



Chichester Transport Study

Local Plan Review Transport Assessment

On behalf of **Chichester District Council**



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Executive Summary

Introduction

This transport study is undertaken to inform the transport evidence base for the Chichester Local Plan Review 2021-2039, meeting the requirements of the relevant national guidance. The transport study has been undertaken to cover the anticipated development levels created by the Local Plan within Chichester District. This current Local Plan Review proposes 10,354 dwellings for the period 2021 to 2039 which equates to an average build out of 575 dwellings per annum (dpa).

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

The Transport Model

The technical work underpinning the study utilises an industry standard mathematically based modelling package called SATURN, The SATURN highway only model is used to assess the impact of the Local Plan development on the highway network. During the process of model development, West Sussex County Council and National Highways have been engaged and have agreed the use of the modelling tool and the processes for developing the forecast models to assess the Local Plan impacts.

The base year of this model is 2014 and was inherited by Stantec for use within this study. This has been developed to represent traffic conditions in 2014 and uses independent traffic count and journey time data to validate the model to a standard as set out within guidance produced by the Department for Transport.

A Local Model Validation Report (LMVR) has been produced setting out the base year model development was submitted to stakeholders including Chichester District Council, West Sussex County Council and National Highways and a final LMVR agreed by all parties as being suitable for testing of future development scenarios. This model still forms the basis of the future development tests for this study.

The modelling work is used to inform the mitigation strategy required to support the Local Plan and inform more detailed junction modelling, using industry standard modelling packages, where required. Models have been developed to represent potential impacts at the end of the Local Plan period (2039), for the AM (0800-0900), Interpeak (IP) and PM (1700-1800) peak hours. Analysis has focussed on the more congested AM and PM peaks while the IP flows have been used together with AM and PM outputs to provide inputs for Air Quality assessments.

The modelling undertaken is based on the most unbiased and realistic set of assumptions. Background forecasts only include developments and schemes within Chichester and neighbouring authorities included within the geographical scope of the model, where the likelihood of them going ahead is near certain, or more than likely.

Local Plan Development

The 2039 Local Plan Review development quanta that has been assumed in the transport modelling is shown in the Table below. Some locations have development in both the Reference Case and the Local Plan Review scenario models, and this is shown in the table. The reason for this, is that the developments included within the Reference Case were deemed to have been included within the modelling exercise undertaken to inform the mitigation strategy for the Adopted Local Plan and

¹ <https://www.gov.uk/guidance/transport-evidence-bases-in-plan-making-and-decision-taking>

therefore their impacts are already effectively mitigated through the mitigation strategy developed for that piece of work.

Group	Location	Land use	Reference Case Quanta	Additional Southern Plan Area Quanta	Northern Plan Area (see note below table)	Total Quanta
North	Plaistow	Residential			15	15
	Kirdford	Residential			70	70
	Loxwood	Residential			125	125
	Wisborough	Residential			40	40
	Total Residential (Dwellings)		0		250	500
	Total Employment (Ha)		0		0	0
Western Corridor	Westbourne	Residential		30		30
	Southbourne	Residential		1,052		1,052
	Childham	Residential		300		300
	Highgrove Farm, Bosham	Residential	50	200		250
	Fishbourne	Residential		30		30
	Total Residential (Dwellings)		50	1,612		1,662
	Total Employment (Ha)		0	0		0
Chichester and Eastern Corridor	Land at Maudlin Farm, Westhampnett	Residential		270		270
	Land east of Rolls Royce	Employment		7		7
	Boxgrove	Residential		50		50
	Chichester City	Residential		300		300
	West of Chichester	Residential	1,600	0		1,600
	Tangmere SDL	Residential	1,000	300		1,300
	Land East of Drayton Lane, Oving	Residential		0		0
	Land East of Chichester, Oving	Residential		600		600
	Southern Gateway, Chichester	Residential		270		270
	Land South of Bognor Road, North Mundham	Employment		15		15
	Total Residential (Dwellings)		2,600	1,790		4,390
	Total Employment (Ha)		0	22		22
Manhood Peninsula	Apuldram (SW Chichester)	Residential		0		0
	Birdham	Residential		50		50

Group	Location	Land use	Reference Case Quanta	Additional Southern Plan Area Quanta	Northern Plan Area (see note below table)	Total Quanta	
	West Wittering	Residential		0		0	
	East Wittering	Residential		0		0	
	North of Park Farm, Selsey	Residential		250		250	
	Hunston	Residential		150		150	
	North Mundham	Residential		50		50	
	Total Residential (Dwellings)				500		500
	Total Employment (Ha)				0		0
HDA	Runcton (glasshouse)	Employment		30		30	
	Runcton (class E/B8)	Employment		7		7	
	Tangmere (glasshouse)	Employment		7		7	
	Total Residential (Dwellings)				0		0
	Total Employment (Ha)			0	44		44
Total Residential (dwellings)			2,650	4,152		6,802	
Total Employment (Ha)			0	66		66	

Note: The quanta for the sites in the north of the plan area shown within the table, was added to the model, however the model is not detailed within this area and therefore a separate assessment was undertaken. This included an assessment of a wider range of dwelling numbers in the north of the plan area.

