 J10 NB Off Slip Approach to Roundabout	67.19	68.61	68.3
M23 J10	M23 J10 Off Slip	100.76	100.99	100.89
M23 J10	M23 Northbound slip road merge at J10	99.95	100.06	99.83
M23 J11	A23 northbound slip road entry before M23 J11	57.25	59.28	58.67
M23 J11	Exit onto A264 WB at M23 Junction 11 roundabout	41.77	41.27	40.91
M23 J11	M23 J11 Roundabout NB Offslip Approach	86.07	86.8	86.8
M23 J11	A264 Exit at M23 Junction 11 roundabout	48.3	48.45	48.53
M23 J11	M23 southbound slip at M23 junction 11 roundabout	102.13	102.82	102.91
M23 J11	Horsham Rd/Brighton Road roundabout	76.31	78.14	76.34
M23 J9	M23 J9 Off Slip	95.52	95.24	95.56

7.3.2 Analysis of each highlighted junction in the table above is described within the points below.

A23 Bolney Junction

7.3.3 Flow restricted to capacity at EB approach to roundabout within both reference case and preferred scenario within both the AM & PM Peak. **No mitigation required.**

A23 Hickstead Junction – A2300 NB on-slip merge to A23

7.3.4 Slip road significantly over capacity within AM reference case, restricted merge capacity within reference case due to large mainline flow. **No mitigation required.**

A23 Hickstead Junction - A23 NB off-slip approach to A2300 roundabout

7.3.5 Restricted Capacity at give way within the PM reference case due to large circulator flow. No V/C increase within the LP preferred scenario in AM but significant increase in PM. **No mitigation required.**

A23 Hickstead Junction - West Hickstead Lane Approach to A23 Hickstead Roundabout Junction

7.3.6 Reduction of V/C within the PM LP scenario due to background traffic flow re-routing. **No mitigation required.**

A23 Hickstead Junction - A23 Hickstead Junction SB on Slip Merge

7.3.7 AM/PM – Similar level of V/C with the LP scenario when compared against the Reference case. **No mitigation required.**

A23 Pyecombe Junction – A23 SB Mainline “Q” merge point From Junction

- 7.3.8 Pseudo node representing the merge highlighted as being over capacity within reference case, LP preferred scenario increase this, however this is an existing background growth issue within the reference case AM & PM models. **No mitigation required.**

A23 Pyecombe Junction - A23 NB Off-slip Diverge

- 7.3.9 AM Mainline flow increase within the LP preferred scenario taking the 2-lane mainline diverge to be at capacity. It should be noted that this is a minor turning with minor flow that reduces within the mitigated scenario. **No further mitigation required.**

A23 Pyecombe Junction - A23 Access from West Road West of Pyecombe

- 7.3.10 Close to capacity within reference case AM, increase in flow in LP scenario along the A23 mainline results in increased V/C of merge. It should be noted that this is a minor turning with minor flow. **No further mitigation required.**

A23 Pyecombe Junction - A23 NB On-slip Merge

- 7.3.11 PM increase of mainline flow increasing V/C within the LP scenario. It should be noted that the NB on slip is a minor turning point with minor flows. **No further mitigation required.**

A23 Sayers Common Junction - B2118 NB on-slip merge

- 7.3.12 AM reference case significantly over capacity on merge due to high flow on mainline (at capacity) leaving no capacity for additional LP trips. **No mitigation required**

M23 J10 – NB Off-slip approach to Junction

- 7.3.13 V/C increase in LP scenario now being over capacity in AM only. **Changing of signal timings required, and model indicates this should be possible.**

M23 J10 – SB Off-slip Diverge

- 7.3.14 No V/C significant increase in AM or PM LP Preferred scenario **No further mitigation required.**

M23 J11 – NB Off-slip Diverge

- 7.3.15 No V/C increase in AM or PM LP Preferred scenario **No further mitigation required.**

M23 J11 – EB A264 EB Exit

- 7.3.16 Blocking Back signalisation optimisation issues within the AM Reference Case no worse within LP scenario. **Changing of signal timings required, and model indicates this should be possible.**

