# Appendix A Local Plan Scenarios Analysis Horsham Highway Model Data Collection Report



# **Horsham Transport Study**

Local Plan Scenario Analysis



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## **1** Introduction

## 1.1 Background

- 1.1.1 Stantec was commissioned by Horsham District Council (HDC) to undertake a transport study to inform the emerging Horsham Local Plan.
- 1.1.2 The purpose of the study is to build a strategic highway model to underpin the assessment of the Local Plan impacts. This model will then be 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 2036 within Horsham District. The highway impacts in neighbouring authorities and on the Strategic Road network managed by Highways England (HE) 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 Ministry of Communities and Local Government Guidance, Transport Evidence Bases in Plan Making and Decision Taking, March 2015<sup>1</sup>. 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 (Surrey), Chichester, Arun and Adur. The Office for National Statistics mid-2018 population estimate for the District was just above 142,000.
- 1.2.2 Horsham is the main settlement within the District, Other major areas of population within Horsham District being Billinghurst, Storrington & Sullington, Pulborough, Henfield & Southwater, Broadbridge Heath and Steyning/Bramber/Upper Beeding.
- 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 the district is the A23. This is one of the main north-south routes from the south coast (Brighton) to London and forms part of Highways 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.

<sup>&</sup>lt;sup>1</sup> 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 750 dwellings (up from 664 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 2037. 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.

### 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 and to inform the Transport Evidence Base as part of the Local Plan process. 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 development scenarios.
- 1.4.2 It should be noted that the quanta 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 an emerging strategy emerges, the sites and capacity for development may change as a result of the evolving evidence base. It should also be noted that this stage of modelling tests impacts up until 2036. Since the start of the exercise, the Local Plan period has been extended to 31 March 2037. It is considered that the outcome of modelling up until 2036 is still valid given the purpose of this stage is to assess the high-level relative impacts of the scenarios being tested and the uncertainties inherent with forecasting of traffic growth 15/16 years in to the future.

## 1.5 Report Structure

- 1.5.1 Following this introduction, the report is broken down as follows:
  - Section 2 provides an overview of the Local Plan development scenarios modelled as part of this study.
  - Section 3 provides an overview of the modelling approach to assessing the traffic impact of the Local Development Scenarios; and
  - Section 4 details the outputs of the modelling prior to consideration of any mitigation.



## 2 Local Plan Scenarios

- 2.1.1 The transport assessment has been based on five spatial scenarios as set out in Tables 2.1 to 2.5. The data feeding into the development of the models may be subject to change, however for this stage of the study using the most appropriate data available at the time of developing the models is the proportionate approach.
- 2.1.2 The tables show the developments that have been included explicitly within the modelling for each scenario, with an additional allowance for windfall sites. These can be summarised as follows (note the 'dwellings per annum' includes existing commitments):
  - Scenario 1 1,000 homes per annum
  - Scenario 2 Medium Growth 1,164 homes per annum. New settlement plus settlement hierarchy (Mayfield):
  - Scenario 3: Medium Growth 1,164 homes per annum. New settlement plus settlement hierarchy (Buck Barn)
  - Scenario 4: Medium Growth 1164 Homes per annum. New settlement plus settlement hierarchy (Adversane)
  - Scenario 5: High Growth Urban Extension and New Settlements
- 2.1.3 Locations of the Strategic Sites are shown in Figures 2.1 to 2.5.

Development Location	Plan Period	Overall	Employment
West of Ifield (SA101)	2,500	9,200	750 B1a, b / 220 B1b/B8
East of Billingshurst (SA118)	650	650	410 B1a, b / 120 B1b/B8
West of Kilnwood Vale Extension (SA341)	800	800	270 B1a, b / 80 B1b/B8
Rookwood (SA394)	900	900	310 B1a, b / 90 B1b/B8
West of Southwater (SA119)	800	1,200	410 B1a, b / 120 B1b/B8
North Horsham densification (SA296)	250	500	6.4 ha
Ashington	600		
TOTAL	8,050		

Table 2.2:Scenario 1 Neighbourhood Plan Sites

Development Location	Plan Period	Overall	Employment
Barns Green	50		
Billingshurst	0		19,200 sqm
Broadbridge Heath	150		3.7 ha
Cowfold	75		
Henfield	350		
Horsham - Forest ward	100		3.7 ha
Lower Beeding	35		
North Horsham parish	300		



Development Location	Plan Period	Overall	Employment
Partridge Green	200		3.9 ha
Pulborough	275		3 ha
Rudgwick	50		
Small Dole	20		
Steyning	50		
Storrington & Sullington	100		
Thakeham	50		
Upper Beeding	70		
Warnham	50		3 ha
West Chiltington	25		
North and south of Buck Barn Petrol Filling Station	0		5.5 ha
Land South of Hop Oast Roundabout	0		1 ha
TOTAL	18,330		

Table 2.3: Scenario 2 Strategic Sites

Development Location	Plan Period	Overall	Employment
Mayfield (SA414)	1,900	7,000	680 B1a, b / 200 B1b/B8
West of Ifield (SA101)	2,500	10,000	750 B1a, b / 220 B1b/B8
West of Southwater (SA119)	800		410 B1a, b / 120 B1b/B8
East of Billingshurst (SA118)	650		410 B1a, b / 120 B1b/B8
Rookwood (SA394)	900		310 B1a, b / 90 B1b/B8
West of Kilnwood Vale Extension (SA341)	800		270 B1a, b / 80 B1b/B8
North Horsham densification	500		6.4 ha
TOTAL	8,050		

#### Table 2.4: Scenario 2 Neighbourhood Plan Sites

Development Location	Plan Period	Overall	Employment	
Ashington	600			
Barns Green	50			
Billingshurst	0		19,200 sqm	
Broadbridge Heath	150		3.7 ha	
Cowfold	75			
Henfield	0			
Christs Hospital	30			
Horsham - Forest ward	100		3.7 ha	
Lower Beeding	35			
North Horsham parish	300			
Partridge Green	200		3.9 ha	
Pulborough	275		3 ha	

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Development Location	Plan Period	Overall	Employment
Rudgwick	50		
Small Dole	20		
Steyning	50		
Storrington & Sullington	100		
Thakeham	50		
Upper Beeding	70		
Warnham	50		3 ha
West Chiltington	25		
North and south of Buck Barn Petrol Filling Station	0		5.5 ha
Land South of Hop Oast Roundabout	0		1 ha
TOTAL	10,280		

#### Table 2.5: Scenario 3 Strategic Sites

Development Location	Plan Period	Overall	Employment
Buck Barn (SA716)	2,100	3,500	680 B1a, b / 200 B1b/B8
West of Ifield (SA101)	2,500	10,000	750 B1a, b / 220 B1b/B8
West of Southwater (SA119)	800		410 B1a, b / 120 B1b/B8
East of Billingshurst (SA118)	650		410 B1a, b / 120 B1b/B8
Rookwood (SA394)	900		310 B1a, b / 90 B1b/B8
West of Kilnwood Vale Extension (SA341)	800		270 B1a, b / 80 B1b/B8
North Horsham densification (SA296)	500		6.4 ha
TOTAL	8,250		

#### Table 2.6: Scenario 3 Neighbourhood Plan Sites

Development Location	Plan Period	Overall	Employment
Ashington	600		
Barns Green	50		
Billingshurst	0		19,200 sqm
Broadbridge Heath	150		3.7 ha
Christs Hospital	30		
Cowfold	0		
Henfield	350		
Horsham - Forest ward	100		3.7 ha
Lower Beeding	35		
North Horsham parish	300		
Partridge Green	200		3.9 ha
Pulborough	275		3 ha
Rudgwick	50		



Development Location	Plan Period	Overall	Employment
Small Dole	20		
Steyning	50		
Storrington & Sullington	100		
Thakeham	50		
Upper Beeding	70		
Warnham	50		3 ha
West Chiltington	25		
North and south of Buck Barn Petrol Filling Station	0		5.5 ha
Land South of Hop Oast Roundabout	0		1 ha
TOTAL	10,755		

#### Table 2.7: Scenario 4 Strategic Sites

Development Location	Plan Period	Overall	Employment
Adversane	2,100	3,500	2.0 ha
West of Ifield (SA101)	2,500	10,000	750 B1a, b / 220 B1b/B8
West of Southwater (SA119)	800		410 B1a, b / 120 B1b/B8
East of Billingshurst (SA118)	650		410 B1a, b / 120 B1b/B8
Rookwood (SA394)	900		310 B1a, b / 90 B1b/B8
West of Kilnwood Vale Extension (SA341)	800		270 B1a, b / 80 B1b/B8
North Horsham densification (SA296)	500		6.4 ha
TOTAL	8,250		

#### Table 2.8: Scenario 4 Neighbourhood Plan Sites

Development Location	Plan Period	Overall	Employment
Ashington	600		
Barns Green	50		
Billingshurst	0		19,200 sqm
Broadbridge Heath	150		3.7 ha
Cowfold	75		
Christs Hospital	30		
Henfield	350		
Horsham - Forest ward	100		3.7 ha
Lower Beeding	35		
North Horsham parish	300		
Partridge Green	200		3.9 ha
Pulborough	275		3 ha
Rudgwick	50		
Small Dole	20		



Development Location	Plan Period	Overall	Employment
Steyning	50		
Storrington & Sullington	100		
Thakeham	50		
Upper Beeding	70		
Warnham	50		3 ha
West Chiltington	25		
North and south of Buck Barn Petrol Filling Station	0		5.5 ha
Land South of Hop Oast Roundabout	0		1 ha
TOTAL	10,830		

#### Table 2.9: Scenario 5 Strategic Sites

Development Location	Plan Period	Overall	Employment
Adversane	2,100	3,500	2.0 ha
Buck Barn (SA716)	2,100	3500	680 B1a, b / 200 B1b/B8
Mayfield (SA414)	1,900	7,000	680 B1a, b / 200 B1b/B8
West of Ifield (SA101)	2,500	10,000	750 B1a, b / 220 B1b/B8
West of Southwater (SA119)	800		410 B1a, b / 120 B1b/B8
East of Billingshurst (SA118)	650		410 B1a, b / 120 B1b/B8
Rookwood (SA394)	900		310 B1a, b / 90 B1b/B8
West of Kilnwood Vale Extension (SA341)	800		270 B1a, b / 80 B1b/B8
North Horsham densification (SA296)	500		6.4 ha
TOTAL	12,250		

#### Table 2.10: Scenario 5 Neighbourhood Plan Sites

Development Location	Plan Period Overall		Employment	
Ashington	600			
Barns Green	50			
Billingshurst	0		19,200 sqm	
Broadbridge Heath	150		3.7 ha	
Christs Hospital	30			
Cowfold	0			
Henfield	0			
Horsham - Forest ward	100			
Lower Beeding	35			
North Horsham parish	300			
Partridge Green	200		3.9 ha	
Pulborough	275		3 ha	
Rudgwick	50			



Development Location	Plan Period Overall		Employment
Small Dole	20		
Steyning	50		
Storrington & Sullington	100		
Thakeham	50		
Upper Beeding	70		
Warnham	50		3 ha
West Chiltington	25		
North and south of Buck Barn Petrol Filling Station	0		5.5 ha
Land South of Hop Oast Roundabout	0		1 ha
TOTAL	14,405		







#### Figure 2.1: Scenario 1 Strategic Sites





#### Figure 2.2: Scenario 2 Strategic Sites



Figure 2.3: Scenario 3 Strategic Sites





Figure 2.4: Scenario 4 Strategic Sites





Figure 2.5: Scenario 5 Strategic Sites



## 3 Transport Modelling

## 3.1 Overview

- 3.1.1 To inform the Transport Study and to provide information to support the development of Horsham's Local Plan a traffic modelling exercise has been undertaken. The study has been undertaken in two stages, with Stage 1 being to produce a highway modelling tool covering the District. This is developed to represent traffic conditions in the current situation, known as the base year models. This is then used to underpin Stage 2 of the study, to evaluate the highway impact of development within Horsham District up to 2036 and to support the delivery of the Horsham Local Plan, through development of forecast models to represent traffic conditions.
- 3.1.2 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.
- 3.1.3 To inform the impact of the Local Plan developments a transport modelling package known as SATURN<sup>2</sup> has been used. SATURN is a widely used and industry respected software package for highway assignment modelling.
- 3.1.4 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.
- 3.1.5 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 take into account 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.
- 3.1.6 The fixed trip matrix approach is seen to be proportionate for the purposes of then Local Plan study, which is strategic in nature and concerned with the overall impacts of development across Horsham district. Sustainable travel measures, which may form part of a Local Plan mitigation package will be considered as part of Stage 2 of the study and reflected within the modelling at that stage.
- 3.1.7 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 Highways England 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.

<sup>&</sup>lt;sup>2</sup> https://saturnsoftware2.co.uk/

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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. This also represents the start of the emerging Local Plan period.
- 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. Two 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 generally 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)<sup>3</sup> where judged too large and zone loading was judged too geographically coarse. This is particularly the case in built up areas, such as Horsham.

<sup>&</sup>lt;sup>3</sup> 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)





Figure 3.2: Horsham District Zones

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Figure 3.3: Wider Area Model Zones

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- 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 M3.1<sup>4</sup>.
- 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 base year model development process and validation have been agreed with West Sussex County Council and Highways England 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. The technical detail for development of the Reference Case Models is provided with Horsham Transport Study, Model Forecast Report, Stantec, June 2020, which is attached as Appendix C. The methodology used for developing the forecast models was agreed with West Sussex County Council and Highways England.
- 3.3.2 In order to inform the Local Plan Review transport evidence base, Reference Case models have been produced to represent a forecast year of 2036. These take into account committed growth in Horsham up to 2036, committed growth in neighbouring authorities and background growth.
- 3.3.3 Traffic growth has been applied to the validated Base Year 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.
- 3.3.4 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 to DfT TAG forecasting guidance. The guidance helps limit and define uncertainty around assumptions 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).
- 3.3.5 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 2036 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 provided in Appendix D.
- 3.3.6 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

<sup>4</sup> 

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

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happen as they are within adopted or emerging Local Plans or within Neighbourhood Plans, and trip rates associated with new developments.

3.3.7 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.

l and Lise	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

Table 3.1: Trips Rates

- 3.3.8 The trip rates used have also been reviewed against trip rates used within the transport assessments undertaken for Land North of Rectory Lane, West of Southwater and Land South of Marringden, Billinghurst and the trip rates are shown to be consistent.
- 3.3.9 In order to inform the level of internalisation to be applied to the strategic mixed used sites, the recently approved North Horsham development has been used to provide a level of internalisation within this study. 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), therefore it is felt that this approach is appropriate, given the proximity of the developments to this site.
- 3.3.10 North Horsham development includes both housing and employment and the Transport Assessment for that site has been used to inform the level of internalisation likely, as a result of people living and working within the North Horsham development. Trips for this site have therefore been reduced by 12% based on the calculations and assumptions made on the site. Due to the limited data available of internalisation rates of large mixed land use "garden village" type sites within the TRIC database, 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. The 12% trip reduction is applied to the total number of trips derived for the development. Initial trip numbers are derived using trip rates applied on a land use basis (i.e. individual land use trips rates as per table 3.1 above).
- 3.3.11 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.
- 3.3.12 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.

- 3.3.13 In addition, background growth assumptions have been applied to neighbouring authorities through growth rates; these growth rates are derived from national assumptions about background growth in travel demand, provided 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. In essence, 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.
- 3.3.14 Adjusted NTEM Background growth rates are applied on top of committed developments in neighbouring authority areas. The adjusted NTEM background growth rates take into consideration projected NTEM growth rates for the forecast year of 2036 and subtract growth already applied through individual committed sites input within the model forecasts, so that the entire growth within neighbouring authorities matches with NTEM forecast figures.
- 3.3.15 Within Horsham, NTEM growth assumptions are not used. The exemption of any NTEM background growth within Horsham is due to NTEM assumptions being superseded by the greater detailed understanding of the districts committed developments and the function of the Local Plan to deliver forecast housing and employment in comparison to assumptions from growth assumptions derived from NTEM.
- 3.3.16 Windfall developments (c.1600 dwellings) within Horsham are also accounted for within the Local Plan scenarios, these have not been assigned to particular zones, rather the additional developments have been spread across the District and trips added within the model using a blanket growth factor. Developments within Neighbourhood Plan Sites have been included in the same manner as the Strategic Local Plan sites, with zones being allocated for trip distribution and trip generation based on the trip rates with table 3.1.
- 3.3.17 A summary of the approach to infilling committed development and adjusting NTEM background growth forecasting is highlighted within Tables 3.2 to 3.4.
- 3.3.18 The adjusted NTEM rates noted within the tables below applies to neighbouring authorities where committed developments have been applied, as such the adjustment takes into consideration the specific committed development forming part of the projected NTEM growth totals and is adjusted in order to balance and constrain total growth within a Local Authority to projected NTEM forecasts. Commitments have been included where data was available from neighbouring authorities and they are deemed to have an impact on traffic within the study area. This does not apply within Horsham as stated above, forecast growth is covered through the Local Plan Development and windfall allocations.