In addition, since the modelling was undertaken a small number of major development sites have received planning consent. Three sites on the Manhood Peninsula have come forward, which total 200 dwellings. The new sites are:

- Land to the West of Church Road, West Wittering – 70 dwellings
- Earnley Concourse Clappers Lane, Earnley – 30 dwellings
- Land south of Clappers Lane, Earnley – 100 dwellings

A further 165 dwellings has also been allowed on Land within Westhampnett / North East Chichester Strategic Development Location (SDL).

There has also been some amendment to the distribution of development:

- Removal of North Park Farm, Selsey - 250 dwellings
- Removal of a parish allocation of 50 dwellings at Birdham
- Reduction in housing numbers in Chichester City by 120 dwellings
- 80 dwellings have been moved from North Mundham to East of Chichester allocation in Oving

Overall these changes are unlikely to have any material impact on the outputs of the modelling and mitigation requirements.

Forecast Development Trip Rates

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

Reference Case Forecast Model

A 2037 Reference Case forecast model has been developed to represent future traffic conditions at without the consideration of the Local Plan development. This model includes all committed development within Chichester District, including development within the adopted Local Plan and in neighbourhood plans that were 'made' before May 2021, as well as any committed development within neighbouring authorities. A key point to note is that the Southern Gateway development allocation has been included, but the highway mitigation scheme has not been included in the Reference Case.

It should be noted that the model year is 2037 and the Local Plan Review horizon year is 2039. The Reference Case model was produced for the previous iteration of Local Plan tests and given the level of uncertainty inherent in forecasts, the difference is not deemed to be material, hence the model was not updated. The Reference Case model going forward is referred to as a 2039 model.

Local Plan Forecast Model

The Local Plan Forecast model builds upon the Reference case model by adding the preferred Local Plan development information provided by CDC as outlined above.

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

In undertaking the Local Plan model scenario, a 5% reduction in demands has been assumed within the strategic local plan locations to represent a reduction in trips as a result of development-specific travel planning and behaviour change packages encompassing smarter choices. The 5% reduction assumption was retained from the tests undertaken for the adopted Local Plan and was agreed with CDC as a plausible and achievable target. These have been implemented within the modelling by reducing the matrices accordingly. The 5% car trip reduction assumption has been retained from the previous 2018 study and was agreed by WSSCC, CDC and NH (then Highways England). The reduction was applied in both the Reference Case and with Local Plan scenarios.

Sustainable Transport Mitigation

At a broader level, it is generally now considered that potential sustainable mitigation measures should have priority over highway capacity mitigation and hence a need to shift away from a 'Predict and Provide' approach towards a 'Monitor and Manage' approach. Given the long-term horizon of the Local Plan, there will always be uncertainty about the level of growth in travel that may materialise. Some significant changes in travel behaviour alongside technology advances have been seen in recent times, and the COVID-19 pandemic has accelerated these changes with significantly more people working at home and shopping online (virtual mobility). While the long-term impacts on travel behaviour are unknown, it has been demonstrated during these challenges that the potential exists to undertake activities remotely without the need to travel, by working from home or shopping online.

This study provides an overview of options which could be considered in the medium term to long term as an alternate or complementary mitigation measure to the highway mitigation considered for the Chichester plan area. The study provides an overview whether they are viable sustainable transport options. The 2018 study considered sustainable options in the context of Chichester District and these issues remain pertinent and are included in this report.

Highway Mitigation

The 2018 Local Plan study identified a number of highway mitigation schemes both on the A27 Chichester Bypass which is part of the Strategic Road Network (SRN) managed by NH as well as on the local highway network in Chichester, which is managed by WSCC. Key to the mitigation are the six junctions on the SRN.

The Table below seeks to rank the 6 junctions along the A27 in priority of construction, on the premise that the ranking will be reviewed as each junction mitigation scheme is completed, as their changes may have a material impact on the ranking.

PBA Ranking	Junction No.	Junction Name
1	13	Fishbourne Roundabout
2	16	Bognor Road Roundabout
3	18	Portfield Roundabout
4	19	Oving Junction
5	14	Stockbridge Roundabout
6	15	Whyke Roundabout

This phasing allows flexibility on scheme implementation based on funding and considers the National Highways emerging Road Investment Strategy Tranche 3 (RIS3) Process, in that the schemes are of sufficiently flexible design to support the RIS3 process and allow modification in the future and still maintain economic growth in the area.

Costs for highway mitigation have been estimated separately for schemes on the SRN (based on latest WSCC estimates) and those on WSCC network within Chichester.