M23 J11 – NB Off slip Approach to Gyratory

- 7.3.17 Blocking Back signalisation optimisation issues within the AM & PM Reference Case no worse within LP scenario. **Changing of signal timings required, and model indicates this should be possible.**

M23 J11 – A24 WB Approach to Gyratory

- 7.3.18 Blocking Back signalisation optimisation issues within the AM Reference Case no worse within LP scenario. **Changing of signal timings required, and model indicates this should be possible.**

M23 J11 – SB off-slip approach to gyratory

- 7.3.19 Increase flow on circulatory with AM & PM LP scenario. Only over capacity in PM. **Changing of signal timings required and model indicates this should be possible.**

M23 J11 - Horsham Rd/Brighton Road roundabout

- 7.3.20 PM LP Preferred scenario V/C increase of Horsham Road WB approach due to increase in flow within the LP scenario. **Changing of signal timings required, and model indicates this should be possible.**

7.4 Strategic Road Network Assessment Summary

- 7.4.1 The assessment of the impacts of the Local Plan on the SRN, has indicated that the A23 is already over capacity within the Reference Case model, due to the amount of additional traffic being added from the south coast towns, travelling north towards the M25 and London, as well as growth from Mid Sussex and Crawley.
- 7.4.2 The merge-diverge assessments do show that there are a number of locations where the current layouts are not sufficient to accommodate the forecast growth, however in all cases the Reference Case traffic growth causes the issues, and the Horsham Local Plan does not exacerbate these issues. The outcomes of this should be discussed further with National Highways,

8 Summary and Conclusions

8.1 Report Context

- 8.1.1 This report has been prepared by Stantec on behalf of Horsham District Council to provide technical evidence of the traffic impact impacts in context of the Local Plan Preferred Scenario for the period up to 2040.
- 8.1.2 The Transport Assessment derives its outputs and recommendations from the Horsham Transport Model forecasts, built in accordance with DfT Transport modelling guidance. This involves a fixed vehicle matrix approach in which origin to destination travel demand within the model respond to changes in network costs (combination of travel time and travel distance) in order to re-route to an optimal travel path.

8.2 Approach to Analysis

- 8.2.1 The modelling has been used to assess the Horsham Preferred Local Plan scenario. The approach focuses on mitigation through sustainable measures and informing any residual impacts where highway mitigation requires consideration.
- 8.2.2 The study has assessed the impacts of the Horsham Preferred Scenarios by comparing the performance of the highway network within Horsham and immediate neighbouring area and comparing these with the Reference Case outputs.
- 8.2.3 Where the network is shown to perform worse than the Reference Case and junctions are over-capacity, further analysis is undertaken to inform a mitigation strategy.
- 8.2.4 It is not the purpose of the Local Plan mitigation to resolve all forecast congestion issues within the Horsham network. If issues are shown to exist within the reference case scenario, prior to adding in Preferred Local Plan scenario growth, mitigation of local plan impacts is required to ensure that congestion and delays do not exceed reference case scenario level of congestion.

8.3 Sustainable Transport

- 8.3.1 Consideration has been given to sustainable travel measures that could impact on how people travel in the future and achieve a mode shift from car use.
- 8.3.2 The local plan development sites are proposed to comprise of sustainable transport measures that promote and encourage more sustainable active travel modes. This includes improved public transport, cycling and walking facilities.
- 8.3.3 A number of the site promoters have indicated the need for improving bus services between Horsham and Crawley, in order to provide more attractive alternatives to the private car. This would include provision of bus priority at Moorhead and Faygate roundabouts, in order to improve journey times and bus reliability on this section of the corridor.
- 8.3.4 Further Local Plan site-specific sustainable mitigation measures have been discussed and agreed with WSCC. The ideas are used to inform a level of car trip reduction in addition to the internalisation and the soft measures outlined previously. The car trip reduction rates are input within the Local Plan Forecasts.
- 8.3.5 Junctions initially identified as requiring further mitigation were analysed to understand whether the capacity shortcomings could be addressed through further sustainable mitigation measures (i.e. those likely to reduce car trips) connected with the Horsham Transport Strategy and to minimise as far as possible the need for physical mitigation.