Zone Type	Committed Developments	NTEM Derived Background Growth
Horsham District Zones	$\checkmark$	×
Neighbouring Authority Zones	$\checkmark$	$\checkmark$

Table 3.2:	Reference	Case F	orecasting	Assumptions

Table 3.3: NTEM Dwellings Forecast Adjustmen	Table 3.3:	NTEM Dwellings Forecast Adjustment
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	Households									
Authority	NTEM 2019	NTEM 2036	Projected NTEM Growth	Committed Development Total (Dwellings)	Adjust/Not Adjust NTEM	Adjusted NTEM				
Adur	29,269	31,736	2,467	-	No Adjustment	-				
Arun	73,413	84,698	11,285	3,089	Adjust	81,609				
Chichester	55,324	64,847	9,523	-	No Adjustment	-				
Crawley	46,177	50,854	4,677	3,753	Adjust	47,101				
Horsham	62,459	75,256	12,797	6,026	Not Applied	-				
Mid Sussex	64,326	76,724	12,398	10,232	Adjust	66,492				
Worthing	50,200	54,566	4,366	-	No Adjustment	-				

#### Table 3.4: TEMPro Jobs Forecast Adjustment

	Employment (Jobs)							
Authority	NTEM 2019	NTEM 2036	Projected NTEM Growth	Committed Employment (Jobs)	Adjust/Not Adjust/Don't Use NTEM			
Adur	26,625	27,927	1,302	-	No Adjustment			
Arun	59,368	62,339	2,971	-	No Adjustment			
Chichester	73,832	77,507	3,675	-	No Adjustment			
Crawley	95,326	99,983	4,657	-	No Adjustment			
Horsham	67,348	70,633	3,285	10,392	Not Applied			
Mid Sussex	72,794	76,393	3,599	-	No Adjustment			
Worthing	59,459	62,431	2,972	-	No Adjustment			

3.3.19 Another approach would be to use neighbouring authority Local Development Plans to underpin the total forecast growth from all neighbouring authorities. However, as Local Plan periods differ from authority to authority, and as there is a level of uncertainty regarding employment projections obtained from LDPs, there is an overall level of uncertainty in discerning whether neighbouring LDPs diverge or not from NTEM, therefore it has been assumed that adjusted NTEM figures, in combination with selected developments, provide a robust approach for background growth forecasting over assumptions from LDPs with varying plan periods.

## 3.4 Local Plan Scenario Modelling

- 3.4.1 Modelling of the five spatial options as set out in Section 2, has been undertaken using the Reference Case model as the starting point in each scenario.
- 3.4.2 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.
- 3.4.3 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. TRICS was reviewed to understand the differences between each location type 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 were also deemed as the most appropriate rates for Mayfield, Buck Barn and Adversane. Further reduction in trips will be applied for trip internalisation and when sustainable transport mitigation is considered later in the study.
- 3.4.4 Where there are large strategic sites which include residential and employment, 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.
- 3.4.5 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 is tabulated in Appendix F.
- 3.4.6 At this stage no changes will be made to the highway network, apart from any essential infrastructure associated with developments. The essential infrastructure has been agreed with HDC and WSCC.

# **4** Scenario Test Outputs (No Mitigation)

### 4.1 Overview

- 4.1.1 This section provides a summary of the results of each of the five Local Plan Scenario tests.
- 4.1.2 For each scenario test a set of data and key performance indicators (KPIs) have been produced, 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.
- 4.1.3 The highway modelling outputs include:
  - Plots showing flow changes within the network, comparing each 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.
- 4.1.4 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.

### 4.2 Traffic Flow Changes

- 4.2.1 Traffic flow comparisons between the Reference Case and each of the five scenario tests are provided within Appendix G. These show where large increases in flows are seen on the network, resulting from the new developments.
- 4.2.2 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.
- 4.2.3 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.
- 4.2.4 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. This will need to be explored further when mitigation is modelled. Similarly, high levels of background growth are influencing traffic and route choice on the A23.

## 4.3 Changes in Delay

- 4.3.1 Changes in delays on links between the Reference Case and each of the five scenario tests are provided within Appendix H. These show where large increases in flows are seen on the network, resulting from the new developments.
- 4.3.2 The plots show locations where there are increases in delays of more than 30 seconds per vehicle on average in the modelled peak hour.
- 4.3.3 In all scenarios, there are junctions to the south of Horsham where delay increases are seen. This includes the A24/B2237 and A281/Kerves Lane junction.
- 4.3.4 In Horsham itself, delay increases are seen on the Wimblehurst Road approach to North Parade and the North Street/Hurst Road junction in all scenarios.

- 4.3.5 To the north of Horsham, delay increases are seen on the A264/B2195 roundabout and on the Tower Road approach to the A264 in all scenarios.
- 4.3.6 To the south of the district delays are seen on a number of approaches to the Buck Barn junction and the Washington Roundabout.

## 4.4 **Over Capacity Junctions**

- 4.4.1 The outputs of the modelling exercise have been reviewed to determine which junctions are shown to be over capacity and where a Local Plan scenario has a significant impact on the capacity at the junction.
- 4.4.2 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.

### 4.5 Horsham District

- 4.5.1 Tables 4.1 and 4.2 provide the V/C outputs at junctions for the AM and PM peaks respectively for junctions within Horsham District. The results are provided for the Reference Case and each of the five scenario tests undertaken. The highest V/C value at a junction is provided. Results for the A272/A24 junction are provided separately in Tables 4.3 and 4.4 for the AM and PM peaks respectively.
- 4.5.2 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 excessive delays. 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.
- 4.5.3 The table only includes junctions where at least one arm sees an increase of 1.5% or more in the V/C and is over 100% or where the Local Plan development results in a junction becoming over capacity, where it was not in the Reference Case. The label numbers provided refer to the numbers shown on the plots which are provided in Appendix I.
- 4.5.4 The worst performing junctions impacted by LP development are shown in bold. The worst performing junctions are those which are shown to have large increases in the V/C percentage when comparing the scenario tests with the Reference Case outputs. Some junctions where the Reference Case is shown to have a very high V/C, may not necessarily get much worse and are therefore not included as a worse performing junction, as a result of the additional Local Plan growth.

Label	Junction Name	Ref	Sc1	Sc2	Sc3	Sc4	Sc5	Max
	A24 Northbound							
	approach at Washington	400.0	405.0	1011	100.4	400.0	1010	400.0
1	Roundabout	123.9	135.8	134.1	133.4	136.8	134.3	136.8
2	Road	110.2	113.9	114.3	113.8	113.9	114 1	114.3
		400.0	400.4	400.4	400.0	400.5	400.7	400.5
4	B2237/Wimblehurst Road	106.9	109.4	109.1	109.3	109.5	108.7	109.5
5	Moorhead Roundabout	105.6	109.7	109.5	108.8	110.0	109.6	110.0
9	A272/A281 roundabout north of Cowfold	102.7	104.7	104.3	105.4	105.4	104.6	105.4
10	A281/Springfield Road Junction	102.2	103.6	103.7	103.8	103.5	104.0	104.0
40	Rusper Road Roundabout (Rusper Road NB	100.0	1011	100 5	400.0	404.0	400.0	404.0
13	Approach)	100.2	104.1	103.5	103.3	104.2	103.0	104.2
19	Forest Road	79.7	101.5	101.2	101.8	101.8	101.3	101.8
22	Crawley Road/ Forest Road Junction	84.2	104.3	103.4	103.4	104.3	102.4	104.3
	A283 Amberley Road							
23	Roundabout Storrington	96.6	99.4	99.9	100.1	100.2	100.5	100.5
27	East Street / Park Way	89.2	101.2	101.2	101.5	101.6	100.9	101.6
	Hop Oast Roundabout -							
	Worthing Road WB		440.0			1110		444.0
29	approach	86.9	110.6	111.6	111.1	111.9	111.1	111.9
	Pulborougn - A283/A29							
30	Roundabout	96.2	103.8	103.3	103.1	107.5	107.4	107.5
	Pondtail Road / North							
31	Parade	91.6	103.8	103.1	102.8	104.0	102.7	104.0
	Horsham Station - North							
0.4	Street/Hurst Street	70.4	404.4	400.0	101.0	101.0	400.5	404.0
34	Roundabout	73.4	101.1	100.9	101.2	101.2	100.5	101.2
38	A24/Steyning Road	68.8	86.2	88.0	102.4	100.5	100.1	102.4
40	Wheatsheaf Road/ A281	56.1	102.5	110.2	97.7	103.4	111.9	111.9
41	Kerves Lane/A281 Brighton Road	62.4	101.7	102.9	105.8	103.9	104.0	105.8
	St Leonards Rd/A281							
42	Brighton Road	68.1	100.1	98.4	98.5	98.9	80.6	100.1
43	A29/ Adversane Lane	53.9	60.5	60.6	62.9	108.4	108.5	108.5
46	Wimblehurst Rd/Parsonage Rd	83.3	100.6	100.2	100.1	100.7	100.1	100.7
47	Harwood Road	00.7	400.0	400.4	00.7	400.0	400.4	400.0
47	Koundabout	82.7	100.6	100.4	99.7	100.6	100.1	100.6
48	Street Roundabout	79.2	100.5	100.3	100.5	100.5	98.3	100.5
49	A29/ New Road	76.8	100.3	96.7	99.0	97.5	94.5	100.3
	B2115/A281 Brighton Road							
51	(Ciswood House Junction)	86.9	98.7	100.4	101.4	101.3	101.0	101.4
52	Hop Oast Roundabout, Worthing Rd WB Approach	95.8	91.0	92.0	100.4	95.8	97.4	100.4
	Steyning Bypass							
53	Roundabout with Clays Hill	85.6	97.8	97.6	100.2	101.2	101.1	101.2

Table 4.1: Junction Capacity Outputs – Horsham District - AM Peak (All Scenarios - %)