The Table below shows a summary of the latest estimated costs for each Mitigation Area.

Mitigation Area	Full Implementation (CDC/WSCC Review Costs)	
	Lower Project Cost	Upper Project Cost
City and Wider Area Revised	£2,534,500	£2,534,500
A27 Corridor including Stockbridge Link Road	£89,390,000	£134,030,000
Overall Total Project Costs	£91,890,000	£136,530,000

Note: Highways England (HE) (now National Highways -NH) Inflation adjusted costs included in brackets

CDC and WSCC have reviewed the historical scheme costs. WSCC considered the A27 Chichester bypass scheme costs only and estimated the Lower costs at £89,390,000 and the Upper costs at £134,030,000. Taking into account the City Centre scheme costs indicates that the total cost of implementation could range between **£92m to £137m**.

A review of the A27 Chichester Bypass – Economic Assessment Report (July 2016) was undertaken to inform high-level assumptions of the potential NH operation and maintenance costs for the proposed mitigation schemes over a 60-year appraisal period.

The estimated operation and maintenance cost for the new A27 junctions over a 60-year period is estimated to be between **£7.75m - £9.68m**. It would be expected that there would be no maintenance costs for the first 5-to 10 years and the existing operation and maintenance costs are not considered, so these would be considered as a saving to NH not included within the figure above.

At the moment the current SPD is unlikely to secure sufficient funds to meet the implementation and maintenance costs.

An analysis of impacts of traffic from committed and Local Plan developments on the SRN junctions has been undertaken. This helps to understand the impact of the development as a proportion of all traffic growth, and hence inform an apportionment of costs. This concludes that up to 28% of traffic growth between the base year and end of plan period, can be linked to committed and proposed (but not currently committed) Local Plan developments in Chichester. The modelling shows that all the junctions on the A27 Chichester bypass are well over capacity, even before adding in the Local Plan development and with the exception of Portfield Roundabout are actually shown to be over capacity in the base model year (2014) in one or both peaks.

National Highways have included the A27 Chichester bypass in their current RIS 3 funding review, which is likely to conclude 23/24, beyond the anticipated timescale for submission of the Local Plan. There is no certainty at this time for inclusion of any scheme within RIS 3.

Summary and Conclusions

In summary the key findings are that:

- The emerging Local Plan transport study evidence base has followed best practice to update the CATM model, develop future forecasts and undertake testing in order to understand the network impacts of the development scenario considered for the Local Plan Review to 2039.
- In the base year (2014) and baseline scenario without the emerging Local Plan development, a number of junctions already experience capacity issues and are over capacity. This includes all the junctions on the A27 Chichester Bypass which are over capacity in the base year (with the exception of Portfield Roundabout) and all over capacity in one or both peak periods modelled in the baseline. This is projected to get worse, when the traffic generation anticipated from the development scenario considered for the Local Plan Review, without mitigation are included.
- The study has indicated that, the impact of the forecast development up to 2039, requires a significant mitigation package, the majority of which is focused on the A27.
- With the proposed mitigation in place, the network conditions are generally projected to be comparable to those in the baseline suggesting that the proposed junction mitigation has the potential to mitigate and accommodate the growth provided for in this scenario.
- In total, 20 junctions have been identified to require mitigation across all three scenarios. They are broken down into four components comprising the A27 Corridor Junction, Chichester City, Wider Chichester Area and Neighbouring Local Authorities.
- The anticipated costs of the overall mitigation are estimated at £92m to £137m. A ranking or prioritisation of the provision of the mitigation on the A27 has been proposed. This prioritises the mitigation of the A27 Fishbourne junction and Bognor junction as the top two junctions that would require mitigation first.
- In respect of the neighbouring Councils of Arun District and Havant Borough, the study suggests that, with the full mitigation package in place, the impacts of the Local Plan development on network performance, are likely to be comparable to the baseline scenario.
- In respect of Arun District, the A259 is the main link connecting Bognor Regis and Littlehampton. The A259/B2132 Comet Corner junction and the nearby A259/Yapton Road junction will require

mitigation to accommodate even the Reference Case and 2039 Local Plan. The agreed mitigation measures for the A259/B2132 Comet corner junction included in the Arun Local Plan are included in the 2039 Mitigated Local Plan scenario and the capacity of the junction is anticipated to be adequate if the previously agreed mitigation measures are implemented.