8.3.6 Proposed measures included the prioritisation of active modes, where specifically feasible to reduce localised car trips further, and the general projection of virtual mobility (i.e. increased opportunity to work from home, due to technological advances reducing need to commute and reduce face to face meetings). The effect was to reduce car trips.

8.3.7 In addition, where junctions are signalised and only just over the threshold for requiring mitigation, the signal timings and V/C on all arms were examined, to explore whether there would be an opportunity to alter the signal timings. This typically involved looking at where the worse performing movement could be given more green time, without unduly impacting upon opposing movements which had plenty of spare capacity.

8.3.8 The following junctions were seen to be only just over the threshold based on the preferred strategy and could be dealt with through the measures above. The junction locations are highlighted within figure 8-1.

1. A283/A29 Pulborough Roundabouts (Sustainable Measures)
2. A272/A281 Roundabout, Southern Roundabout (Cowfold) (Sustainable Measures)
3. A281 Albion Way/Springfield Road (Signal Optimisation)
4. Bar Lane/A24 Southbound Approach to Buck Barn (Sustainable Measures)
5. Southwater Street/Worthing Road (Sustainable Measures)
6. Five Oaks Road/A264 Westbound (South of Newbridge Roundabout) (Sustainable Measures)
7. Five Oaks Road/Lyon Road (Sustainable Measures)
8. Stane Street/New Road Roundabout (Sustainable Measures)
9. Moorhead Roundabout (A264 Approach) (Signal Optimisation)

8.4 Highway Mitigation

8.4.1 Where it has been demonstrated that sustainable travel measures would not be enough to fully mitigate the impacts of the Local Plan, further mitigation measures have been assessed.

8.4.2 The following junctions are shown to require physical mitigation within Horsham District. The junction locations are highlighted within Figure 8-1.