A283 High Street/Old Mill         008.         1102         109.3         111.5         110.1         111.5           4         B2237/Wimblehurst Road         103.1         105.6         105.7         105.4         106.9         106.7         106.9           A264 WB Approach at Sundabout         100.7         113.0         112.8         113.4         113.5         114.5         114.5         114.5           A264/A29 Five Oaks         88.0         98.5         99.0         97.7         99.9         100.3         100.3           9         north of Cowhold         94.8         101.0         100.2         101.4         101.0         102.2         102.6           Rusper Road Approach         65.5         100.0         99.7         100.2         101.4         101.0         101.4           13<(Rusper Road Approach)         66.5         100.0         99.7         100.2         101.4         101.0         102.4           14         Lordon Road approach         66.5         100.0         102.1         110.4         111.2         112.2         112.2           15         Road Jondabout         108.1         111.0         111.2         112.4         112.4         102.7         104.8         104.4<	Label	Junction Name	Ref	Sc1	Sc2	Sc3	Sc4	Sc5	Max
2         Road         108.0         109.2         109.3         111.5         110.1         111.5           4         B2237Wmblehurst Road         103.1         105.6         105.7         105.4         106.9         106.9         106.9         106.9         106.9         106.9         106.9         106.9         106.9         106.9         106.9         106.9         106.9         106.9         106.9         106.9         106.9         106.9         106.9         106.3         100.3         101.2         101.4         101.0         111.4         111.0         111.4         111.6         112.6         <		A283 High Street/Old Mill							
4         B2237/Wmblehurst Road         103.1         105.6         105.7         105.4         106.9         106.7         106.9           5         Moorhead Roundabout         110.7         113.0         112.8         113.4         113.5         114.5         114.5           A264/A29 Five Oaks         88.0         98.5         99.0         97.7         99.9         100.3         100.3           9         north of Cowfold         94.8         101.0         100.0         102.6         101.0         102.2         102.6           Rusper Road Approach         66.5         100.0         99.7         100.2         101.4         101.0         101.4           London Road approach         66.5         100.0         99.7         100.2         101.4         101.0         101.4           London Road approach         66.5         100.0         99.7         100.2         101.4         101.0         101.4           London Road approach         108.1         111.0         111.7         110.7         111.6         112.6         112.6           Statisting Road Approach         108.4         108.4         108.4         108.4         108.4         104.4           Colgate - Tower Road /         1	2	Road	108.0	109.8	110.2	109.3	111.5	110.1	111.5
A264 WB Approach at 5         112.6         113.6         113.5         114.5         114.5           8         Roundabout         88.0         98.5         99.0         97.7         99.9         100.3         100.3           9         north of Cowfold         94.8         101.0         100.2         101.0         102.2         102.6           13         (Rusper Road Approach)         86.5         100.0         99.7         100.2         101.4         101.0         101.4         101.0         101.4         101.0         101.4         101.0         101.4         101.0         101.4         101.0         101.4         101.0         101.4         101.0         101.4         101.0         101.4         101.0         101.4         101.0         101.4         101.0         101.4         101.0         101.4         101.0         101.4         101.0         101.2         102.6         102.1         102.6         106.1         106.7         102.7         101.8         100.6         106.1         106.2         106.4         106.7         102.7         104.8         102.8         102.7         104.8         103.4         102.4         104.8         103.2         103.4         105.4         105.4         105.	4	B2237/Wimblehurst Road	103.1	105.6	105.7	105.4	106.9	106.7	106.9
5         Moorhead Roundabout         110.7         113.0         112.8         113.4         113.5         114.5		A264 WB Approach at							
A264/A29 Five Oaks         88.0         98.5         99.0         97.7         99.9         100.3         100.3           A272/A281 roundabout         94.8         101.0         100.0         102.6         101.0         100.2         102.6           9         north of Cowfold         94.8         101.0         100.2         101.4         101.0         102.2         102.6           13         (Rusper Road Roundabout (A283 WB) at Washington Roundabout         86.5         100.0         99.7         100.2         101.4         101.0         101.4           14         London Road approach (A283 WB) at Washington Roundabout         106.8         108.7         110.1         110.3         112.2         112.2           19         Forest Road         102.8         106.0         106.1         106.2         106.4         106.7         106.7           21         Roundabout         102.5         102.4         104.8         103.8         102.7         104.8         104.8           22         Road Junction         102.0         112.8         110.9         115.3         115.9         116.7         116.7           24         Road junction         101.2         103.3         103.3         103.2         103.1 <td>5</td> <td>Moorhead Roundabout</td> <td>110.7</td> <td>113.0</td> <td>112.8</td> <td>113.4</td> <td>113.5</td> <td>114.5</td> <td>114.5</td>	5	Moorhead Roundabout	110.7	113.0	112.8	113.4	113.5	114.5	114.5
8         Roundabout         88:0         98:5         99:0         97.7         99:9         100.3         100.3           9         north of Cowlold         94.8         101.0         100.2         101.2         102.2         102.6           13         (Rusper Road Approach)         86.5         100.0         99.7         100.2         101.4         101.0         101.2         102.6           14         London Road approach         86.5         100.0         99.7         100.2         101.4         101.0         101.4         101.0         101.2         112.2		A264/A29 Five Oaks		00.5		077	00.0	100.0	400.0
P         A2/2/A28 Holifoldabout         94.8         101.0         100.0         102.6         101.0         102.2         102.8           Rusper Road Roundabout         66.5         100.0         99.7         100.2         101.4         101.0         101.4         101.0         101.4         101.6         100.7         102.5         102.4         104.8         102.7         104.8         104.8         102.7         104.8         104.8         102.4         104.4         103.7         105.4         105.4         105.4         105.4         105.4         105.4         105.4         105.4         105.4         105.4 <td< td=""><td>8</td><td>Roundabout</td><td>88.0</td><td>98.5</td><td>99.0</td><td>97.7</td><td>99.9</td><td>100.3</td><td>100.3</td></td<>	8	Roundabout	88.0	98.5	99.0	97.7	99.9	100.3	100.3
9         Round Count and Approach         34.8         101.0         100.0         102.8         101.0         102.2 <td>0</td> <td>A272/A281 roundabout</td> <td>04.9</td> <td>101.0</td> <td>100.0</td> <td>102.6</td> <td>101.0</td> <td>102.2</td> <td>102.6</td>	0	A272/A281 roundabout	04.9	101.0	100.0	102.6	101.0	102.2	102.6
13         (Rusper Road Approach) (A283 WB) at Washington         86.5         100.0         99.7         100.2         101.4         101.0         101.4           15         Roundabout         108.1         111.0         111.7         110.7         111.6         112.6         112.6           16         Washington Roundabout         106.9         108.8         108.7         110.1         110.3         112.2         112.2           16         Vashington Roundabout         106.9         108.8         108.7         110.1         110.3         112.2         112.2           20         south of Cowfold         102.8         106.0         106.1         106.2         106.4         106.7         106.7           20         south of Cowfold         102.5         102.4         104.8         103.8         102.7         104.8         104.8           21         Road Junction         102.0         112.8         110.9         115.3         115.9         116.7         116.7           224         Road junction         101.2         103.3         103.3         103.2         103.1         103.3           24         Road junction         100.7         103.4         103.2         103.1         103.	9	Rusper Road Roundabout	94.0	101.0	100.0	102.0	101.0	102.2	102.0
10         London Road approach (A283 WB) at Washington Roundabout         10000         10000         10000         10000         10000         10000         10000         10000         10000         10000         10000         10000         10000         10000         10000         10000         10000         100000         100000         100000         100000         100000         100000         100000         100000         100000         100000         100000 <th< td=""><td>13</td><td>(Rusper Road Approach)</td><td>86.5</td><td>100.0</td><td>99.7</td><td>100.2</td><td>101 4</td><td>101.0</td><td>101 4</td></th<>	13	(Rusper Road Approach)	86.5	100.0	99.7	100.2	101 4	101.0	101 4
(A283 WB) at Washington Roundabout         108.1         111.0         111.7         110.7         111.6         112.6         112.6           A283 EB approach at Washington Roundabout         106.9         108.8         108.7         110.1         110.3         112.2         112.2           19         Forest Road         102.8         106.0         106.1         106.2         106.4         106.7         106.7           20         south of Cowfold         102.5         102.4         104.8         103.8         102.7         104.8         104.8           21         Roundabout         102.0         112.8         100.9         115.3         115.9         116.7         116.7           24 Road junction         102.0         112.8         110.9         115.3         115.9         116.7         116.7           25         Horsham Town Centre         100.9         104.7         105.0         104.3         104.4         103.2         103.2         103.1         103.3           25         Horsham Town Centre         100.9         104.7         105.0         104.3         104.6         103.9         105.0           9         Junction         100.7         103.4         103.2         103.4		London Road approach	00.0	100.0	00.1	100.2	101.1	10110	10111
15         Roundabout         108.1         111.0         111.7         110.7         111.6         112.6         112.6           16         Washington Roundabout         106.9         108.8         108.7         110.1         110.3         112.2         112.2           Colgate - Tower Road / 19         Forest Road / Forest Road         102.8         106.0         106.1         106.2         106.4         106.7         106.7           20         south of Cowfold         102.5         102.4         104.8         103.8         102.7         104.8         104.8           21         Roundabout         102.0         112.8         100.4         104.4         103.7         105.4         105.4         105.4           22         Road Junction         102.0         112.8         110.9         115.3         115.9         116.7         116.7           24         Road Junction         102.0         102.8         103.3         103.2         103.1         103.3         103.2         103.1         103.3           25         Horsham Town Centre         100.9         104.7         105.0         104.3         104.6         103.9         105.0           26         Roundabout         100.7		(A283 WB) at Washington							
A283 EB approach at Colgate - Tower Road / 19         108.8         108.7         110.1         110.3         112.2         112.2           19         Forest Road / Forest Road         102.8         106.0         106.1         106.2         106.4         106.7         106.7           20         south of Cowfold         102.5         102.4         104.8         103.8         102.7         104.8         106.7           20         south of Cowfold         102.5         102.4         104.4         103.7         105.4         105.4         105.4           21         Roundabout         102.0         112.8         110.9         115.3         115.9         116.7         116.7           22         Road Junction         101.2         103.3         103.3         103.2         103.1         103.3           24         Road Junction         101.2         103.3         103.3         104.4         104.5         105.0           25         Horsham Town Centre         100.9         104.7         105.0         104.3         104.6         103.9         105.0           26         Roundabout         100.7         103.4         103.2         103.4         104.2         104.5           27 <td>15</td> <td>Roundabout</td> <td>108.1</td> <td>111.0</td> <td>111.7</td> <td>110.7</td> <td>111.6</td> <td>112.6</td> <td>112.6</td>	15	Roundabout	108.1	111.0	111.7	110.7	111.6	112.6	112.6
16         Washington Roundabout         106.9         108.8         108.7         110.1         110.3         112.2         112.2           19         Forest Road         102.8         106.0         106.1         106.2         106.4         106.7         106.7           20         south of Cowfold         102.5         102.4         104.4         103.8         102.7         104.8         104.4           21         Roundabout         102.0         112.8         110.9         115.3         115.9         116.7         116.7           24         Road Junction         101.2         103.3         103.3         103.2         103.1         103.3           24         Road junction         101.2         103.3         103.3         103.2         103.1         103.3           25         Horsham Town Centre         100.9         104.7         105.0         104.3         104.6         103.9         105.0           26         Roundabout         100.7         103.4         103.2         103.4         104.2         104.2         104.5           27         Junction Western Mini         20.4         104.2         104.5         104.1         104.0         104.2         104.5     <		A283 EB approach at							
Colgate - Tower Road / 19         Torest Road         102.8         106.0         106.1         106.2         106.4         106.7         106.7           20         south of Cowfold         102.5         102.4         104.8         103.8         102.7         104.8         104.8         104.8         104.8         104.8         104.8         104.8         104.8         104.8         104.8         104.8         104.4         103.7         105.4         103.3         103.2         103.3         103.2         103.1         103.3         103.2         103.4         104.6         103.9         105.0         104.3         104.6         103.9         105.0         104.3         104.4         104.2         104.5         104.1         104.9         105.2         105.2         105.2         105.2         105.2         105.2	16	Washington Roundabout	106.9	108.8	108.7	110.1	110.3	112.2	112.2
19         Forest Koad         102.8         106.0         106.1         106.2         106.4         106.7         106.7           20         south of Cowfold         102.5         102.4         104.8         103.8         102.7         104.8         104.8           20         south of Cowfold         102.3         104.4         104.4         103.7         105.4         105.4         105.4           21         Road Junction         102.0         112.8         110.9         115.3         115.9         116.7         116.7           24         Road Junction         101.2         103.3         103.3         103.2         103.2         103.1         103.3           24         Road Junction         101.2         103.3         103.3         103.2         103.4         103.9         105.0           24         Road Junction         100.7         103.4         103.2         103.4         104.6         103.9         105.0           25         Horsham Town Centre         100.9         104.7         105.0         104.3         104.6         103.9         105.0           26         Roundabout         100.4         104.2         104.5         104.1         104.0         10		Colgate - Tower Road /	100.0	400.0	400.4	400.0	100.1	400 -	400 7
A27/2/AS281 roundabout         102.5         102.4         104.8         103.8         102.7         104.8         104.8           20         south of Cowfold         102.5         102.4         104.4         103.7         105.4         105.4           21         Roundabout         102.0         112.8         110.9         115.3         115.9         116.7         116.7           22         Road Junction         101.2         103.3         103.3         103.2         103.1         103.3           24         Road junction         101.2         103.3         103.3         103.2         103.1         103.3           25         Horsham Town Centre         100.9         104.7         105.0         104.3         104.6         103.9         105.0           26         Roundabout         100.7         103.4         103.2         103.4         104.9         105.2         105.2           27         Junction Western Mini         Roundabout -         100.7         103.4         104.1         104.0         104.2         104.5           29         Hop Cast Roundabout -         100.4         104.2         104.5         104.1         104.9         104.9           29         H	19	Forest Road	102.8	106.0	106.1	106.2	106.4	106.7	106.7
20         South O Colving         102.3         102.4         104.6         102.7         102.7         104.6         104.8           21         Roundabout         102.3         104.4         104.4         103.7         105.4         105.4         105.4           21         Road Junction         102.0         112.8         110.9         115.3         115.9         116.7         116.7           22         Road junction         101.2         103.3         103.3         103.2         103.1         103.3           25         Horsham Town Centre         100.9         104.7         105.0         104.3         104.6         103.9         105.0           9         Junction Western Mini         100.7         103.4         103.2         103.4         104.9         105.2         105.2           26         Roundabout         100.7         103.4         104.5         104.1         104.0         104.2         104.5           27         Junction         100.4         104.2         104.5         104.1         104.0         104.2         104.5           29         Worthing Road approach         54.3         103.1         101.3         102.3         103.4         101.2         <	20	A272/A8281 roundabout	102 5	102.4	104.0	102.0	102.7	104.0	104.9
D2.31         EXAMPLA         102.3         104.4         103.7         105.4         105.4         105.4           Crawley Road/ Forest         Road Junction         102.0         112.8         110.9         115.3         115.9         116.7         116.7           A264/Langhurst Wood         Interpretain         Interpretain <thinterpretain< th=""> <thinterpretain< th=""> <thinter< td=""><td>20</td><td>B2227 ovit at Hop Oast</td><td>102.5</td><td>102.4</td><td>104.6</td><td>103.6</td><td>102.7</td><td>104.6</td><td>104.0</td></thinter<></thinterpretain<></thinterpretain<>	20	B2227 ovit at Hop Oast	102.5	102.4	104.6	103.6	102.7	104.6	104.0
21         Total         101.1         10	21	Roundabout	102.3	104.4	104.4	103.7	105.4	105.4	105.4
22         Road Junction         102.0         112.8         110.9         115.3         115.9         116.7         116.7           24         Road junction         101.2         103.3         103.3         103.2         103.1         103.3           25         Horsham Town Centre         100.9         104.7         105.0         104.3         104.6         103.9         105.0           Pulborough - A283/A29         Junction Western Mini         100.7         103.4         103.2         104.4         104.9         105.2         105.2           26         Roundabout         100.7         103.4         103.2         104.5         104.1         104.0         104.2         104.5           27         Junction Mestern Mini         100.4         104.2         104.5         104.1         104.0         104.2         104.5           29         Worthing Road approach         54.3         103.1         101.3         102.3         103.4         101.2         103.4           30         Roundabout -         99.4         98.1         98.0         98.0         104.9         104.9           30         Roundabout -         99.4         98.1         98.0         98.0         105.4	21	Crawley Road/ Forest	102.0	104.4	104.4	100.7	100.4	100.4	100.4
A264/Langhurst Wood         101.2         103.3         103.3         103.2         103.2         103.1         103.3           A281/New Street Junction         Horsham Town Centre         100.9         104.7         105.0         104.3         104.6         103.9         105.0           Pulborough - A283/A29         Junction Western Mini         Roundabout         100.7         103.4         103.2         104.6         104.9         105.2         105.2           East Street / Park Way         100.4         104.2         104.5         104.1         104.0         104.2         104.5           Yorthing Road approach         54.3         103.1         101.3         102.3         103.4         101.2         103.4           Pulborough - A283/A29         Junction Eastern Mini         99.4         98.1         98.0         98.0         104.9         104.9         104.9           Junction Eastern Mini         Roundabout         99.4         98.1         98.0         98.0         104.9         104.9         104.9           Junction Eastern Mini         Roundabout         99.4         98.1         98.0         98.5         108.5         108.5         108.5         108.5           Storrington approach at         Washington Roundab	22	Road Junction	102.0	112.8	110.9	115.3	115.9	116.7	116.7
24         Road junction         101.2         103.3         103.3         103.2         103.1         103.3           25         Horsham Town Centre         100.9         104.7         105.0         104.3         104.6         103.9         105.0           Pulborough - A283/A29 Junction Western Mini         100.7         103.4         103.2         103.4         104.9         105.2         105.2           East Street / Park Way         100.7         103.4         103.2         103.4         104.9         105.2         105.2           29         Worthing Road approach         54.3         103.1         101.3         102.3         103.4         101.2         103.4           30         Roundabout         99.4         98.1         98.0         98.0         104.9         104.9         104.9           31         Parade         94.3         102.1         102.0         105.4         103.5         105.4           36         junction         54.9         108.6         108.4         108.5         108.5         108.6           36         junction         54.9         108.6         108.4         108.5         108.5         108.6           36         junction         54.9		A264/Langhurst Wood							
A281/New Street Junction Horsham Town Centre         100.9         104.7         105.0         104.3         104.6         103.9         105.0           Pullborough - A283/A29 Junction Western Mini 26         Roundabout         100.7         103.4         103.2         103.4         104.9         105.2         105.2           East Street / Park Way 27         Junction         100.4         104.2         104.5         104.1         104.0         104.2         104.5           Point Street / Park Way 27         Junction         100.4         104.2         104.5         104.1         104.0         104.2         104.5           Point Street / Park Way 27         Junction         54.3         103.1         101.3         102.3         103.4         101.2         103.4           Pulborough - A283/A29 Junction Eastern Mini 30         Roundabout         99.4         98.1         98.0         98.0         104.9         104.9         104.9           90.4         91.4         98.1         98.0         98.0         104.4         103.5         105.4           11         Pondtail Road / North 31         Parade         94.3         102.1         102.0         105.4         103.5         105.4           36         junction         54.9 </td <td>24</td> <td>Road junction</td> <td>101.2</td> <td>103.3</td> <td>103.3</td> <td>103.2</td> <td>103.2</td> <td>103.1</td> <td>103.3</td>	24	Road junction	101.2	103.3	103.3	103.2	103.2	103.1	103.3
25         Horsham Town Centre         100.9         104.7         105.0         104.3         104.6         103.9         105.0           Pulborough - A283/A29 Junction Western Mini 26         Park Way Junction Western Mini 27         100.7         103.4         103.2         103.4         104.9         105.2         105.2           East Street / Park Way 27         Junction         100.4         104.2         104.5         104.1         104.0         104.2         104.5           29         Worthing Road approach         54.3         103.1         101.3         102.3         103.4         101.2         103.4           Pulborough - A283/A29 Junction Eastern Mini Roundabout         99.4         98.1         98.0         98.0         104.9         104.9           Pondtail Road / North Junction         99.4         98.1         98.0         98.0         104.9         104.9         104.9           Storrington approach at Junction         54.9         102.1         102.0         105.4         103.5         108.5         108.6           30         Roundabout         87.2         103.3         103.2         102.8         101.7         101.2         103.3           31         Parade         94.3         102.1         102.0 <td></td> <td>A281/New Street Junction</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>		A281/New Street Junction							
Pulborough - A283/A29 Junction Western Mini Roundabout         100.7         103.4         103.2         103.4         104.9         105.2         105.2           East Street / Park Way Junction         100.4         104.2         104.5         104.1         104.0         104.2         104.5           Yelp Oast Roundabout - Worthing Road approach         54.3         103.1         101.3         102.3         103.4         101.2         103.4           Pulborough - A283/A29 Junction Eastern Mini Roundabout         99.4         98.1         98.0         98.0         104.9         104.9         104.9           Pondtail Road / North Parade         94.3         102.1         102.1         102.0         105.4         103.5         105.4           36         junction approach at junction approach at storrington approach at gastington Roundabout         87.2         103.3         103.2         102.8         101.7         101.2         103.3           38         A24/Steyning Road         95.8         95.3         93.9         101.5         100.6         101.4         101.5           41         Kerves Lane/A281         70.4         101.7         100.2         105.3         105.3           39         Road         76.4         100.1         102.7	25	Horsham Town Centre	100.9	104.7	105.0	104.3	104.6	103.9	105.0
Junction Western Mini         100.7         103.4         103.2         103.4         104.9         105.2         105.2           East Street / Park Way         100.4         104.2         104.5         104.1         104.0         104.2         104.5           27         Junction         100.4         104.2         104.5         104.1         104.0         104.2         104.5           29         Worthing Road approach         54.3         103.1         101.3         102.3         103.4         101.2         103.4           9         Worthing Road approach         54.3         103.1         101.3         102.3         103.4         101.2         103.4           9         Worthing Road approach         99.4         98.1         98.0         98.0         104.9         104.9           9         Pondtail Road / North         94.3         102.1         102.1         102.0         105.4         103.5         105.4           36         junction         54.9         108.6         108.4         108.5         108.5         108.5         108.5         108.6           37         Washington Roundabout         87.2         103.3         103.2         102.8         101.7         101.2		Pulborough - A283/A29							
25         Roundabout         100.7         103.4         103.2         103.4         104.3         103.2         104.5         104.1         104.0         104.2         104.5         104.1         104.0         104.2         104.5         104.1         104.0         104.2         103.4         101.2         103.4         101.2         103.4         101.2         103.4         101.2         103.4         101.2         103.4         104.9         <	26	Junction Western Mini	100.7	102.4	102.2	102.4	101.0	105.2	105.2
27         Junction         100.4         104.2         104.5         104.1         104.0         104.2         104.5           29         Worthing Road approach         54.3         103.1         101.3         102.3         103.4         101.2         103.4           29         Worthing Road approach         54.3         103.1         101.3         102.3         103.4         101.2         103.4           Pulborough - A283/A29         Junction Eastern Mini         99.4         98.0         98.0         98.0         104.9         104.9         104.9           30         Roundabout         99.4         98.1         98.0         98.0         104.9         104.9         104.9           31         Parade         94.3         102.1         102.0         105.4         103.5         105.4           36         junction         54.9         108.6         108.4         108.5         108.5         108.5         108.6           37         Washington Roundabout         87.2         103.3         103.2         102.8         101.7         101.2         103.3           38         A24/Steyning Road         95.8         95.3         93.9         101.5         100.6         101.4	20	East Street / Park Way	100.7	103.4	103.2	103.4	104.9	105.2	105.2
Lin         Hor Oast Roundabout - Worthing Road approach         54.3         103.1         101.3         102.3         103.4         101.2         103.4           29         Worthing Road approach         54.3         103.1         101.3         102.3         103.4         101.2         103.4           9         Worthing Road approach         54.3         103.1         101.3         102.3         103.4         101.2         103.4           30         Roundabout         99.4         98.1         98.0         98.0         104.9         104.9           9         Pondtail Road / North         94.3         102.1         102.1         102.0         105.4         103.5         105.4           31         Parade         94.3         102.1         102.1         102.0         105.4         103.5         105.4           36         junction         54.9         108.6         108.4         108.5         108.5         108.5         108.6           37         Washington Roundabout         87.2         103.3         103.2         102.8         101.7         101.2         103.3           38         A24/Steyning Road         95.8         95.3         93.9         101.5         100.6	27	Junction	100.4	104.2	104 5	104 1	104.0	104.2	104.5
29         Worthing Road approach         54.3         103.1         101.3         102.3         103.4         101.2         103.4           9         Pulborough - A283/A29 Junction Eastern Mini Roundabout         99.4         98.1         98.0         98.0         104.9         104.9         104.9           30         Roundabout         99.4         98.1         98.0         98.0         104.9         104.9         104.9           31         Parade         94.3         102.1         102.1         102.0         105.4         103.5         105.4           36         Jifield Avenue/Stagelands         54.9         108.6         108.4         108.5         108.5         108.5         108.5         108.6           37         Washington Roundabout         87.2         103.3         103.2         102.8         101.7         101.2         103.3           38         A24/Steyning Road         95.8         95.3         93.9         101.5         100.6         101.4         101.5           39         Road         76.4         100.1         102.7         102.7         100.2         105.3         105.3           41         Kerves Lane/A281         93.1         98.2         99.3		Hop Oast Roundabout -		10112	10110	10111	10110	10112	10110
Pulborough - A283/A29 Junction Eastern Mini Roundabout         99.4         98.1         98.0         98.0         104.9         104.9           30         Roundabout         99.4         98.1         98.0         98.0         104.9         104.9         104.9           31         Parade         94.3         102.1         102.1         102.0         105.4         103.5         105.4           36         Ifield Avenue/Stagelands         54.9         108.6         108.4         108.5         108.5         108.5         108.5         108.6           37         Washington Roundabout         87.2         103.3         103.2         102.8         101.7         101.2         103.3           38         A24/Steyning Road         95.8         95.3         93.9         101.5         100.6         101.4         101.5           A281/Partridge Green         76.4         100.1         102.7         102.2         105.3         105.3           41         Kerves Lane/A281         70.4         101.7         100.4         101.3         102.3         100.6         102.3           42         St Leonards Rd/A281         93.1         98.2         99.3         97.1         104.2         103.4 <td< td=""><td>29</td><td>Worthing Road approach</td><td>54.3</td><td>103.1</td><td>101.3</td><td>102.3</td><td>103.4</td><td>101.2</td><td>103.4</td></td<>	29	Worthing Road approach	54.3	103.1	101.3	102.3	103.4	101.2	103.4
Junction Eastern Mini Roundabout         99.4         98.1         98.0         98.0         104.9         104.9           31         Parade         94.3         102.1         102.1         102.0         105.4         103.5         105.4           36         junction         54.9         108.6         108.4         108.5         108.5         108.5         108.5         108.5         108.6         108.4         101.7         101.2         103.3           36         junction         storrington approach at yuashington Roundabout         87.2         103.3         103.2         102.8         101.7         101.2         103.3           38         A24/Steyning Road         95.8         95.3         93.9         101.5         100.6         101.4         101.5           39         Road         76.4         100.1         102.7         102.7         100.2         105.3         105.3           41         Kerves Lane/A281         70.4         101.7         100.4         101.3         102.3         100.6         102.3           42         St Leonards Rd/A281         93.1         98.2         99.3         97.1         104.2         103.4         104.2           50         A283/		Pulborough - A283/A29							
30         Roundabout         99.4         98.1         98.0         98.0         104.9         104.9         104.9           31         Parade         94.3         102.1         102.1         102.0         105.4         103.5         105.4           36         junction         54.9         108.6         108.4         108.5         108.5         108.5         108.5         108.6           37         Washington Roundabout         87.2         103.3         103.2         102.8         101.7         101.2         103.3           38         A24/Steyning Road         95.8         95.3         93.9         101.5         100.6         101.4         101.5           39         Road         76.4         100.1         102.7         102.7         100.2         105.3         105.3           41         Kerves Lane/A281         70.4         101.7         100.4         101.3         102.3         100.6         102.3           42         St Leonards Rd/A281         93.1         98.2         99.3         97.1         104.2         103.4         104.2           45         A29/ Lordings Road         80.3         89.1         90.4         87.9         102.8         104.		Junction Eastern Mini							
Pondtail Road / North         94.3         102.1         102.1         102.0         105.4         103.5         105.4           31         Parade         94.3         102.1         102.1         102.0         105.4         103.5         105.4           36         junction         54.9         108.6         108.4         108.5         108.5         108.6           37         Washington approach at Washington Roundabout         87.2         103.3         103.2         102.8         101.7         101.2         103.3           38         A24/Steyning Road         95.8         95.3         93.9         101.5         100.6         101.4         101.5           A281/Partridge Green         76.4         100.1         102.7         102.7         100.2         105.3         105.3           41         Kerves Lane/A281         70.4         101.7         100.4         101.3         102.3         100.6         102.3           42         St Leonards Rd/A281         93.1         98.2         99.3         97.1         104.2         103.4         104.2           45         A29/ Lordings Road         80.3         89.1         90.4         87.9         102.8         104.5         104.5	30	Roundabout	99.4	98.1	98.0	98.0	104.9	104.9	104.9
31         Parade         94.3         102.1         102.1         102.0         105.4         103.5         105.4           36         junction         54.9         108.6         108.4         108.5         108.5         108.5         108.5         108.6           37         Washington approach at Washington Roundabout         87.2         103.3         103.2         102.8         101.7         101.2         103.3           38         A24/Steyning Road         95.8         95.3         93.9         101.5         100.6         101.4         101.5           A281/Partridge Green 39         Road         76.4         100.1         102.7         102.3         100.6         102.3           41         Kerves Lane/A281         70.4         101.7         100.4         101.3         102.3         100.6         102.3           42         St Leonards Rd/A281         93.1         98.2         99.3         97.1         104.2         103.4         104.2           45         A29/ Lordings Road         80.3         89.1         90.4         87.9         102.8         104.5         104.5           50         A283/ Water Lane         68.5         96.0         100.2         98.1 <td< td=""><td>24</td><td>Pondtail Road / North</td><td>04.0</td><td>400.4</td><td>400.4</td><td>102.0</td><td>405.4</td><td>100 5</td><td>405.4</td></td<>	24	Pondtail Road / North	04.0	400.4	400.4	102.0	405.4	100 5	405.4
36         junction         54.9         108.6         108.4         108.5         108.5         108.5         108.6           37         Washington Roundabout         87.2         103.3         103.2         102.8         101.7         101.2         103.3           38         A24/Steyning Road         95.8         95.3         93.9         101.5         100.6         101.4         101.5           A281/Partridge Green         76.4         100.1         102.7         102.7         100.2         105.3         105.3           41         Kerves Lane/A281         70.4         101.7         100.4         101.3         102.3         100.6         102.3           42         St Leonards Rd/A281         93.1         98.2         99.3         97.1         104.2         103.4         104.2           45         A29/ Lordings Road         80.3         89.1         90.4         87.9         102.8         104.5         104.5           50         A283/ Water Lane         68.5         96.0         100.2         98.1         94.2         96.8         100.2           51         B2115/A281         77.6         93.1         95.2         99.2         96.3         100.4         100	31	Ifield Avenue/Stagelands	94.3	102.1	102.1	102.0	105.4	103.5	105.4
Stornigton         Stornig	36	iunction	54 9	108.6	108.4	108.5	108.5	108.5	108.6
37         Washington Roundabout         87.2         103.3         103.2         102.8         101.7         101.2         103.3           38         A24/Steyning Road         95.8         95.3         93.9         101.5         100.6         101.4         101.5           A281/Partridge Green         A281/Partridge Green         76.4         100.1         102.7         102.7         100.2         105.3         105.3           41         Kerves Lane/A281         70.4         101.7         100.4         101.3         102.3         100.6         102.3           42         St Leonards Rd/A281         93.1         98.2         99.3         97.1         104.2         103.4         104.2           45         A29/ Lordings Road         80.3         89.1         90.4         87.9         102.8         104.5         104.5           50         A283/ Water Lane         68.5         96.0         100.2         98.1         94.2         96.8         100.2           51         B2115/A281         77.6         93.1         95.2         99.2         96.3         100.4         100.4           53         Roundabout with Clays Hill         84.2         95.7         96.6         100.4		Storrington approach at	04.0	100.0	100.4	100.0	100.0	100.0	100.0
38         A24/Steyning Road         95.8         95.3         93.9         101.5         100.6         101.4         101.5           39         Road         76.4         100.1         102.7         102.7         100.2         105.3         105.3           41         Kerves Lane/A281         70.4         101.7         100.4         101.3         102.3         100.6         102.3           42         St Leonards Rd/A281         93.1         98.2         99.3         97.1         104.2         103.4         104.2           45         A29/ Lordings Road         80.3         89.1         90.4         87.9         102.8         104.5         104.5           50         A283/ Water Lane         68.5         96.0         100.2         98.1         94.2         96.8         100.2           51         B2115/A281         77.6         93.1         95.2         99.2         96.3         100.4         100.4           53         Roundabout with Clays Hill         84.2         95.7         96.6         100.4         95.7         99.9         100.4           54         Roundabout         79.0         99.2         99.4         97.6         101.0         100.9 <td< td=""><td>37</td><td>Washington Roundabout</td><td>87.2</td><td>103.3</td><td>103.2</td><td>102.8</td><td>101.7</td><td>101.2</td><td>103.3</td></td<>	37	Washington Roundabout	87.2	103.3	103.2	102.8	101.7	101.2	103.3
A281/Partridge Green         76.4         100.1         102.7         100.2         105.3         105.3           41         Kerves Lane/A281         70.4         101.7         100.4         101.3         102.3         100.6         102.3           42         St Leonards Rd/A281         93.1         98.2         99.3         97.1         104.2         103.4         104.2           45         A29/ Lordings Road         80.3         89.1         90.4         87.9         102.8         104.5         104.5           50         A283/ Water Lane         68.5         96.0         100.2         98.1         94.2         96.8         100.2           51         B2115/A281         77.6         93.1         95.2         99.2         96.3         100.4         100.4           Steyning Bypass         53         Roundabout with Clays Hill         84.2         95.7         96.6         100.4         95.7         99.9         100.4           54         Roundabout         79.0         99.2         99.4         97.6         101.0         100.9         101.0           55         A281 Clearance Road         55.2         93.2         96.2         94.1         100.2         95.0	38	A24/Stevning Road	95.8	95.3	93.9	101.5	100.6	101.4	101.5
39         Road         76.4         100.1         102.7         102.7         100.2         105.3         105.3           41         Kerves Lane/A281         70.4         101.7         100.4         101.3         102.3         100.6         102.3           42         St Leonards Rd/A281         93.1         98.2         99.3         97.1         104.2         103.4         104.2           45         A29/ Lordings Road         80.3         89.1         90.4         87.9         102.8         104.5         104.5           50         A283/ Water Lane         68.5         96.0         100.2         98.1         94.2         96.8         100.2           51         B2115/A281         77.6         93.1         95.2         99.2         96.3         100.4         100.4           53         Roundabout with Clays Hill         84.2         95.7         96.6         100.4         95.7         99.9         100.4           54         Roundabout         79.0         99.2         99.4         97.6         101.0         100.9         101.0           55         A281 Clearance Road         55.2         93.2         96.2         94.1         100.2         95.0 <td< td=""><td></td><td>A281/Partridge Green</td><td></td><td>0010</td><td></td><td></td><td></td><td></td><td></td></td<>		A281/Partridge Green		0010					
41       Kerves Lane/A281       70.4       101.7       100.4       101.3       102.3       100.6       102.3         42       St Leonards Rd/A281       93.1       98.2       99.3       97.1       104.2       103.4       104.2         45       A29/ Lordings Road       80.3       89.1       90.4       87.9       102.8       104.5       104.5         50       A283/ Water Lane       68.5       96.0       100.2       98.1       94.2       96.8       100.2         51       B2115/A281       77.6       93.1       95.2       99.2       96.3       100.4       100.4         53       Roundabout with Clays Hill       84.2       95.7       96.6       100.4       95.7       99.9       100.4         A29/ High Street       79.0       99.2       99.4       97.6       101.0       100.9       101.0         54       Roundabout       79.0       99.2       99.4       97.6       101.0       100.9       101.0         55       A281 Clearance Road       55.2       93.2       96.2       94.1       100.2       95.0       100.2	39	Road	76.4	100.1	102.7	102.7	100.2	105.3	105.3
42       St Leonards Rd/A281       93.1       98.2       99.3       97.1       104.2       103.4       104.2         45       A29/ Lordings Road       80.3       89.1       90.4       87.9       102.8       104.5       104.5         50       A283/ Water Lane       68.5       96.0       100.2       98.1       94.2       96.8       100.2         51       B2115/A281       77.6       93.1       95.2       99.2       96.3       100.4       100.4         Steyning Bypass       53       Roundabout with Clays Hill       84.2       95.7       96.6       100.4       95.7       99.9       100.4         429/ High Street       79.0       99.2       99.4       97.6       101.0       100.9       101.0         55       A281 Clearance Road       55.2       93.2       96.2       94.1       100.2       95.0       100.2	41	Kerves Lane/A281	70.4	101.7	100.4	101.3	102.3	100.6	102.3
45         A29/ Lordings Road         80.3         89.1         90.4         87.9         102.8         104.5         104.5           50         A283/ Water Lane         68.5         96.0         100.2         98.1         94.2         96.8         100.2           51         B2115/A281         77.6         93.1         95.2         99.2         96.3         100.4         100.4           53         Roundabout with Clays Hill         84.2         95.7         96.6         100.4         95.7         99.9         100.4           54         Roundabout         79.0         99.2         99.4         97.6         101.0         100.9         101.0           55         A281 Clearance Road         55.2         93.2         96.2         94.1         100.2         95.0         100.2	42	St Leonards Rd/A281	93.1	98.2	99.3	97.1	104.2	103.4	104.2
50         A283/ Water Lane         68.5         96.0         100.2         98.1         94.2         96.8         100.2           51         B2115/A281         77.6         93.1         95.2         99.2         96.3         100.4         100.4           Steyning Bypass         53         Roundabout with Clays Hill         84.2         95.7         96.6         100.4         95.7         99.9         100.4           54         Roundabout         79.0         99.2         99.4         97.6         101.0         100.9         101.0           55         A281 Clearance Road         55.2         93.2         96.2         94.1         100.2         95.0         100.2	45	A29/ Lordings Road	80.3	89.1	90.4	87.9	102.8	104.5	104.5
50         Filler         50.0         50.0         50.1         51.2         50.1         51.2         50.1         51.2         50.1         51.2         50.1         100.2           51         B2115/A281         77.6         93.1         95.2         99.2         96.3         100.4         100.4           Steyning Bypass         53         Roundabout with Clays Hill         84.2         95.7         96.6         100.4         95.7         99.9         100.4           A29/ High Street         79.0         99.2         99.4         97.6         101.0         100.9         101.0           55         A281 Clearance Road         55.2         93.2         96.2         94.1         100.2         95.0         100.2	50	A283/Water Lane	68.5	96.0	100.2	98.1	94.2	96.8	100.2
Stephing Bypass         First         Stephing Bypass	51	B2115/A281	77.6	03.1	05.2	00.1	96.3	100.4	100.2
53         Roundabout with Clays Hill         84.2         95.7         96.6         100.4         95.7         99.9         100.4           A29/ High Street	51	Stevning Bypass	11.0	33.1	33.2	33.2	30.5	100.4	100.4
A29/ High Street         79.0         99.2         99.4         97.6         101.0         100.9         101.0           55         A281 Clearance Road         55.2         93.2         96.2         94.1         100.2         95.0         100.2	53	Roundabout with Clavs Hill	84.2	95.7	96.6	100.4	95.7	99.9	100.4
54         Roundabout         79.0         99.2         99.4         97.6         101.0         100.9         101.0           55         A281 Clearance Road         55.2         93.2         96.2         94.1         100.2         95.0         100.2		A29/ High Street			00.0			00.0	
55         A281 Clearance Road         55.2         93.2         96.2         94.1         100.2         95.0         100.2	54	Roundabout	79.0	99.2	99.4	97.6	101.0	100.9	101.0
	55	A281 Clearance Road	55.2	93.2	96.2	94.1	100.2	95.0	100.2