- In respect of Havant Borough, the impact of the Local Plan Review development results in a negligible impact on the operation of the A27 Havant Bypass roundabout and its slip roads and the A3(M)/A27 junction. The majority of traffic within the area is identified to run east west and north south along the A3(M) and the A27 thus not effecting the local road network within Havant itself.
- The study has also considered the other neighbouring Local Authorities comprising the South Downs National Park Authority (SDNPA), East Hampshire District Council (EHDC), Waverley Borough Council (WBC) and Horsham District Council (HDC). The latter three authorities are on the periphery of the plan area although projected demands from all four local authorities are included in the background growth of future travel demand.
- The study has undertaken an overview of options which could be considered in the medium term to long term as alternate or complementary mitigation measures to the junction schemes proposed for Chichester. The report provides an overview of the sustainable options particularly as to whether they are a viable sustainable option. The sustainable options considered are centred around mode change away from the car such as through potential to use park and ride, bus, cycling and walking as well as parking management to encourage this modal shift where possible.

It is generally now considered that potential sustainable mitigation measures should have priority over highway capacity mitigation and hence a need to shift away from a 'Predict and Provide' approach towards a 'Monitor and Manage' approach. Given the long-term horizon of the Local Plan, there will always be uncertainty about the level of growth in travel that may materialise. Some significant changes in travel behaviour alongside technology advances have been seen in recent times, and the COVID-19 pandemic has accelerated these changes with significantly more people working at home and shopping online (virtual mobility). While the long-term impacts on travel behaviour are unknown, it has been demonstrated during these challenges that the potential exists to undertake activities remotely without the need to travel, by working from home or shopping online.

At the time of undertaking the modelling TEMPro v7.2 was utilised, as the latest version. DfT formally released V8.0 in December 2022. The latest version has lower levels of growth.

In addition, DfT have also developed an Uncertainty Toolkit which explores a number of alternative possible future scenarios in terms of trip making patterns. In terms of impacts within the Chichester area, the two scenarios which are potentially likely to have the greatest impacts are:

- Behavioural Change: This makes assumptions on issues such as future way of working and develops further the impacts that have been seen during the COVID pandemic, with home working becoming more prominent. It is assumed that this trend will continue in the future.
- Regional: This assumes that there will be a tendency for reduced levels of growth away from London, the South East and the East and more in the North and West.

Both of these scenarios would result in lower levels of traffic growth, should they be realised.

In conclusion, subject to securing the full mitigation package identified, the scale and distribution of development provided for in the emerging Local Plan is considered to have an acceptable impact on the highway network through the plan period up to 2039.

1 Introduction

1.1 Introduction

- 1.1.1 Stantec has been commissioned by Chichester District Council (CDC) to assist in the development of the transport evidence base to support the Chichester Local Plan Review (LPR) 2021-2039. The commission involves undertaking a Transport Assessment (TA) to inform the preparation of the Chichester Local Plan Review (LPR).
- 1.1.2 The Local Plan Review will review the policies and strategy of the adopted Chichester Local Plan (LP): Key Policies 2014-2029 whilst also seeking to meet the latest identified needs of the plan area through to 2039. The forecasting for the Transport Assessment is developed and underpinned from the 2014 Base Year CATM model.

1.2 Local Context

- 1.2.1 Chichester is a local government district within West Sussex. The district borders Arun and Horsham to the east and Havant in Hampshire to the west. The South Downs National Park sits in the centre of the district with the northern area including towns such as Loxwood and Wisborough Green bordering on Horsham's northern boundary.
- 1.2.2 Chichester is the main settlement within the district, with other areas of population including Southbourne, West Wittering, East Wittering, Selsey, Tangmere and Oving.
- 1.2.3 The main routes through the district are the A27 which forms part of the National Highways (NH) (formerly Highways England) controlled Strategic Road Network (SRN) which runs east - west along the southern edge of Chichester City, and the A286 providing access from the south coast of Chichester district north along with the A285 through the South Downs National Park to the north of the district.
- 1.2.4 Along the A27 six key junctions provide access between both sides of the A27, and include Fishbourne Roundabout, Stockbridge Roundabout, Bognor Roundabout, Whyke Roundabout, Bognor Roundabout, Oving Junction and Portfield Roundabout.
- 1.2.5 Within Chichester itself, the A286 provides a ring road around the historical City Centre and the A259 providing access from Fishbourne Roundabout into the town centre.
- 1.2.6 In terms of other infrastructure, Chichester is well served by public transport, including Chichester Railway Station on the West Coastway Line which has regular services between Brighton, London, Portsmouth and Southampton being served by GWR and Southern Railway. Chichester is also well served by frequent bus services operated by Stagecoach in the South Downs and Compass Travel.

1.3 Local Plan Review

- 1.3.1 CDC is in the process of updating its Adopted Local Plan which currently sets out development plans and policies for the district for the period 2014 – 2029. The Local Plan was adopted in July 2015, and as part of the adoption process, the Planning Inspector required that CDC undertake a five-year review to address a shortfall in housing and employment provision to ensure sufficient housing would be planned to meet the longer-term needs of the area. As such, there is a requirement to review the current adopted Local Plan to provide a new policy framework for planning and development in the plan area up to 2039. This will form the Chichester Local Plan Review (LPR) 2021 – 2039, although as already noted, future forecasts have been built to represent the forecast period 2014 to 2039 given the 2014 Base Year model from which forecasts have been developed.