1. Hop Oast Roundabout
2. Buck Barn Junction
3. Washington Roundabout

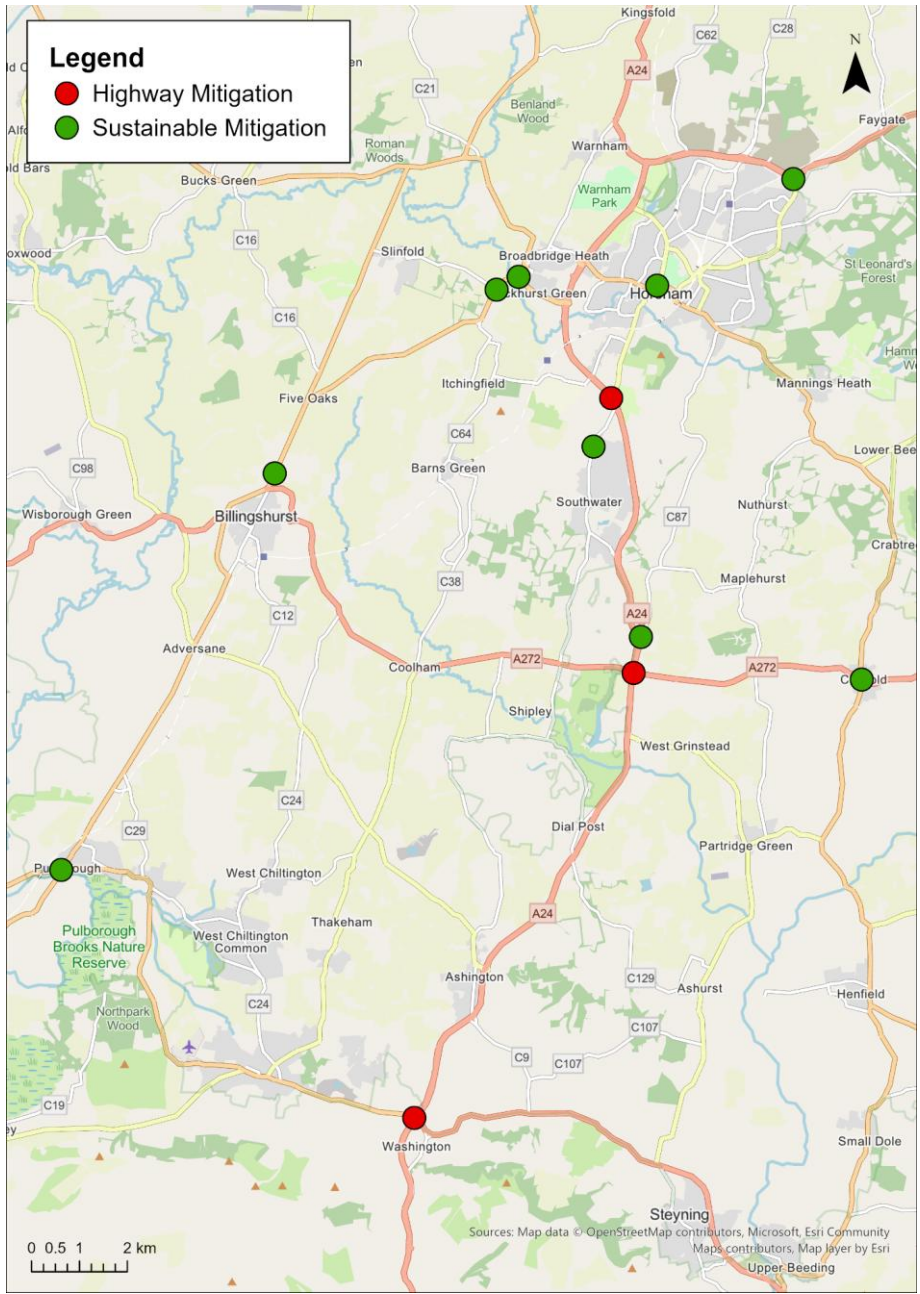


Figure 8-1: Junction Mitigation Locations

8.5 Strategic Road Network

8.5.1 The assessment of the impacts of the Local Plan on the SRN, has indicated that the A23 is already over capacity within the Reference Case model, due to the amount of additional traffic being added from the south coast towns, travelling north towards the M25 and London, as well as growth from Mid Sussex and Crawley. This additional traffic is resultant from background growth of traffic not related to the Horsham Local Plan developments and therefore the majority of impacts arise due to increases in background growth from elsewhere.

8.6 Conclusion

- 8.6.1 Modelling has been undertaken to inform this Transport Assessment for the local plan scenario. The work has considered, at a high level, the sustainable travel mitigation and impact on traffic levels across Horsham District and any impacts within neighbouring authorities and on the Strategic Road Network, which in this case is the A23 and M23.
- 8.6.2 Limited physical highway mitigation is proposed, with two junctions on the A24 corridor being shown to require mitigation, which is deemed to be deliverable through the Local Plan process.
- 8.6.3 Proposed sustainable and physical mitigations are shown to alleviate significant increases of congestion which result from the Local Plan preferred scenario. Furthermore, the sustainable mitigation measures which have been included within the modelling assessment are deemed to be conservative in terms of the mode shift away from cars and therefore the physical mitigation requirements shown, may be reduced if more ambitious sustainable transport measures and targets made by individual site promoters are realised.
- 8.6.4 The impact of the Local Plan on the SRN is difficult to assess due to it already being congested in the Reference Case model. It is recommended that further discussions are held with National Highways to discuss this.
- 8.6.5 The merge-diverge assessments on the SRN do show that there are a number of locations where the current layouts are not sufficient to accommodate the forecast growth, however in all cases the Reference Case traffic growth causes the issues, and the Horsham Local Plan does not exacerbate these issues. The outcomes of this should be discussed further with National Highways,

Appendix A Horsham Transport Model Data Report

**Appendix B Horsham Highway Model Local Model
Validation Report**

Appendix C Traffic Data Review

Appendix D Horsham Highway Model Forecast Report

Appendix E TRICS Trip Rate Derivation

Appendix F Zones used for Trip Distribution

**Appendix G Reference Case v. Preferred Scenario
Flow Differences**

Appendix H Reference Case v. Preferred Scenario Delay Differences

Appendix I High Level Mitigation Costs

Appendix J M23/A23 Merge Diverge Assessments