Table 4.2:	Junction Capacity Outputs – Horsham District - PM Peak (All Scenarios - %)

Label	Junction Name	Ref	Sc1	Sc2	Sc3	Sc4	Sc5	Max
	A24 Northbound signalised							
3	junction with A272	108.5	110.7	110.8	111.7	111.0	110.8	111.7
	A272 westbound signals at							
6	the A24/A272 junction	104.8	104.3	105.2	112.0	105.7	107.3	112.0
	A272 signals over the							
11	A24/A272 junction	101.5	102.1	102.1	102.1	102.1	102.1	102.1
	A24 eastbound approach to							
14	A24/A272 junction	36.9	105.2	107.9	105.1	107.7	105.8	107.9
	A24 southbound signals							
17	before A24/A272 junction	95.2	102.5	102.4	103.9	102.3	102.2	103.9

Table 4.3: Junction Capacity Outputs – A264/A272 Junction - AM Peak (All Scenarios - %)

#### Table 4.4: Junction Capacity Outputs – A264/A272 Junction - PM Peak (All Scenarios - %)

Label	Junction Name	Ref	Sc1	Sc2	Sc3	Sc4	Sc5	Max
	A24 Northbound signalised							
3	junction with A272	116.8	117.0	116.2	115.5	117.5	117.4	117.5
	A272 westbound signals at							
6	the A24/A272 junction	121.5	122.0	121.9	124.8	122.8	124.9	124.9
	A272 signals over the							
11	A24/A272 junction	48.5	48.0	47.9	48.3	48.3	48.4	48.5
	A24 eastbound approach							
14	to A24/A272 junction	108.5	113.9	112.7	111.5	112.3	111.7	113.9
	A24 southbound signals							
17	before A24/A272 junction	103.9	104.6	104.6	105.0	104.7	104.8	105.0

#### Summary of V/C Outputs for Horsham District

- 4.5.5 Table 4.5 provides a summary of the outputs, which indicates those junctions that will need to be considered as part of the mitigation strategy for the scenarios as shown in the last column. A commentary is provided as to the issues seen at the junctions.
- 4.5.6 As stated above, the worst performing junction are shown in bold in the tables above and these are the junctions most likely to require physical mitigation. At this stage it should be noted that no sustainable transport mitigation has been included within the modelling, and with a suitable strategy, this is likely to mitigate the impact of the Local Plan at many of the junctions. This is particularly the case where the Local Plan impact is relatively minor.
- 4.5.7 There are some instances where the modelling is highlighting high V/C on some movements at signalised junctions, however, some arms are shown to have spare capacity, as such it was deemed that optimisation of signal timings may be sufficient to relieve capacity restraint at a significant proportion of junctions.