- 1.3.2 The adopted Chichester Local Plan (LP) 2014-2029, included a set of mitigation measures at the 6 principal junctions along the A27 corridor. Although, there have been works at the Portfield Roundabout in this timeline, no other mitigation schemes have been completed along the A27 corridor, as such the mitigation schemes defined in this report will also be required to consider the development from this plan period.
- 1.3.3 In 2018, CDC appointed Peter Brett Associates (PBA), now Stantec to undertake the Chichester Local Plan Review Transport Study. The outcomes of this study were reported in 'Chichester District Council – Local Plan; Transport Study of Strategic Development Options and Sustainable Transport Measures, December 2018'.
- 1.3.4 Representations received during the subsequent consultation on the Local Plan Review, in combination with updates to the evidence base, indicate that it would be appropriate for further work to be commissioned to update the transport study.
- 1.3.5 It is understood that the Arun Local Plan has now been adopted and that Havant are consulting on their emerging Local Plan and has published their Regulation 19 Local Plan and are moving towards submission (a 'reasonably foreseeable' commitment in transport modelling terms).
- 1.3.6 A review of the committed developments and infrastructure identified, is therefore required to ensure that the data accurately captures the position of specific schemes in the Chichester plan area and adjoining areas of Havant and Arun. The purpose of the Local Plan Transport study is to identify suitable measures that would mitigate the Local Plan impacts and assist in the delivery of the Local Plan development. The aim of the study was not to address Chichester's current transport issues but seek not to exacerbate them as a result of proposed LPR developments.
- 1.3.7 For the purpose of informing this Local Plan Review, computer modelling was used to analyse the complex transport patterns that already take place in the area. The Chichester Area Transport Model (CATM) has been updated by Stantec to investigate travel patterns in and around the Chichester area. This includes taking account of changes in response to the policies and strategy of the emerging Chichester Local Plan.
- 1.3.8 The Local Model Validation Report (LMVR) was one of the documents, through which the preparation of the Chichester Local Plan Review 2021-2039 will be informed. The LMVR was submitted to stakeholders including Chichester District Council (CDC), West Sussex County Council (WSCC) and Highways England (HE) (now National Highways (NH)). Comments from CDC, WSCC and then Highways England were satisfactorily addressed and a final LMVR agreed by all parties. The updated base model has a base year of 2014 and is deemed a satisfactory and robust tool on which to develop future forecasts and inform the Local Plan testing. The base year 2014 model underpinned the 2018 study and continues to inform this current study update.

1.4 Report Purpose

- 1.4.1 The purpose of this report is to provide a detailed assessment of the work undertaken to assess the impact of the preferred Local Plan development and to inform the Transport Evidence Base as part of the Local Plan process and assessment of the preferred scenario. This report is supported by Technical Appendices which provides more detailed information in regard of the development of the modelling tools and the modelling approach to assess the impacts of the wider development scenarios assessed. The report provides details on the tested Local Plan Scenario, its potential network impacts and mitigation required to support and mitigate the proposed Local Plan development.
- 1.4.2 It is important to note that the contents of this document including the quanta and timing of development assumed for this assessment is based on 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.

- 1.4.3 The modelling undertaken provides a strategic view of the cumulative impacts of development within the district rather than specific impacts from specific developments. As such, developers are still required to undertake their own Transport Assessment to identify local impacts and mitigate them appropriately prior to planning consent.

1.5 National Guidance

- 1.5.1 Modelling work has been undertaken in line with relevant national guidance. This guidance is provided by the Department for Transport (DfT) and is known as Transport Analysis Guidance (TAG)².
- 1.5.2 Although the CATM includes an average hour Inter-Peak (IP) model, the Local Plan modelling has followed best practice and focussed on the AM and PM peak hours as these are the most congested hours and hence where the impacts of the Local Plan are most likely to be significant. The IP model has been used with the AM and PM peak hour models to inform the Air Quality and Noise Assessments.
- 1.5.3 The model, as per national guidance, is for an “average day” which in summary assumes a weekday, with all schools open. The modelling for the Local Plan process focuses on new residential and employment development. As such the times of day that these land uses will influence are the AM and PM commuter peaks during term time, when the background traffic is deemed to be at its highest. The modelling for the LP is not required to assess weekends, Bank Holidays or seasonal changes (see TAG Unit M1.2 Section 3.3.6) that may alter traffic flows in an area. In Chichester’s case this could arise in the summer tourist season or when major events are held at Goodwood. For these types of assessment, which are regarded as infrequent occurrences for the purposes of this study, the Council would be required to carry out more localised studies. This approach reflects policy and recognises best practice in transport studies across the country.