Label	Junction Name	Comments	Scenarios with Severe Impact
		Severely Congested within the AM Reference Case NB.	
		Additional flow within all LP scenarios exacerbates the congestion exponentially in the AM Peak.	
1	A24 Northbound approach at Washington Roundabout	Operates under capacity in all scenarios in the PM Peak	All

Table 4.5: Junc	tion Summary -	– Horsham	District
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			Scenarios with Severe
Label	Junction Name	Comments	Impact
		Severely Congested within the AM & PM Reference Case due to restricted "Straight ahead" capacity of the A283 WB due to the right turning traffic onto Old Mill Lane.	
2	A283 High Street/Old Mill Road	In both peaks in all LP scenarios the impact is marginally above the 1.5% threshold.	All
		Over Capacity within reference case, and over the 1.5% threshold on all scenarios in AM and PM peak.	
4	B2237/Wimblehurst Road	Over Capacity on Wimblehurst Road approach - only marginally above threshold therefore signal optimisation may be sufficient	All, Sc4 Worst
		Over Capacity within reference case, and over the 1.5% threshold on all scenarios in AM and PM peak.	
5	A264 WB Approach at Moorhead Roundabout	Only marginally above threshold therefore signal optimisation may be sufficient	All, Sc5 Worst
	A272/A281 roundabout	Above 1.5% threshold in all scenarios in AM and PM peak. A281 NB through movement capacity restricted by conflicting right turning traffic from A281 SB	All Sc5
9	north of Cowfold	due to "mini roundabout" configuration)	Worst
10	A281/Springfield Road	2, 3 and 5. Below 1.5% threshold in PM peak in all scenarios Congested at all approach arms, potential limited scope for signal optimisation to improve junction performance	2,3 and 5, Sc5 Worst
13	Rusper Road Roundabout (Rusper Road NB Approach)	Above 1.5% threshold in all scenarios in AM and PM peak. A281 NB through movement capacity restricted by conflicting right turning traffic from A281 SB (Low turning capacity numbers to begin with at junction due to "mini roundabout" configuration)	All, Sc4 Worst
15	London Road WB approach at Washington Roundabout	Within capacity in AM peak in all scenarios. Above 1.5% threshold in all scenarios in PM peak. Significant increase within LP scenarios of A24 SB flow resulting in increased VC	All, Sc5 Worst
	A283 EB approach at	Within capacity in AM peak in all scenarios. Above 1.5% threshold in all scenarios in PM peak. Significant increase within LP scenarios of A24	All, Sc5
16	Washington Roundabout	SB flow resulting in increased VC Above 1.5% threshold in all scenarios in AM and PM peak.	Worst
19	Colgate - Tower Road / Forest Road	Tower Road SB approach significant volume at give way	All, Sc5 Worst

			Scenarios with Severe
Label	Junction Name	Comments	Impact
		Operates within capacity in AM Peak.	
		Above 1.5% threshold in PM peak for scenarios 2 and 5.	
20	A272/A8281 roundabout south of Cowfold	A281 SB through movement capacity restricted by conflicting Right turning traffic from A281 NB (Low turning capacity to begin with at junction due to "mini roundabout" configuration) Operates within capacity in AM peak.	2 and 5
	B2237 SB approach at	Above 1.5% threshold in PM peak in all scenarios. Significant through movement of the A24 SB restricting "gap time" and capacity for the	All, Sc5
21	Hop Oast Roundabout	Dver-capacity and above 1.5% threshold in all scenarios in AM and PM peak.	Worst
22	Crawley Road/ Forest Road Junction	Heavily Congested at all approach arms, limited scope for signal optimisation to improve junction capacity	All, Sc5
		Above 1.5% threshold in all scenarios in AM peak, operating just below, but very close to capacity in scenarios 3, 4 and 5 (just below in 1 and 2).	
		scenarios.	
23	A283 Amberley Road Roundabout Storrington	relatively low turning capacity at the junction due to driver behaviour	3, 4 and 5
		Operates within capacity in AM peak.	
24	A264/Langhurst Wood	Just above 1.5% threshold in PM peak in all scenarios.	
24		Operates within capacity in all scenarios in AM	All, 505
	A281/New Street	peak. Above 1.5% threshold in all scenarios in PM peak.	
25	Junction Horsham Town Centre	New Street approach - significant volume of right turning traffic restricted at priority marker	All, Sc2 Worst
		Operates within capacity in all scenarios in AM peak. Above 1.5% threshold in all scenarios in PM peak	
26	Pulborough - A283/A29 Junction Western Mini Roundabout	A29 SB through movement capacity restricted by conflicting Right turning traffic from A283 EB (Low turning capacity to begin with at junction due to "mini roundabout" configuration)	All, SC5 Worst
27	Junction	and PM peak.	All,
Label	lunction Name	Commonto	Scenarios with Severe
-------	--	--	--------------------------
Label	Junction Name	Over 1.5% thresholds in all scenarios in AM	impact
		and PM peak.	
20	Hop Oast Roundabout - Worthing Road WB	Significant traffic volume increase on Worthing Road due to Land West of Southwater	All (Developer)
29	арргоаст	Over 1.5% thresholds in AM peak in all	
		scenarios.	
		Over 1.5% threshold in scenarios 4 and 5 in PM peak.	
30	Pulborough - A283/A29 Junction Eastern Mini Roundabout	A29 NB through movement capacity restricted by conflicting Right turning traffic from A283 WB (Low turning capacity to begin with at junction due to "mini roundabout" configuration)	All
		Over 1.5% threshold in all scenarios in AM and PM peak.	
31	Pondtail Road / North Parade	Large flow increase within LP scenarios on Pondtail Road approach Within capacity in AM peak	All, Sc4 & 5 Worst
		Within capacity in All peak.	
		Above 1.5% threshold in PM peak.	
	Horsham Station - North Street/ Hurst Street	Significant increase in SB flow on North Street within LP AM scenarios (Low turning capacity to begin with at junction due to "mini roundabout"	A.11
34	Roundabout	Operates within capacity in AM peak.	All
		Significantly over capacity on PM peak in all scenarios.	
	Ifield Avenue/Stagelands	Ifield Ave SB movement significant increase	
36	junction	due to West of Ifield Operates within capacity in AM peak	All
	Storrington approach	Over capacity on PM peak in all scenarios.	
37	(EB) at Washington	Significant NB increase along A24 restricting	All, Sc1 & 2 Worst
51	Roundabout	Over 1.5% threshold in scenarios 3, 4 and 5 in	VVUIJI
		AM and PM peak.	
38	A24/Steyning Road	Increased arrival with LP scenario from Steyning Road	3, 4 and 5, Sc3 Worst
		Operates within capacity in AM Peak.	
		Above 1.5% threshold in PM peak.	
39	A281/Partridge Green Road	Increased throughput with LP scenarios through A281 NB	All, Sc2 & 3 Worst
		Over-capacity in AM peak in scenarios 1, 2, 4 and 5.	
		Operates within capacity in PM peak.	
40	Wheatsheaf Road/ A281	Increased throughput with LP scenarios through A281 NB	1, 2, 4 and 5

			Scenarios with Severe
Label	Junction Name	Comments	Impact
		Operates above capacity in all scenarios in AM and PM peak.	
41	Kerves Lane/A281	Increased throughput with LP scenarios through A281 WB	All, Sc3 Worst
		Operates above capacity in scenario 1 and 5 in AM peak and 4 and 5 in PM peak.	
42	St Leonards Rd/A281	Increased throughput with LP scenarios through A281 WB	All, SC1 Worst
		Operates above capacity in AM and PM peak in scenarios 4 and 5.	
43	A29/ Adversane Lane	SC4 Increase due to Land at Adversane egress traffic	4 and 5
		Operates above capacity in PM peak in scenarios 4 and 5.	
45	A29/ Lordings Road	SC4 Increase due to Land at Adversane egress traffic	4 and 5
		Operates just over capacity in all scenarios in AM peak.	
46	Wimblehurst Rd/Parsonage Rd	N Heath Ln SB restricted by Wimblehurst Right Turn	All
		Operates just over capacity in scenarios 4 and 5 in AM peak.	
47	Harwood Road Roundabout	Significant increase in SB movement from Harwood Road within LP scenarios	4 and 5
		Operates just over capacity in all scenarios in AM peak.	
		Significant increase in SB movement from Harwood Road within LP scenarios	
19	Harwood Road/North	Signal Optimication possible	ΛU
40	Street Roundabout	Operates just over capacity in scenarios 1 and	
		5 in AM peak.	1 and 5 001
49	A29/ New Road	along A29 within LP scenarios	Worst
50	A283/ Water Lane	SC2 increase of traffic along A283, reducing capacity of Water Lane	2 and 3, SC2 Worst
		Operates just over capacity in AM peak, in scenarios 2, 3, 4 and 5.	
51	B2115/A281 Brighton Road (Ciswood House Junction)	Increase in Right Turning Traffic at the B2115	All, Sc5 Worst
-		Operates just over capacity in AM peak in all scenarios	
52	Hop Oast Roundabout, Worthing Rd WB Approach	Increase in Worthing Road approach flow to the roundabout with LP scenarios	3.
		Operates just over capacity in AM peak in	-,
	Steyning Bypass	scenarios 3, 4 and 5 and scenarios 3 and 5 in the PM peak.	
53	Hill	Increase traffic of Steyning Bypass SB	3, 4 and 5

Label	Junction Name	Comments	Scenarios with Severe Impact
		Operates just over capacity in the PM peak in	
	A20/ High Street	scenarios 4 and 5.	
	AZ9/ Fligh Street		
54	Roundabout	Increase in A29 SB within LP Scenarios	4 and 5
		Operates just over capacity in the PM peak in	
		scenarios 4 and 5.	
		Capacity Capatraint at Clarance Road avit	
		Capacity Constraint at Clarence Road exit	
	A281 Clarence Road	exacerbated by significant increase in A281 EB	
55	junction	traffic within LP PM scenarios	4 and 5

- 4.5.8 The outputs indicate that there are 45 junctions within Horsham which are over-capacity and the Local Plan impact is deemed significant enough for further investigation and consideration of mitigation. However, in the majority of cases the increase in V/C between the Reference Case and the scenarios is relatively small. It is likely that sustainable transport measures or signal optimisation, where relevant, will potentially have enough of an impact to mitigate the impact of development. Whilst each junction will see slightly different impacts from the sustainable transport measures, any junctions where the V/C difference between the Reference Case and scenario test is less than 5%, the sustainable transport and signal optimisation measures may be sufficient.
- 4.5.9 The sustainable transport and signal optimisation measures discussed in the next chapter will indicate which junctions may require further physical mitigation. At this stage the results would indicate that this is only likely to be necessary for those junctions shown in bold in tables 4.1 and 4.2.
- 4.5.10 It should also be noted that mitigating some key junctions could partly relieve congestion at other junctions. For example, changes at A24/A283 Washington roundabout may discourage use of the A283/B2139 route through Storrington for journeys where use of the A24/A280/A27 is more appropriate. This will be considered and analysed in parallel to agreeing specific mitigation.
- 4.5.11 The next stage of the study will be to determine what appropriate sustainable transport mitigation should be considered and what can be applied within the model to represent the reduction of car trips as a result of the mitigation.

## 4.6 Strategic Road Network Junction Impacts

4.6.1 Tables 4.6 and 4.7 show the comparison of V/C between the Reference Case and the Scenario tests on junctions on the Strategic Road Network which is managed by Highways England. The locations of these is shown in Figure 4.1.



Figure 4.1: Strategic Road Network – Junctions Over Capacity

	Junction	SRN							
ID	Description	Junction	Ref	Sc1	Sc2	Sc3	Sc4	Sc5	Max
C1	A2300 northbound	A23							
51	A23	Junction	140.4	146.6	152.6	145.9	146.2	152.6	152.6
S2	B2118 merge onto A23 northbound	A23 Sayers Common Junction	126.0	133.1	138.5	130.0	135.2	140.5	140.5
S3	A23 at Pangdean Farm SB	A23 Pyecombe Junction	113.2	115.0	115.4	116.0	115.0	116.2	116.2
S4	A23 northbound diverge toward roundabout	M23 J11	107.5	110.8	110.9	110.3	110.7	110.8	110.9
S5	M23 J11 Roundabout NB Off slip Approach	M23 J11	101.2	103.3	103.2	103.4	103.2	103.1	103.4
S8	A23 NB Off sip to A273	A23 Pyecombe Junction	96.6	100.3	100.2	99.6	100.5	100.1	100.5
S9	A23 Access from West Road West of Pyecombe	A23 Pyecombe Junction	96.4	106.7	107.0	103.7	103.0	108.2	108.2
S10	A23 NB On Slip Pyecombe Junction	A23 Pyecombe Junction	100.0	100.7	104.0	100.1	100.7	105.5	105.5
S12	A23 Hickstead Junction SB on Slip	A23 Hickstead Junction	96.1	98.7	98.1	100.4	99.5	99.7	100.4

 Table 4.6:
 Junction Capacity Outputs – Strategic Road Network (AM Peak - %)

Table 4.7: Junction Capacity Outputs – Strategic Road Network (PM Peak - %)

-		0.0.11							
	Junction	SRN	Def	0.4	0.0	0.0	0.4	0.5	
U	Description	Junction	Ref	SC1	SC2	SC3	SC4	SC5	мах
<b>S</b> 3	A23 at Pangdean Farm SB	A23 Pyecombe Junction	117.6	118.9	119.0	119.0	118.6	119.1	119.1
S5	M23 J11 Roundabout NB Off slip Approach	M23 J11	99.5	101.5	101.3	101.3	101.4	101.2	101.5
S6	M23 southbound slip at M23 junction 11 roundabout	M23 J11	102.7	104.3	104.9	104.4	104.2	104.7	104.9
S7	West Hickstead Lane Approach to A23 Hickstead Roundabout Junction	A23 Hickstead Junction	101.2	98.0	104.5	97.4	98.0	104.1	104.5
S8	A23 NB Off slip to A273	A23 Pyecombe Junction	101.1	101.3	101.5	101.3	101.4	101.3	101.5
S9	A23 Access from West Road West of Pyecombe	M23 J11	90.3	100.6	100.4	98.2	100.9	100.2	100.9

- 4.6.2 The outputs from the modelling indicate that there are four junctions on the SRN where there are capacity issues, which the Local Plan exacerbates. These are:
  - M23 Junction 11
  - A23 Pyecombe Junction
  - A23 Hickstead Junction
  - A23 Sayers Common Junction
- 4.6.3 The outputs in the table show the comparative performance at each junction as shown by the SATURN model. There are some issues that would require further indication, where alternative more detailed analysis, outside of the SATURN modelling, would be appropriate, as the SATURN model may not accurately model certain merge arrangements and show V/C values which are potentially too high. However, the outputs from the SATURN model give a good comparison between scenarios.
- 4.6.4 It can be seen from the outputs in the table, that in the majority of cases the SRN outputs show the junctions to perform at a similar level in all scenarios. The Hickstead, Sayers Common and Pyecombe junctions are all shown to be slightly worse for scenarios 2 and 5, when Mayfield development is included and scenario 3 with Buck Barn.
- 4.6.5 The modelling does indicate that there are a number of locations on the SRN which are well over capacity in the Reference Case, as a result of large increases in longer distance movements within background traffic growth. These locations would be expected to be worse than is indicated by the modelling in at least some of the Local Plan scenarios with the additional Local Plan traffic from Mayfield's and Buck Barn developments. The modelling does show that traffic is rerouting to avoid the most congested junctions on the SRN and is using WIneham and to reach the A23 at Bolney
- 4.6.6 This would indicate that the mitigation requirements with these scenarios would be more involved and therefore likely to be more costly. The Sayers Common junction is a particular issue with the northbound on-slip merge having a large V/C and causing severe delays. No DMRB merge-diverge assessment has been undertaken at this stage, but mitigation may require additional lanes on the merges and/or mainline e.g. a lane gain layout as the modelling indicates that some of the merge and diverge layouts between main carriageway and slip roads would have insufficient capacity.

## 4.7 Impact on Junctions in Neighbouring Authorities

4.7.1 Tables 4.8 and 4.9 show the junctions which the modelling indicates are over capacity in Crawley Borough. The junctions on the main routes i.e. A264 and A2200 will be influenced by traffic from all developments in the north part of Horsham, however there are a number of locations which are within more residential areas of west Crawley, which are due to the increases in traffic from the West of Ifield development. The flow plots indicated that there were substantial flow increases, as would be expected, on the west side of Crawley as a result of this development. At this stage the modelling does not include the Ifield relief road. The junction hotspots are shown within the Figure 4.2.



Figure 4.2: Crawley Road Network – Junctions Over Capacity

Table 4.8:	Junction Capacity	Outputs – Crawle	v Borough (AM F	<sup>2</sup> eak - %)
10010 1.0.	ounouon oupdong	outputo oranio	, Dorougii (/	<b>Ou</b> ic 70)

ID	Junction Description	Ref	Sc1	Sc2	Sc3	Sc4	Sc5	Max
C1	A264/A2220 Bewbush Manor							
CI	roundabout	102.8	104.4	104.3	105.1	104.3	104.5	105.1
C6	Ifield Avenue/ Stagelands	88.8	102.4	102.4	102.6	102.4	102.5	102.6
<u></u>	Ifield Roundabout, Ifield Ave SB							
0	approach	68.9	101.3	101.4	101.4	101.2	101.4	101.4
C9	Bewbush Drive/Mowbray Drive	98.5	100.0	100.2	100.1	100.1	100.1	100.2

 Table 4.9:
 Junction Capacity Outputs – Crawley Borough (PM Peak - %)

ID	Junction Description	Ref	Sc1	Sc2	Sc3	Sc4	Sc5	Max
C1	A264/A2220 Bewbush Manor							
CI	roundabout	101.1	104.1	103.9	104.1	103.8	104.0	104.1
<u></u>	A2220/A264 Horsham Road							
02	Roundabout	106.5	109.5	109.5	109.4	109.5	109.4	109.5
C3	Cheals Roundabout, Horsham							
	Rd WB approach	137.3	139.2	139.3	138.9	139.1	139.0	139.3
C4	Ifield Roundabout, A23 EB							
	Approach	112.8	115.7	115.7	115.5	115.4	115.6	115.7
C5	Cheals Roundabout, Crawley							
	Ave NB approach	104.4	106.1	106.4	106.6	106.2	106.5	106.6
C6	Ifield Avenue/ Stagelands	103.0	105.9	105.8	105.7	106.3	105.9	106.3
C7	Ifield Avenue / Warren Drive	102.7	104.1	104.1	104.1	104.3	104.3	104.3
<u></u>	Ifield Roundabout, Ifield Ave SB							
00	approach	102.2	102.3	102.3	102.3	102.3	102.3	102.3

- 4.7.2 The modelling does not include any sustainable transport mitigation at this stage, and this will be the next step, to inform what highway mitigation may be required to resolve any issues in this area of Crawley. More detail on trip making patterns in Crawley and potential mitigation requirements are discussed in Section 6.3, after the application of sustainable transport measures.
- 4.7.3 Only two other junctions in the neighbouring authorities has been identified as having been significantly impacted by the Local Plan development. These are the A272/A283 and A272/A285 junctions, both in Petworth, in Chichester District. These are both spatially constrained junction with small turn capacity due to their location, hence sensitive to increases in traffic and difficult to mitigate.

# 5 Mitigation Measure Methodology

# 5.1 Overview

- 5.1.1 This chapter provides an overview of the proposed methodology for modelling the impact of sustainable travel measures and strategies to be used within the "With Mitigation" scenario testing for the five Horsham Local Plan scenarios.
- 5.1.2 Mitigation considerations are to be 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.
- 5.1.3 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.
- 5.1.4 Previous 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. In addition to this, a 12% internalisation reduction factor 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).
- 5.1.5 The methodology set out below is based on a recognised approach, using empirical evidence form 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 Highways England in both instances. The sustainable travel measures will need to align with any emerging schemes and approaches that would appear within the Infrastructure Delivery Plan.
- 5.1.6 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.

# 5.2 Sustainable Transport Measures

- 5.2.1 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.
- 5.2.2 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)
- 5.2.3 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 an approximately 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 an approximately 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%
  - 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.</p>
  - Table 5.1 shows the car trip reductions by distance from the Sustainable Travel Towns study.

### Table 5.1: 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%

- 5.2.4 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.
- 5.2.5 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, that 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.
- 5.2.6 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, by applying the reductions at the distance based level will mean that trip reductions will be relatively low.
- 5.2.7 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.
- 5.2.8 Once the reductions have been made to the model, sense checks will be conducted 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.
- 5.2.9 The originally applied 12% internalisation of trips (as stated in paragraph 5.1.2), derived from census travel to work data proportions based on commute travel within Middle Super Output Areas (MSOAs) in North Horsham is maintained from prior trip generation calculations.

## 5.3 Site Specific Sustainable Transport Considerations

5.3.1 In addition to the soft sustainable transport measures outlined above, further physical sitespecific mitigation measures have been discussed and agreed 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 soft measures outlined previously. 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 5.4.

5.3.2 The site-specific proposed mitigation measures are outlined below:

### Adversane

- Frequent bus service to Billingshurst direct connection to Billingshurst train stationphase 1
- Frequent bus service to Horsham via Billingshurst direct connection to Billingshurst and Horsham train stations - phase 2
- Cycleway / footpath network including:
  - Cycle/ped only connection to Billingshurst and Billingshurst train station
- Supporting sustainable transport measures including Transport on Demand, Shared Transport solutions, MaaS, Behaviour Change, Micromobility and Active Travel Solutions

### East of Billingshurst

- Frequent bus service to Horsham
- Cycleway / footpath network including:
  - Cycle/ped only connection to Broomfield Drive
  - Cycle/ped connection to Brookers Road employment area + cycle route to Weald School
  - Bus+cycle/ped connection to Daux Rd employment area and route to rail station
  - Cycle/ped connection to Daux Avenue
- Mitigation for A29 Northern roundabout (Bypass/Stane St./Amblehurst Green/High St) -Options:
  - Signals with bus priority
  - Conventional improvement to roundabout
- Local/personal mobility solutions / "MAAS" electric buggies/vehicles travel on demand to/from station and town centre

### **Buck Barn**

- Frequent bus service to Horsham including direct connection to Horsham train station
- Likely to be achieved through the extension of the 98 (Horsham P&R service) followed by an increase in the service frequency in later phases.
- Bus to Worthing with diversion of existing services and frequency improvements
- Provision of an east / west bus service serving Billingshurst and Haywards Heath likely to be a lower frequency service introduced in the later phases of the development.
- Bus priority at A24 Hop Oast including at junction and on approaches

- Additional bus priority on route into Horsham Town centre/Station from Hop Oast
  - Bus priority at Albion Way / Worthing Road roundabout
  - Bus Priority at Copnall Way / Piries Place car park
  - Improved capacity at Horsham Bus Station
  - Additional DIDO (drive-in drive-out) stand at the south end of the station
  - Potential removal of ped crossing facility or removal of ped / bus conflict
  - Improved Interchange facilities at Horsham train station
- Cycleway network including:
  - Cycle only connection to Christ's Hospital train station using the Down's Link
- Contribute to major high capacity and frequency bus priority corridor to Horsham and Crawley
- Full suite of supporting sustainable transport measures including Transport on Demand, Shared Transport solutions, MaaS, Behaviour Change, Micromobility and Active Travel Solutions (including an extensive e-bike hire scheme)

### **Southwater**

- Bus frequency improvements to Horsham & Worthing
- Bus priority at A24 Hop Oast including at junction and on approaches
- Traffic calming features in village with bus/cycle bypasses
- Cycle route improvements to Horsham
- Additional bus priority on route into Horsham Town centre/Station from Hop Oast
- Bus priority at Albion Way / Worthing Road roundabout
- Bus Priority at Copnall Way / Piries Place car park
- Improved capacity at Horsham Bus Station
- Improved Interchange facilities at Horsham train station
- Local/personal mobility solutions / "MAAS" in village electric buggies/pods
- Downs link improvements/ improvements at Christ's Hospital station such as to waiting and cycle parking facilities.
- Contribute to major high capacity and frequency bus priority corridor to Crawley?
- Contribute to improvements at A24 Washington junction including bus priority
- Supporting sustainable transport measures including Transport on Demand, Shared Transport solutions, MaaS, Behaviour Change, Micromobility and Active Travel Solutions

#### Rookwood

 Cycle route to town centre and to rail station and hospital including cycle facilities / priority phases at signals:

- B2237 N Parade junctions with Wimblehurst Rd / West Parade
- North Parade / Hurst Road
- Springfield Rd / Albion Way
- Frequent bus to town centre / station / hospital with bus priority at same junctions 10mins frequency?
- Buses to Tanbridge House and Millais schools
- Bus to North Horsham additional route from Town centre to North Horsham via Rookwood – 30mins frequency?
- Bus priority at junctions within Horsham which serve routes listed above
- Cycle/walk route to North Horsham development with safe crossing of A264 at Langhurstwood Rd junction
- Consideration of demand management and parking control/supply measures
- Personal / local mobility solutions / "MAAS" electric buggies / vehicles
- Contribute to major high capacity and frequency bus priority corridor Horsham Crawley & West of Ifield

### West of Kilnwood Vale

- Treat as part of West of Ifield, to have same level of internal and local measures
- Contribute to major high capacity and frequency bus priority corridor Horsham Crawley very high frequency services on corridor to include services between development areas in addition to town centre to town centre services.

### North Horsham Densification

- Expand upon walking / cycling network in North Horsham
- Increase frequency of buses to Horsham and Crawley 10 mins overall
- Additional bus route from Town centre to North Horsham via Rookwood 30mins?
- 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

- ٠
  - Phase 2 route: uses the CWRR (Link Road) to Manor Royal and Gatwick Airport
- In addition to route for phase 1
- May extend to a new train station if built and down to Horsham in the later phases of the full 10,000+ development.
- 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 CWRR
  - 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)

### Mayfield

- Frequent bus service to Burgess Hill including train station from phase 1
  - Providing connections to north / south bus services serving Crawley and Brighton
  - Autonomous bus provision on this service when possible
- DRT services for the site and to Henfield
- Bus provision north / south diversion of existing services in end phases
- Bus priority measures throughout the site with segregated bus provision where necessary
- Bus priority on route to Burgess Hill and in town centre
  - Queen Elizabeth Avenue
  - Station Road
- Full suite of supporting sustainable transport measures including Transport on Demand, Shared Transport solutions, MaaS, Behaviour Change, Micromobility and Active Travel Solutions (including an extensive e-bike hire scheme)

## 5.4 Reduction in Car Trips

5.4.1 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 5.2.

5.4.2 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 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, previously discussed.

Development	Estimated % car trip reduction	End Destination Reduction
Adversane	Medium / High % car trip reduction	Billinghurst & Horsham
	– 7% to 10%	
East of Billingshurst	Low % car trip reduction < 4%	Horsham Town Centre
Buck Barn	Medium / high % car trip reduction	Horsham Town Centre
	– 7% to 10%	
Southwater	Medium / high % car trip reduction	Horsham Town Centre &
	– 7% to 10%	Worthing
Rookwood	Medium / high % car trip reduction	N/A
	– 7% to 10%	
West of Kilnwood	High % car trip reduction – 10% to	Horsham Town Centre,
Vale	12% up to 12% to 15%*	Crawley Town Centre
North Horsham	Medium % car trip reduction -	Horsham Town Centre,
Densification	Overall 5% to 7%	Crawley Town Centre
West of Ifield	Very high % car trip reduction –	Crawley Town Centre
	12% to 15%	
Mayfield	Medium % car trip reduction – 5%	Burgess Hill
	to 7%	-

 Table 5.2:
 Site Specific Mitigation Car Trip Reduction

- 5.4.3 Base on the current distribution of the models, car trip reduction factors are applied through a two-tiered approach.
- 5.4.4 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 will be 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.
- 5.4.5 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 5.1.
- 5.4.6 Table 5.3 highlights the Inbound and Outbound total percentage reduction of trips to each site as a result of applying all the sustainable mitigation measures.

	A	М	PM		
Development	Outbound	Inbound	Outbound	Inbound	
Adversane	-4%	-3%	-3%	-4%	
East of Billingshurst	-4%	-3%	-4%	-3%	
Buck Barn	-3%	-3%	-5%	-3%	
Southwater	-6%	-6%	-6%	-7%	

 Table 5.3:
 Development Trip Total Reduction from Sustainable Measures

	A	N	PM		
Development	Outbound Inbour		Outbound	Inbound	
Rookwood	-5%	-4%	-6%	-8%	
West of Kilnwood Vale	-4%	-8%	-5%	-7%	
North Horsham	10/	10/	10/	20/	
Densification	-1%	-1%	-1%	-2%	
West of Ifield	-8%	-5%	-7%	-9%	
Mayfield	-3%	-3%	-4%	-3%	

- 5.4.7 As the percentage totals are relatively small and the distribution of trips from the sites relatively widely dispersed, the sustainable mitigation measures brings about small reductions to Volume over Capacity ratios of the worst performing junctions.
- 5.4.8 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). In comparison to the reduction of trips at other more rural locations.
- 5.4.9 The proportion of reduction at each individual site is deemed to provide an accurate representation of each sites constraints in delivering sustainable mitigations.

# **6** Consideration for Further Mitigation

# 6.1 **Physical Mitigation**

- 6.1.1 Post application of the sustainable mitigation measures a further process of optimising signalised junctions that have already been earmarked as congestion hotspots was undertaken. This process was undertaken thorough the SATURN strategic modelling software which has an inbuilt process which optimises green times based on the flow to capacity relationship of individual turns. This process reviews the timings within the model, the flows at the junction and the delays on each arm and will aim to better balance the delays and the overall performance of the junction.
- 6.1.2 After the application of the sustainable transport measures within each of the 5 scenarios, further analysis has been conducted identifying the locations where physical junction mitigation may still be required.
- 6.1.3 Post application of the signalised junction optimisation, a high-level exercise was undertaken to identify what could be delivered in terms of physical mitigation and what is achievable given any local constraints, or highlight any locations where physical mitigation would be very difficult or impossible to achieve given the congestion levels experienced.
- 6.1.4 Two high-level interventions have been identified and these have been considered within the modelling and analysis of the outputs:
  - West of Ifield Relief Road The modelling assumes that only the middle section of this relief road will be tested at this stage and the impact of this on potential additional mitigation is considered. This is included within the main tests with the West of Ifield development.
  - Mayfield Link Road A link road from Mayfield to the B2118 London Road, at Sayers Common has been included within a sensitivity test to identify the impact of this on the local network and the A23.

## 6.2 Junction Mitigation Summary

6.2.1 Table 6.1 and Table 6.2 show the remaining junctions that are flagged as congestion hotspots post sustainable mitigation and signal optimisation. All junctions are shown for both peak periods modelled, where issues are still seen in at least one of these peaks i.e. some junctions are shown as working adequately in one peak, but not the other. This allows the reader to see that mitigation is only likely to be required to resolve issues seen in just one peak. Where junctions are mitigated through signal optimisation the outputs in the table show lower V/C values than the outputs for the non-mitigated junctions and those junctions where this is seen as possible mitigation is detailed in the text for the relevant junctions in paragraph 6.2.2ff.

Junction Name	AM	AM	AM	AM	AM	AM	Maxi
	Ref	SC1	SC2	SC3	SC4	SC5	mum
A24 approach at Washington							
Roundabout	123.9	136.5	134.5	136.2	137.3	138.0	138.0
B2237/Wimblehurst Road	106.9	109.4	109.1	109.3	109.5	108.7	109.5
A264 WB Approach at							
Moorhead Roundabout	105.6	109.7	109.5	108.8	110.0	109.6	110.0
A272/A281 roundabout,							
Cowfold	102.7	104.7	104.3	105.4	105.4	104.6	105.4

Table 6.1:	AM Junction Hots	ots (Max V/C) Post Si	ustainable Mitigation	and Signal Optimisation

Junction Name	AM Ref	AM SC1	AM	AM SC3	AM SC4	AM SC5	Maxi
A281/Springfield Boad	i i i i i i i i i i i i i i i i i i i	501	562	505	564	303	mann
lunction	102.2	103.6	103 7	103.8	103 5	104.0	104.0
Rusper Road Roundabout	102.2	105.0	105.7	105.0	105.5	10 1.0	101.0
(Rusper Road Approach)	100.2	104 1	103 5	103 3	104.2	103.0	104.2
London Boad approach at	100.2	10.11	100.0	100.0	10 112	100.0	102
Washington Roundabout	84.4	91.2	93.0	91.0	94.0	91.0	94.0
A283 approach at	0	5112	5510	5110	5 110	5110	5.110
Washington Roundabout	83.7	96.6	96.6	97.1	97.7	97.0	97.7
Colgate - Tower Road /							0/11
Forest Road	79.7	101.5	101.2	101.8	101.8	101.3	101.8
A272/A281 roundabout							
south of Cowfold	85.9	93.7	94.4	88.1	94.5	95.1	95.1
B2237 approach at Hop Oast							
Roundabout	36.1	43.2	42.0	39.9	43.6	41.2	43.6
Crawley Road/ Forest Road							
Junction	84.2	104.3	103.4	103.4	104.3	102.4	104.3
A283 Amberley Road							
Roundabout Storrington	96.6	99.4	99.9	100.1	100.2	100.5	100.5
A264/Langhurst Wood Road							
junction	70.7	83.9	82.9	86.7	84.0	81.3	86.7
A281/New Street Junction							
Horsham Town Centre	52.9	73.5	71.6	72.6	70.8	65.1	73.5
A283 /A29 South							
Roundabout Pulborough	83.0	86.3	85.3	85.8	93.1	92.9	93.1
East Street / Park Way							
Junction	89.2	101.2	101.2	101.5	101.6	100.9	101.6
Hop Oast Roundabout -							
Worthing Road approach	86.9	110.6	111.6	111.1	111.9	111.1	111.9
Pulborough - A283/A29							
Junction	96.2	103.8	103.3	103.1	107.5	107.4	107.5
Ifield Avenue/Stagelands							
junction	35.6	73.2	73.4	72.9	73.4	73.0	73.4
Storrington approach at							
Washington Roundabout	82.2	88.6	87.5	88.1	86.5	85.4	88.6
A24/Steyning Road	68.8	86.2	88.0	102.4	100.5	100.1	102.4
Wimblehurst Rd/Parsonage							
Rd	83.3	100.6	100.2	100.1	100.7	100.1	100.7
Harwood Road Roundabout	82.7	100.6	100.4	99.7	100.6	100.1	100.6
Harwood Road/North Street							
Roundabout	79.2	100.5	100.3	100.5	100.5	98.3	100.5

Table 6.2: PM Junction Hotspots (Max V/C) Post Sustainable Mitigation and Signal Optimisation

Junction Name	PM Ref	PM SC1	PM SC2	PM SC3	PM SC4	AM SC5	Maxi mum
A24 approach at Washington							
Roundabout	89.6	98.0	99.0	101.8	102.8	102.8	102.8
B2237/Wimblehurst Road	103.1	102.9	102.3	102.7	102.9	102.9	103.1