1.6 Report Structure

- 1.6.1 Following this introduction, the report is set out as follows:
- Section 2 outlines the Local Plan development assumptions for this study update, which is focussed in the southern plan area.
 - Section 3 provides a high-level overview of the Chichester Area Transport Model (CATM) which underpins the Transport Assessment.
 - Section 4 discuss the Reference Case scenario which represents the future forecasts without the Local Plan.
 - Section 5 sets out the modelling outputs with Local Plan Development and no mitigation.
 - Section 6 provides an overview of sustainable mitigation measures in light of the Climate Change emergency.
 - Section 7 sets out the highway mitigation assumed to mitigate the Local Plan.
 - Section 8 reports on the Local Plan Scenario model outputs in light of proposed mitigation.
 - Section 9 discusses mitigation costs.
 - Section 10 discusses uncertainties associated with forecasting and the Monitor and Manage Approach.
 - Section 11 provides a summary and conclusions from the study.

² <https://www.gov.uk/guidance/transport-analysis-guidance-webtag>

1.7 Other Considerations

- 1.7.1 Additional analysis associated with the traffic impacts of the Local Plan has also been undertaken and the output from this work is reported separately as set out below.
- A standalone study on Collision Analysis and hence associated Safety implications of the Local Plan development has been undertaken. This is reported within *Chichester Local Plan Review - District Wide Collision Review, Stantec, May 202* and attached as Annex A.
 - Analysis has been undertaken of seasonal impacts and this is reported within a Technical Note '*Chichester Local Plan Review – Seasonal Impact Review, Stantec, April 2022*' attached as Annex B.
 - An assessment of interim impacts in 2026 and 2031, with the premise to define if there is a threshold for development that can be supported by a reduced package of mitigation on the A27 corridor is reported in '*Chichester Local Plan Review – 2026 and 2031 Interim Year Review*' which is attached as Annex C.
 - Environmental considerations in terms of Air Quality assessments are progressing separately following the conclusion of transport modelling which provides inputs for the AQ assessments. These assessments are reported in *Chichester Local Plan Review – Air Quality Assessment, Stantec, September 2022* which is attached as Annex D.

2 Local Plan Development Assumptions

2.1 Introduction

2.1.1 This section reports on the Local Plan Scenarios that have been assessed and the key assumptions made. It first provides a summary of the scenarios modelled in the previous study in 2018 and then outlines the Local Plan scenario tested that is the subject of this study for the Local Plan Review for the period 2021 to 2039

2.2 Previous Modelled Scenarios

2.2.1 For the previous Local Plan Review (LPR) transport evidence base in the 2018 study, three development scenarios were modelled. The scenarios were agreed with Chichester District Council (CDC). The forecasts for the scenarios all pertain to the impact on the highway network as of 2035 with a contingency to 2036 to take account of any project slippage. A list of the scenarios modelled as part of the previous 2035/36 LPR is shown below. Table 2-1 provides more detail on the development quanta of the three LPR scenarios that were tested in the previous study in 2018.

- 2035 Reference Case
- 2035 with Local Plan Review Development Scenario 1 (650 dwellings per annum (dpa))
- 2035 with Local Plan Review Development Scenario 2 (800 dpa)
- 2035 with Local Plan Review Development Scenario 3 (1000 dpa)

Table 2-1 Previous study (2018) 2035 Local Plan Review Development Quanta by Scenario

Item No.	Strategic Sites	Scenario 1 (650 dpa)	Scenario 2 (800 dpa)	Scenario 3 (1,000 dpa)
1	Chichester City (including Southern Gateway)	400	400	400
2	Tangmere	300	300	300
3	Southbourne	1,250	1250	1250
4	East Wittering	350	736	1250
5	South of Shopwyke	600	1261	1250
6	Selsey	250	526	1179
7	Chidham/Hambrook	500	1051	1250
8	Fishbourne	250	526	1179
9	Broadbridge	250	526	1179
10	Hunston/North Mundham	250	526	1179
11	Apuldram	100	100	100
12	West Wittering	25	25	25
13	Westhampnett	50	50	50
14	Birdham	125	125	125
15	Boxgrove	50	50	50
16	Loxwood	125	125	125
17	Wisborough Green	25	25	25
18	Land south-west of Chichester employment (ha)	30	30	30
Total - Residential		4,900	7,600	10,914
Total – Employment (ha)		30	30	30

2.3 2039 Local Plan Modelled Scenario

2.3.1 The Local Plan Review quanta of development assumed and modelled in the updated 2039 LPR and the subject of this report, is summarised in Table 2.2. This consists of a single Local Plan scenario.

2.3.2 In terms of the transport modelling, this has been based on the 2039 Reference Case scenario following which the Local Plan development assumptions were added on top of the Reference Case. It is noted that some of the development sites already have quanta in the Reference Case. Where this is the case, Table 2-2 shows the quanta assumed in the Reference Case, the additional Local Plan quanta and the resultant total quanta.