Junction Name	PM	PM	PM	PM	PM	AM	Maxi
	Ref	SC1	SC2	SC3	SC4	SC5	mum
A264 WB Approach at							
Moorhead Roundabout	110.7	103.3	102.8	103.7	104.1	104.1	110.7
A272/A281 roundabout,							
Cowfold	94.8	93.7	96.9	99.2	102.1	102.1	102.1
A281/Springfield Road							
Junction	102.5	90.4	91.8	90.9	85.2	85.2	102.5
Rusper Road Roundabout							
(Rusper Road Approach)	86.5	88.3	87.5	89.9	86.2	86.2	89.9
London Road approach at							
Washington Roundabout	108.1	108.0	107.3	107.2	107.2	107.2	108.1
A283 approach at							
Washington Roundabout	106.9	107.9	107.2	107.9	108.1	108.1	108.1
Colgate - Tower Road /							
Forest Road	102.8	100.5	100.9	101.6	101.5	101.5	102.8
A272/A281 roundabout							
south of Cowfold	102.5	103.3	103.8	103.1	103.1	103.1	103.8
B2237 approach at Hop Oast							
Roundabout	102.3	104.0	101.4	102.1	102.9	102.9	104.0
Crawley Road/ Forest Road							
Junction	102.0	102.1	101.5	102.0	102.2	102.2	102.2
A283 Amberley Road							
Roundabout Storrington	101.3	101.3	101.2	101.2	100.9	100.9	101.3
A264/Langhurst Wood Road							
junction	101.2	93.4	92.4	91.5	91.0	91.0	101.2
A281/New Street Junction							
Horsham Town Centre	100.9	103.7	103.1	104.2	102.7	102.7	104.2
A283 /A29 South	400 7	102 5	102.4	102 5	105.1	105.1	105.4
Roundabout Pulborougn	100.7	103.5	103.4	103.5	105.1	105.1	105.1
East Street / Park Way	100.4	102.2	102.0	104.2	104.2	104.2	104.2
Junction	100.4	103.3	103.8	104.2	104.3	104.3	104.3
Hop Oast Roundabout -	F4 2	100 F	02.0	02.2	00.1	00.1	100 F
Pulberough A282/A20	54.5	100.5	93.0	92.3	90.1	90.1	100.5
Pubbliougii - A283/A29	00.4	06.9	00.4	07.9	105.2	105.2	105.2
Ifield Avenue (Stagelands	99.4	90.0	99.4	97.0	105.5	105.5	105.5
iunction	540	104.6	104.4	104 5	104.0	104.0	104.0
Storrington approach at	54.9	104.0	104.4	104.5	104.9	104.9	104.9
Washington Boundabout	87.2	105.3	105 5	107 1	106.3	106.3	107 1
	95.2	92.8	92.8	70 9	87.0	87.0	95.8
Wimblehurst Rd/Parsonage	55.0	52.0	52.0	70.9	07.0	07.0	55.8
Rd	88.0	91.8	80.8	95.3	100.7	100.7	100.7
Harwood Road Roundabout	51.0	52.2	56.0	54.1	53.1	53.1	56.0
Harwood Road/North Street	51.0	55.5	50.0	54.1	55.1	55.1	50.0
Roundabout	58.5	53.0	55.6	54.2	54.0	54.0	58.5
Washington RoundaboutA283 approach atWashington RoundaboutColgate - Tower Road /Forest RoadA272/A281 roundaboutsouth of CowfoldB2237 approach at Hop OastRoundaboutCrawley Road/ Forest RoadJunctionA283 Amberley RoadRoundabout StorringtonA264/Langhurst Wood RoadjunctionA281/New Street JunctionHorsham Town CentreA283 /A29 SouthRoundabout PulboroughEast Street / Park WayJunctionHop Oast Roundabout -Worthing Road approachPulborough - A283/A29JunctionIfield Avenue/StagelandsjunctionStorrington approach atWashington RoundaboutA24/Steyning RoadWimblehurst Rd/ParsonageRdHarwood Road/North StreetRoundaboutHarwood Road/North StreetRoundabout	108.1 106.9 102.8 102.5 102.3 102.3 102.3 100.4 100.7 100.7 100.7 100.4 54.3 99.4 54.3 99.4 54.3 58.5	108.0 107.9 100.5 103.3 104.0 102.1 101.3 93.4 103.7 103.7 103.5 103.5 103.5 103.3 100.5 96.8 104.6 105.3 92.8 91.8 53.3	107.3 107.2 100.9 103.8 101.4 101.5 92.4 103.1 103.1 103.4 103.8 93.0 93.0 93.0 103.4 103.4 103.4 103.5 93.0 95.0 95.0 95.0 95.0 95.0 95.0 95.0 95.0 95.0 95.0	107.2 107.9 101.6 103.1 102.1 102.0 101.2 101.2 101.2 101.2 101.2 103.5 104.2 103.5 104.2 103.5 104.2 104.5 104.5 104.5 107.1 107.1 107.1 107.1 107.1 107.1 107.1 107.1 107.2 10	107.2 108.1 101.5 103.1 102.9 102.2 100.9 102.7 100.7 105.1 104.3 90.1 105.3 104.3 104.3 105.3 104.9 105.3 100.7 105.3 100.7 100	107.2 108.1 101.5 103.1 102.9 102.2 100.9 91.0 102.7 105.1 105.1 104.3 90.1 105.3 104.9 105.3 104.9 105.3 104.9 105.3 100.7 53.1 100.7	108.1 108.1 102.8 102.8 104.0 102.2 104.2 101.3 104.2 104.3 104.3 104.3 104.3 100.5 105.3 104.9 105.3 104.9 105.3 104.9 105.3

Table 6 3.	A070/A04 /I	Max M/C) Dect	Suctainable	Mitigation and	Signal	Ontimication	AM Dook
	AZI Z/AZ4 (I	iviax v/C) FUSI	Sustainable	willigation and	Siyilai	Opunisation	AIVI FEAK

Junction Name	AM	AM	AM	AM	AM	AM	Maxi
	Ref	SC1	SC2	SC3	SC4	SC5	mum
A24 Northbound signalised							
junction with A272	108.5	107.1	106.9	109.1	108.1	111.5	111.5
A272 westbound signals at							
the A24/A272 junction	104.8	102.8	102.3	110.2	102.7	105.7	110.2
A272 signals over the							
A24/A272 junction	101.5	102.4	102.4	103.0	103.0	102.1	103.0
A24 eastbound approach to							
A24/A272 junction	36.9	106.4	106.2	109.2	108.7	106.5	109.2
A24 southbound signals							
before A24/A272 junction	95.2	104.1	104.5	108.2	106.4	101.7	108.2

Table 6.4: A272/A24 (Max V/C) Post Sustainable Mitigation and Signal Optimisation PM Peak

Junction Name	PM	PM	PM	PM	PM	PM	Maxi
	Ref	SC1	SC2	SC3	SC4	SC5	mum
A24 Northbound signalised							
junction with A272	116.8	117.0	116.2	115.5	117.5	117.4	117.5
A272 westbound signals at							
the A24/A272 junction	121.5	122.0	121.9	124.8	122.8	124.9	124.9
A272 signals over the							
A24/A272 junction	48.5	48.0	47.9	48.3	48.3	48.4	48.5
A24 eastbound approach to							
A24/A272 junction	108.5	113.9	112.7	111.5	112.3	111.7	113.9
A24 southbound signals							
before A24/A272 junction	103.9	104.6	104.6	105.0	104.7	104.8	105.0

### Junctions Congestion Hotspots in Horsham District Summary

- 6.2.2 The outputs shown in the table are discussed on a junction by junction basis below. Where the text is shown as green it is suggested that either sustainable travel mitigation or traffic signal optimisation will suffice. Where red, junctions are likely to require physical highway mitigation measures or further consideration of sustainable travel measures and reductions on a case by case basis. The summary also provides detail on which scenarios the further mitigation would be required, and this is detailed further in Section 6.3.
- 6.2.3 A number of junctions highlighted below are shown to be on the A24. It is understood that WSCC are undertaking a study of this corridor and therefore further discussions should take place as to how the local plan findings can influence the outcomes of this study and vice versa. As such the A24 work will also be expected to make use of the Local Plan modelling tool with appropriate modification. Outcomes from the Local Plan study will also be used to inform priorities for the A24 study.
- 6.2.4 **A24/A283 Washington Roundabout** severely congested within the AM Reference Case at A283, Storrington Road & A24 NB approach. Additional flow within all LP scenarios exacerbates the congestion exponentially in the AM Peak. Scenario 5 shows the highest level of congestion, followed by scenario 4. Scenario 3 shows the lowest levels of congestion, however still well over capacity and worse than the reference case in the AM peak. All scenarios requiring mitigation. Potential mitigation could be to signalise the roundabout. The junction lies within the South Downs National Park, therefore any mitigation would require

discussions and liaison with the National Park Authority and the process for determining a scheme may take longer than elsewhere.

- 6.2.5 **B2237/Wimblehurst Road** over capacity within reference case and over the 1.5% threshold on all scenarios in AM and PM peak. With signal optimisation V/C is brought down to below the mitigation threshold within the PM Peak but not within the AM Peak, with all scenarios still reaching over the 1.5% threshold **all scenarios require further mitigation**.
- 6.2.6 **A264 WB Approach at Moorhead Roundabout** over capacity within reference case, and over the 1.5% threshold on all scenarios in AM and PM peak. With signal optimisation V/C is brought down to below the mitigation threshold within the PM Peak, however this still remain over the mitigation threshold within the AM Peak and therefore **all scenarios require further mitigation**.
- 6.2.7 **A272/A281 mini roundabouts, Cowfold.** Above 1.5% threshold in all scenarios in AM and PM peak. A281 NB through movement capacity restricted by conflicting Right turning traffic from A281 SB. **All scenarios requiring further mitigation**. Signalising junctions may be possible, which may also allow for improved pedestrian crossing facilities within the centre of Cowfold. Another alternative could be to change junction priorities, to make the A272 the major route, with the A281 having to give way, with priority junctions, however this has the potential to attract more traffic on to the A272 and cause delays on the A281, which is a key north-south bus route.
- 6.2.8 **A281/Springfield Road Junction -** above 1.5% capacity increase in AM Peak for scenarios 2, 3 and 5. Signal optimisation V/C is brought down to below the mitigation threshold, therefore no further mitigation required post signal optimisation in all scenarios.
- 6.2.9 A264/Rusper Road Roundabout (Rusper Road Approach from the south). Significant increase in V/C within the AM Peak. Scenario 1 and 4 are slightly worse than the other scenarios in the AM peak and scenario 3 in the PM peak, however the differences are marginal. Signal optimisation is likely to resolve the issues at this junction in all scenarios, as there is spare capacity shown in the modelling on the circulatory.
- 6.2.10 Colgate Tower Road / Forest Road, Above 1.5% threshold in all scenarios in AM and PM peak. Limited scope for mitigation given constraints. The Tower Road approach is seen to be over capacity, however, it would not be appropriate to mitigate this through physical mitigation as it would potentially make the route more attractive to rat running traffic. The solution should be to improve the junctions on the A264 to make that a more attractive route and therefore reduce potential rat-running and flows at this junction. No physical mitigation would be proposed at this junction.
- 6.2.11 B2237 approach at A24/B2237 Hop Oast Roundabout, Operates within capacity in AM peak. Above 1.5% threshold in PM peak in all scenarios. Significant through movement of the A24 SB restricting "gap time" and capacity for the B2237. All scenarios requiring mitigation. Potential to signalise or partially signalise the roundabout.
- 6.2.12 B2195 Harwood Road/Crawley Road/ Forest Road Junction over capacity and above 1.5% threshold in all scenarios in AM and PM peak. Congested at all approach arms, however modelling indicates that there is scope to optimise the signals to mitigate the local plan impact in all scenarios.
- 6.2.13 A283/Amberley Road Roundabout, Storrington, above 1.5% threshold in all scenarios in AM peak, operating just below, but very close to capacity in scenarios 3, 4 and 5 (just below in 1 and 2). Below 1.5% threshold in PM peak in all scenarios. Mini Roundabout configuration Low Sat flow restricting capacity. Mitigation required with scenario 3, 4 & 5. Potential to signalise junction, which would improve pedestrian provision at this location. This however may require the closing off of Monastery Lane or making this one-way southbound.

- 6.2.14 A264/Langhurst Wood Road junction operates within capacity in AM peak. Just above 1.5% threshold in PM peak in all scenarios. Signal optimisation result in significant reduction of V/C to less than 100, no further mitigation required.
- 6.2.15 A281 Brighton Road/New Street Junction Horsham Town Centre operates within capacity in all scenarios in AM peak, above 1.5% threshold in all scenarios in PM peak. New Street approach significant volume of right turning traffic restricted at priority marker. No mitigation would be proposed at this junction, as the issue is traffic coming out of New Street and improving this access could potential make this route more attractive to rat-running.
- 6.2.16 A283 /A29 Roundabouts, Pulborough, the eastern roundabout operates within capacity in all scenarios in AM peak, above 1.5% threshold in all scenarios in PM peak. A29 SB through movement capacity restricted by conflicting right turning traffic from A283 EB. Mini roundabouts are not ideal for high flows on more than one route within a junction as they have relatively low turn capacities, where there are large conflicting movements and the model represents this situation. Driver behaviour at mini roundabouts also influences the capacity where there are large flows form more than one link. At the western roundabout, the situation is worse for scenarios 4 and 5, with the highest V/C being 107% in the PM peak, compared to 103% for scenarios 1 to 3 and 96% in the Reference Case. All scenarios require mitigation. There is limited scope for improvements due to physical constraints at the junction. There is potential to explore signalisation, however this would not resolve issues that are experienced by HGV's, which would require stop lines to be located quite far back and therefore require long inter-green times.
- 6.2.17 A281 East Street / Park Way Junction above 1.5% threshold in all scenarios in AM and PM peak. Modelling indicates that signal optimisation should suffice at this location.
- 6.2.18 A24/Steyning Road, over 1.5% threshold in scenarios 3, 4 and 5 in AM and PM peak. Scenarios 3, 4 and 5 requiring further mitigation. Given the current junction layout, the increase in traffic exiting from Steyning Road and in particular, turning north onto the A24, could potentially have safety implications.
- 6.2.19 Wimblehurst Road/Parsonage Road operates just over capacity in all scenarios in AM peak. North Heath Lane westbound, restricted by Wimblehurst Road right turn. No mitigation would be proposed here as any increase in capacity would be likely to increase rat-running through these residential areas. Sustainable travel mitigation should be enhanced to reduce traffic levels at this location.
- 6.2.20 Harwood Road/Comptons Lane Roundabout operates just over capacity in scenarios 4 and 5 in AM peak. Significant increase in SB movement from Harwood Road within LP scenarios. The junction operates only just over capacity in the AM peak hour only and additional delays are small, so no physical mitigation is proposed.
- 6.2.21 Harwood Road/North Street Roundabout operates just over capacity in all scenarios in AM peak. Significant increase in SB movement from Harwood Road within LP scenarios. The junction operates only just over capacity in the AM peak hour only and additional delays are small, so no physical mitigation is proposed.
- 6.2.22 A272/A24 Buck Barn The staggered crossroads junction is well over capacity in the reference case and the situation exacerbated in all Local Plan Scenarios. Signal optimisation may be sufficient to negate the impact of the Local Plan, however as stated the junction is still well over capacity. It would be expected that this junction would be looked at as part of the WSCC A24 study. Mitigation required in all scenarios.

### 6.3 Summary of Junctions Requiring Mitigation by Scenario

6.3.1 The junctions which are still shown to require mitigation, once sustainable travel measures and signal optimisation have been considered are detailed below, split out by scenario

- 6.3.2 From the above highlighted junctions, the following issues are seen, with potential mitigation and issues stated:
  - Washington Roundabout This is shown to be marginally worse in Scenarios 4 and 5 when compared to the other three scenarios and may therefore, require slightly more mitigation. The main congestion hotspots stem from the large traffic volume approaching the junction from the South, travelling North bound on the A24 in the AM and the opposite direction travelling South in the PM. A solution for mitigation would be to signalise the roundabout therefore managing traffic flow and providing greater capacity for these movements (All Scenarios).
  - A272/A281 Mini Roundabouts, Cowfold the modelling indicates there is very little difference between scenarios at these junctions. The junctions are well over capacity in the Reference Case and any increase in trips will exacerbate the issue. Traffic will also reroute to avoid Cowfold and this will need to be taken into consideration when looking at mitigation. One potential solution may be to signalise the two junctions and integrate pedestrian crossings into this and remove the current pedestrian crossing between the junctions. This could provide additional capacity, which is likely to suffice for some scenarios, however for scenarios which include Buck Barn and Mayfield, any additional capacity is likely to be used up quickly and the mitigation requirements are likely to be greater (All Scenarios).
  - Moorhead Roundabout. Signal optimisation does improve the level of delay, however all scenarios including the reference case remain over 100%, therefore further capacity increases would be required to improve the congestion at the junction. As the junction is only just over the threshold, it may be possible to mitigate the impact with some minor widening on the WB approach arm to provide additional capacity here (All Scenarios).
  - Hop Oast Roundabout this junction is shown to be marginally worse in Scenario 1. Although Scenario 1 has the lowest growth levels, it is likely that it is shown to be worse when looking at the wider picture as capacity and rerouting impacts within other scenarios as a result of other congested junctions, is in fact reducing potential flows in these scenarios, whereas this would not occur as much in scenario 1. Nonetheless, within other scenarios it is still well above capacity and a lot worse than the Reference Case in all scenarios, so the level of mitigation is unlikely to differ much between scenarios. The main congestion hotspots stem from the large traffic volume approaching the junction along the A24, causing limited gap time for vehicles to exit onto the roundabout from Worthing Road. A solution for mitigation would be to signalise the roundabout, therefore managing traffic flow and providing greater capacity for these movements (All Scenarios).
  - A283/A29 Roundabouts, Pulborough These junctions are worse in both scenarios 4 and 5, when compared to the other three scenarios and therefore the level of mitigation required would be greater. However, all scenarios indicate issues at the junction. The locality of the junctions and the constraints make mitigation considerations difficult. The proximity of buildings and narrow footways will make any mitigation here very difficult (All Scenarios).
  - A272/A24 Buck Barn. Over capacity within all approaches, limited scope for further signal optimisation improvements. Potential further dedicated left and right turn lane filtering and bypassing the interchange would improve the capacity and performance of the junction. However, it is most likely that the junction would require further larger scale physical mitigation and widening in order to accommodate the additional traffic demand. A hamburger style arrangement that would significantly improve capacity of the junction, such example of hamburger style arrangements can be found at the Ringmead Road/A322 Bagshot road junction in Bracknell (All Scenarios).
  - A24/Steyning Road. Junction could provide greater capacity for vehicles to access onto the A24 from Steyning Road as the current arrangement leaves little gap time for vehicles to exit (Scenarios 3, 4 & 5). New roundabout improvements proposals could include signalisation of the roundabout to improve junction throughput.

A283/Amberley Road Roundabout, Storrington. Signalising the A283 Amberley Road roundabout could provide additional capacity for Amberley Road to exit onto the A283, which is almost at capacity as there is little gap time within the current arrangement for vehicles to exit from Amberley Road onto the A283. This would require Monastery Lane to be closed or changed to one-way exit only (one-way may only be required for a short section). This could be difficult to achieve due to lack of local acceptability (Scenarios 3, 4 & 5). Further improvement to visibility to right exiting Fern Road to Amberley Road to allow westbound traffic on Fern Road to be intensified could also be required. However, this scheme may not be required subject to the approval of the proposed A27 Arundel Bypass alleviating congestion within the area. A preferred route for the Arundel bypass was announced by Highways England on 15<sup>th</sup> October 2020.

### **Junctions in Neighbouring Authorities**

6.3.3 Several junctions within Crawley have been identified as being over capacity and still require further mitigation as a result of the Local Plan development post sustainable measures and signal optimisation. The junctions shown to still have issues in one or both peak periods are shown in Tables 6.5 and 6.6.

Junction Name	AM	AM	AM	AM	AM	AM	Maxi
	Ref	SC1	SC2	SC3	SC4	SC5	mum
Gossop Drive/Crawley							
Avenue	103.2	102.7	102.8	102.7	102.7	102.8	103.2
A2220/A264 Horsham Road							
Roundabout	102.8	104.4	104.3	105.1	104.3	104.5	105.1
Cheals Roundabout	43.9	50.2	50.4	50.0	50.1	50.0	50.4
Ifield Roundabout	23.0	28.3	28.3	28.1	28.2	28.2	28.3
Ifield Avenue/ Stagelands	88.8	102.4	102.4	102.6	102.4	102.5	102.6
Ifield Avenue/ Warren Drive	83.4	77.5	76.8	77.5	77.4	76.9	83.4
Bewbush Drive/Mowbray							
Drive	98.5	100.0	100.2	100.1	100.1	100.1	100.2

Table 6.5: Crawley (Max V/C) Post Sustainable Mitigation and Signal Optimisation AM Peak

Table 6.6: Crawley (Max V/C) Post Sustainable Mitigation and Signal Optimisation PM Peak

Junction Name	РМ	PM	PM	РМ	PM	PM	Maxi
	Ref	SC1	SC2	SC3	SC4	SC5	mum
Gossop Drive/Crawley							
Avenue	101.1	104.1	103.9	104.1	103.8	104.0	104.1
A2220/A264 Horsham Road							
Roundabout	106.5	109.5	109.5	109.4	109.5	109.4	109.5
Cheals Roundabout	137.3	139.2	139.3	138.9	139.1	139.0	139.3
Ifield Roundabout	112.8	115.7	115.7	115.5	115.4	115.6	115.7
Ifield Avenue/ Stagelands	103.0	105.9	105.8	105.7	106.3	105.9	106.3
Ifield Avenue/ Warren Drive	102.7	104.1	104.1	104.1	104.3	104.3	104.3
Bewbush Drive/Mowbray							
Drive	69.7	64.0	64.9	64.2	63.0	63.9	69.7

6.3.4 The modelling to date has been undertaken assuming only a partial Ifield Relief Road, which does not provide an alternative route to the A264, Therefore, traffic to the west and Horsham direction, currently has to utilise the roads in Crawley. The relief road or further, more ambitious sustainable transport measures are likely to be required to mitigate the impact of the

West of Ifield development on the locations noted above. Potential mitigation on an individual junction by junction basis is discussed below.

- Gossop Drive / A23 Crawley Avenue This is a signalised junction and the PM peak is shown to be worse than the reference case. The Gossop Road arm is the worst performing and it may be possible to optimise the signals as the Crawley Avenue arms have some limited spare capacity, however this may not be ideal for Crawley Avenue, which is a key route for more strategic movements within Crawley.
- A2220/A264 Horsham Road Roundabout The junction is shown to be over capacity in both peaks in the Reference Case and made worse in all scenarios. The roundabout is signalised and the issue appears to be the eastbound movement through the roundabout causing blocking back, however signal optimisation should suffice with more green time being provided for the circulatory and less for the approach arms – in particular the approach from Sullivan Drive.
- A23 Crawley Avenue / A2220 Horsham Road (Cheals) Roundabout The westbound approach arm to the junction (from Crawley town centre) is seen to be well over capacity in the PM peak Reference Case and exacerbated in all scenarios. Signalising that arm or the whole roundabout may be a solution.
- A23 Crawley Avenue / Ifield Road (Ifield) Roundabout This roundabout is well over capacity on a number of arms in the PM peak Reference Case and all scenarios. Signalisation of the roundabout may be a solution.
- Ifield Avenue / Stagelands The junction is over capacity in the Reference Case in the PM peak and in both the AM and PM peak in all scenarios. The Stagelands and eastbound Ifield Avenue are the worst performing arms. There may be potential to signalise this junction. This may provide improved crossing facilities at what is a residential location, with two primary schools relatively close by and with relatively high flows on Ifield Avenue.
- Ifield Avenue / Warren Drive This junction is a mini roundabout which is shown to be over capacity in the PM Peak Reference Case and made worse in all scenarios. The situation is likely to be caused by the low capacity at the mini roundabout, with right turning traffic from Ifield Avenue to Warren Drive conflicting with Ifield Avenue westbound traffic flows. Signalisation may be possible, however the modelling does indicate that the right turning flow is high and would be reduced if mitigation is provided at the Ifield Roundabout, therefore negating the need for mitigation at this location.
- Bewbush Drive / Mowbray Drive This junction is shown to be just under capacity in the AM peak Reference Case and going just over in the scenarios. Whilst traffic signals may be an option to replace the current mini roundabout, given the likely period of any congestion is likely to be very short, this may be excessive. It is also likely if Ifield Avenue / Crawley Avenue is mitigated, any rat running traffic through this residential part of Crawley could be reduced.

### **Junctions along SRN**

6.3.5 Table 6.7 and 6.8 show the SRN junctions are shown to be operating over capacity and are worse in at least some of the Local Plan scenarios.

Table 6 7 <sup>.</sup>	SRN (Max V/C)	Post Sustainable	Mitigation ar	nd Signal	Ontimisation	AM Peak
	SKIN (IVIAX V/C)	FUSI Sustainable	iviiliyalion ai	nu Siynai	Optimisation	AIVI FEAK

Junction Name	PM	PM	PM	PM	PM	AM	Maxi
	Ref	SC1	SC2	SC3	SC4	SC5	mum
A2G300 northbound on slip							
merge to A23	140.4	145.8	149.0	146.5	151.0	153.9	153.9
West Hickstead Lane							
Approach to HA23 Hickstead							
Roundabout Junction	44.0	41.8	46.0	42.6	45.4	46.2	46.2
A23 Hickstead Junction SB							
on Slip	96.1	97.3	97.0	100.3	99.7	99.7	100.3
A23 at Pangdean Farm	113.2	114.7	115.0	115.7	115.6	116.1	116.1
A23 NB Off slip to A273	96.6	100.2	100.0	99.7	100.8	100.5	100.8
A23 Access from West Road							
West of Pyecombe	96.4	105.0	106.4	105.1	107.7	108.4	108.4
A23 NB On Slip Pyecombe							
Junction	100.0	100.5	102.9	100.3	104.2	107.8	107.8
B2118 merge onto A23							
northbound (Sayers							
Common)	126.0	131.7	136.6	131.2	139.7	142.8	142.8
A23 northbound slip road							
entry before M23 J11	107.5	110.5	110.9	109.9	111.1	110.6	111.1
M23 J11 Roundabout NB Off							
slip Approach	101.2	94.1	94.8	94.4	95.4	103.0	103.0
M23 southbound slip at M23							
junction 11 roundabout	67.7	75.7	75.8	76.0	77.1	79.3	79.3
Horsham Rd/Brighton Road							
roundabout	75.6	88.6	90.2	92.2	87.3	81.5	92.2

Table 6.8:	SRN (Max V	//C) Post	Sustainable	Mitigation	and Signal	Optimisation AM Peak

Junction Name	PM	PM	PM	PM	PM	AM	Maxi
	Ref	SC1	SC2	SC3	SC4	SC5	mum
A2300 northbound on slip							
merge to A23	82.4	84.4	83.2	85.7	86.1	86.1	86.1
West Hickstead Lane							
Approach to HA23 Hickstead							
Roundabout Junction	101.2	101.4	104.1	101.5	103.5	103.5	104.1
A23 Hickstead Junction SB							
on Slip	94.4	95.4	98.0	97.9	100.0	100.0	100.0
A23 at Pangdean Farm	117.6	118.3	117.9	117.9	117.9	117.9	118.3
A23 NB Off slip to A273	101.1	101.2	101.1	101.3	101.2	101.2	101.3
A23 Access from West Road							
West of Pyecombe	74.7	75.3	77.8	77.4	79.7	79.7	79.7
A23 NB On Slip Pyecombe							
Junction	78.8	80.1	81.7	82.0	83.8	83.8	83.8
B2118 merge onto A23							
northbound (Sayers							
Common)	71.3	72.3	71.7	74.0	74.5	74.5	74.5
A23 northbound slip road							
entry before M23 J11	63.8	68.9	70.7	72.8	72.0	72.0	72.8

Junction Name	PM	PM	PM	PM	PM	AM	Maxi
	Ref	SC1	SC2	SC3	SC4	SC5	mum
M23 J11 Roundabout NB Off							
slip Approach	99.5	90.8	90.9	92.0	90.2	90.2	99.5
M23 southbound slip at M23							
junction 11 roundabout	102.7	99.0	100.3	100.8	100.7	100.7	102.7
Horsham Rd/Brighton Road							
roundabout	90.3	100.4	99.7	99.9	99.3	99.3	100.4

- 6.3.6 From the above tables the following elements of the SRN are seen to be requiring further mitigation.
  - A23 Hickstead Junction, A2300 northbound on slip merge to A23 within AM Peak over capacity in all scenarios. West Hickstead Lane Approach to A23 Hickstead Roundabout Junction over capacity in PM Peak. It is likely that the outputs for the northbound slip will be exacerbated by the fact that the model indicates very high delays on the northbound slip at Sayers Common (see below) and traffic from e.g. Mayfield in scenario 2 and 5 is using this junction, rather than Sayers Common. The slip already has a lane gain and any more mitigation may be limited. As the junction is over capacity in the Reference Case there is likely to be a requirement for further discussions with Highways England and Mid-Sussex (where the junction sits) to determine the best way forward.
  - B2118 merge onto A23 northbound (Sayers Common) within AM Peak over capacity in all scenarios. This junction is a particular issue and is shown to be well over capacity already within the Reference Case. With the additional traffic of the Local Plan, in particular from Mayfield within Scenario 2 and 5 this is causing further traffic to re-route and avoid the junction This is highlighted within the modelling of the Mayfield link road, which shows that traffic from Mayfield wanting to go north on the A23 is not using the link road but is finding alternative routes to avoid this merge. The modelling indicates that the main route being used is Wineham Lane to get to the A272 and then joining the A23 at Bolney. Delays are shown to be excessive, it would be logical to state that there is a need to mitigate this junction, however any additional capacity provided with the Mayfield development will quickly fill up, so a major mitigation is likely to be required in Scenarios 2 and 5. As discussed above, the Hickstead junction is likely to be influenced by the issues at this junction and further examination is required. Further discussions would be required with Highways England and Mid Sussex.
  - A23 Pyecombe Junction is shown to be worse with Local Plan development in AM Peak. The situation arises in all scenarios, however it is marginally worse in Scenario 5.
  - M23 J11. A23 northbound slip road entry before M23 J11 over capacity in AM Peak in all scenarios. M23 J11 Roundabout NB Off slip Approach over capacity in scenario 4 and 5.
- 6.3.7 The modelling indicates that Scenarios 2, 4 and 5 have the biggest impact on West Hickstead Lane Approach to A23 Hickstead Roundabout in the PM peak. This operates well within capacity in the AM peak.
- 6.3.8 A23 Hickstead Junction SB on Slip and B2118 merge (Sayers Common) onto A23 northbound junctions, with scenario 4 being worse at A23 Access from West Road west of Pyecombe and A23 NB On Slip at Pyecombe Junction.
- 6.3.9 Further examination is required of what could be achieved in terms of mitigation, if anything, particularly given the level of delays and high V/C at B2118 merge (Sayers Common) and Hickstead junctions on the merges.

6.3.10 Pyecombe junction falls within the boundary of the South Downs National Park and therefore any mitigation requirements here, which are outside of the current highway boundary would be very difficult to achieve.

# 7 Summary and Next Steps

# 7.1 Summary

- 7.1.1 Modelling has been undertaken to inform this Transport Assessment for five development scenarios. 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.
- 7.1.2 Sustainable transport measures have been considered at an origin and destination level and trip reductions applied at a high level within the modelling, which results in trip reductions as a result of trip internalisation within the strategic sites (to reflect agglomeration of land uses, resulting in reduced need to travel offsite for work, leisure, retail purposes for example). Further reductions are applied to reflect soft transport measures on a distance basis and reductions on key corridors to reflect public transport measures. The approach taken to application of reductions for sustainable transport measures is seen as realistic and achievable.
- 7.1.3 Locations where residual highway mitigation requirements have been discussed at a high level. The key issues resulting from these outputs are as follows (Costs provided at this stage are very high level at this stage):
  - Washington Roundabout lies within the South Downs National Park; therefore, any major improvements will be difficult to achieve. Signalising the roundabout may be an option, which would not require land take or minimal land take. This will be more achievable in Scenario 1 and Scenarios 4 and 5 may require more substantial mitigation. Depending on whether any or what scale of widening is required, the cost is likely to be in the region of £2-5m.
  - Junctions in Cowfold are shown to be at capacity and traffic appears to be avoiding the route in future scenarios. Modelling does indicate that providing additional highway capacity will result in additional traffic in the village i.e. if additional capacity is provided on the A272, traffic which is avoiding the route and using alternative (less suitable routes) will reassign to the A272. This will be a particular issue for scenarios including Mayfield's and/or Buck Barn. Cowfold is also an AQMA, which adds to potential issues for mitigation.
  - A283/A29 junctions in Pulborough are very constrained and any physical mitigation is likely to be limited. Scenarios 4 and 5 are worse than other scenarios, therefore traffic growth from these scenarios will be more difficult to mitigate.
  - A24/A272 Buck Barn junction is well over capacity and is shown to require mitigating. Further sustainable travel mitigation will be explored, but it appears that a relatively large scheme will be required. Should a hamburger style roundabout be required this is likely to cost in the region of £5-8m.
  - A24/Steyning Road requires mitigation in Scenarios 3, 4 and 5. New roundabout improvements proposals could include signalisation of the roundabout to improve junction throughput. Depending on whether any or what scale of widening is required, the cost is likely to be in the region of £2-5m.
  - A283/Amberley Road Roundabout, Storrington. Signalising the A283 Amberley Road roundabout could provide additional capacity for Amberley Road to exit onto the A283. This would be required in Scenarios 3, 4 and 5. Depending on whether any or what scale of widening is required, the cost is likely to be in the region of £2-5m.
  - Junctions within Crawley identified as requiring mitigation, are all likely to be impacted on with the Ifield Relief Road. However, further sustainable transport mitigation on the Ifield

Avenue route may reduce the need for highway mitigation at the level of development included within the model.

### 7.2 Next Steps

- 7.2.1 Following selection of the preferred development scenario, the following next steps are recommended:
  - Further investigation within modelling of impacts of reassignment when adding additional capacity.
  - Test of additional large-scale highway mitigation required to support the delivery for specific strategic locations e.g. Ifield Relief Road.
  - Further review of specific sustainable transport mitigation e.g. review of potential of specific high-quality public transport measures on specific corridors – assessment of potential additional mode shift requirements to remove need for highway mitigation e.g. Ifield Avenue and A24 corridors.
  - Further consideration of specific junction mitigation, included high level design and costings
  - Identification of any locations which are seen as accident hotspots and consideration of safety mitigation schemes
  - Modelling indicates that the main issues on the A23 are related to merge and diverge issues and related to high mainline flows, as much as additional Local Plan development. Further discussions are recommended with Highways England as to these issues.

# Appendix A Transport Model Data Report

# Appendix B Local Model Validation Report

# Appendix C Model Forecast Report

# Appendix D Reference Case Developments

# Appendix E Trip Rates
## Appendix F Zones used for LP Distribution



## Appendix G Traffic Flow Comparisons



## Appendix H Changes in Delays



## Appendix I Over Capacity Junctions