Table 2-2 2039 Local Plan Review Development Quanta

Group	Location	Land use	Reference Case Quanta	Additional Southern Plan Area Quanta	Northern Plan Area (see note below table)	Total Quanta	
North	Plaistow	Residential			15	15	
	Kirdford	Residential			70	70	
	Loxwood	Residential			125	125	
	Wisborough	Residential			40	40	
	Total Residential (Dwellings)			0		250	500
	Total Employment (Ha)			0		0	0
Western Corridor	Westbourne	Residential		30		30	
	Southbourne	Residential		1,052		1,052	
	Childham	Residential		300		300	
	Highgrove Farm, Bosham	Residential	50	200		200	
	Fishbourne	Residential		30		30	
	Total Residential (Dwellings)			50	1,612		1,662
	Total Employment (Ha)			0	0		0
Chichester and Eastern Corridor	Land at Maudlin Farm, Westhampnett	Residential		270		270	
	Land east of Rolls Royce	Employment		7		7	
	Boxgrove	Residential		50		50	
	Chichester City	Residential		300		300	
	West of Chichester	Residential	1,600	0		1,600	
	Tangmere SDL	Residential	1,000	300		1,300	
	Land East of Drayton Lane, Oving	Residential		0		0	
	Land East of Chichester, Oving	Residential		600		600	
	Southern Gateway, Chichester	Residential		270		270	

Group	Location	Land use	Reference Case Quanta	Additional Southern Plan Area Quanta	Northern Plan Area (see note below table)	Total Quanta	
	Land South of Bognor Road, North Mundham	Employment		15		15	
	Total Residential (Dwellings)		2,600	1,790		4,390	
	Total Employment (Ha)			22		22	
Manhood Peninsula	Apuldram (SW Chichester)	Residential		0		0	
	Birdham	Residential		50		50	
	West Wittering	Residential		0		0	
	East Wittering	Residential		0		0	
	North of Park Farm, Selsey	Residential		250		250	
	Hunston	Residential		150		150	
	North Mundham	Residential		50		50	
	Total Residential (Dwellings)				500		500
Total Employment (Ha)				0		0	
HDA	Runcton (glasshouse)	Employment		30		30	
	Runcton (class E/B8)	Employment		7		7	
	Tangmere (glasshouse)	Employment		7		7	
	Total Residential (Dwellings)				0		0
	Total Employment (Ha)				44		44
Total Residential (dwellings)			2,650	4,152		6,802	
Total Employment (Ha)			0	66		66	

Note: The quanta for the sites in the north of the plan area shown within the table, was added to the model, however the model is not detailed within this area and therefore a separate assessment was undertaken. This included an assessment of a wider range of dwelling numbers in the north of the plan area.

2.3.3 When considered in total, most of the Local Plan development is located in the Chichester and Eastern corridor of the southern plan area, with 500 dwellings proposed on the Manhood Peninsula.

2.3.4 For modelling purposes, each development site was assigned a zone in the model. Zones are used to describe the geographic start (origin) and end (destinations) of trips due to development.

2.3.5 The quanta for the sites in the north shown within the table was added to the model, however the model is not detailed within this area and therefore a separate assessment was undertaken looking at a wider range of dwelling numbers in the north. The outputs from this work is reported in a separate Technical Note which is attached as Appendix A.

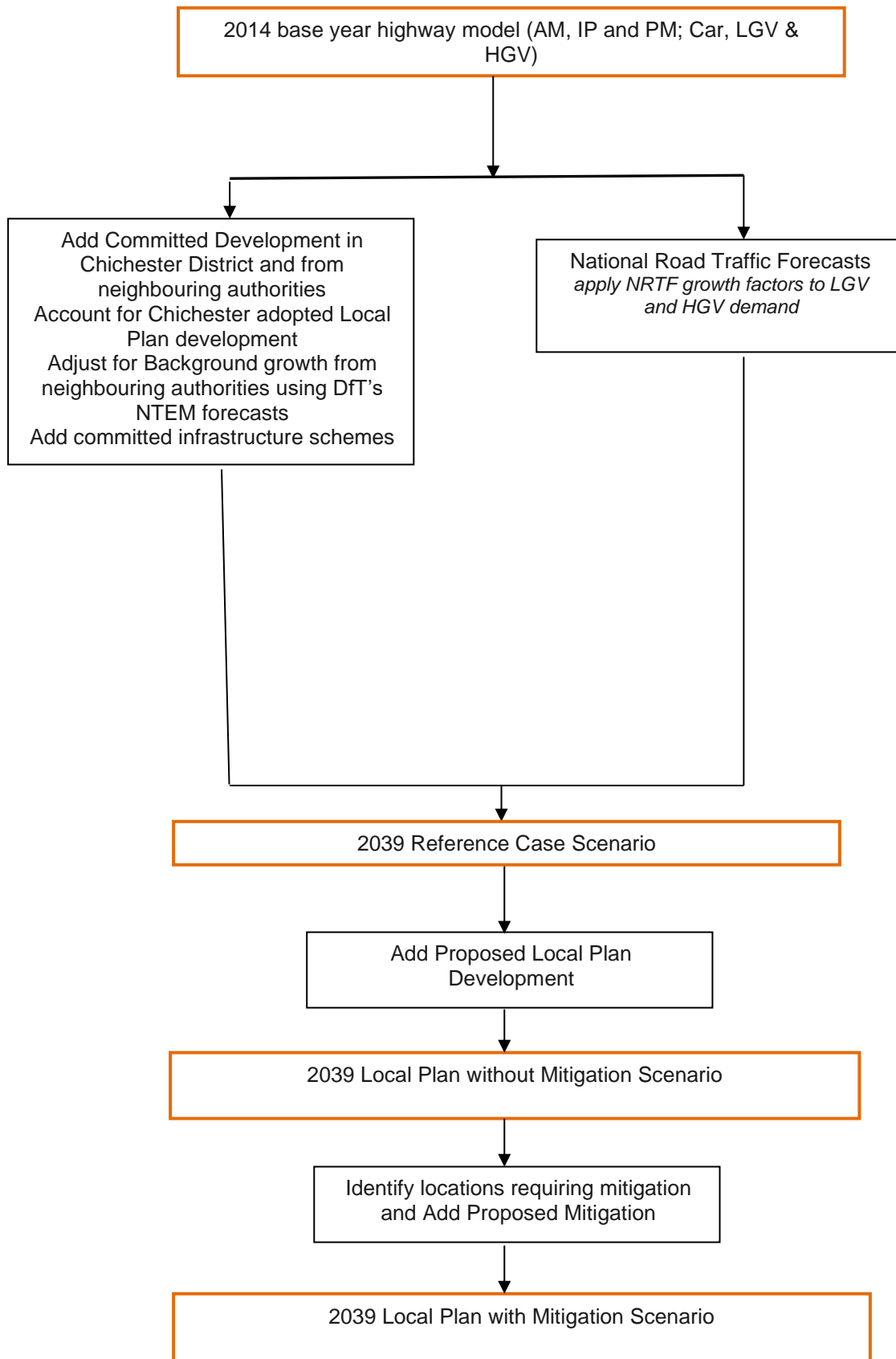
- 2.3.6 In addition, since the modelling was undertaken a small number of sites have received planning consent. Three sites on the Manhood Peninsula have come forward, which total 200 dwellings, however this has resulted in the removal of North Park Farm, Selsey (all 250 dwellings). The new sites are:
- Land to the West of Church Road, West Wittering – 70 dwellings
 - Earnley Concourse Clappers Lane, Earnley – 30 dwellings
 - Land south of Clappers Lane, Earnley – 100 dwellings
- 2.3.7 The remaining 50 dwellings from Selsey have been replaced by 165 dwellings at Land within Westhampnett / North East Chichester Strategic Development Location (SDL), along with 50 dwellings from Birdham and 65 from Chichester City.
- 2.3.8 100 dwellings have also been moved from North Munham to East of Chichester allocation in Oving.
- 2.3.9 Overall these changes are unlikely to have any material impact on the outputs of the modelling and mitigation requirements.

3 Chichester Area Transport Model (CATM)

3.1 Introduction

- 3.1.1 The key modelling assessment tool used to inform this Local Plan Review modelling is based around the existing National Highways Simulation and Assignment of Traffic in Urban Road Networks (SATURN) highway model known as the Chichester Area Transport Model (CATM). The CATM model was most recently validated to a 2014 base year and consists of a SATURN (V11.3.10E) highway model and a DIADEM V 5.0 demand model. The model was originally created to understand the impact of identified options to relieve congestion on A27 Chichester Bypass. Full details of the model development and validation are provided in the 'A27 Chichester Local Model Validation Report', produced by Highways England in July 2016.
- 3.1.2 A previous version of CATM, which was validated to a 2009 base year was used to provide the transport evidence for the adopted Local Plan up to 2029. More information on this model and the outputs from that study are provided in 'Chichester District Council – Local Plan Transport Study of Strategic Development Options and Sustainable Transport Measures,' produced by Jacobs in March 2013.
- 3.1.3 For the purpose of testing the 2039 Local Plan Review 2021-2039, the Chichester Area Transport Model (CATM) has been updated by Stantec to investigate travel patterns in and around the Chichester area with a view to understand the changes that may occur to those patterns in response to the policies and strategy of the emerging Chichester Local Plan. The model has retained the 2014 base year of the HE CATM. The key update has been to extend the model to the west and south of Chichester where the original HE CATM model was less detailed. The model update has been described in the Chichester Area Transport Model Local Model Validation Report (LMVR), August 2018. The LMVR was reviewed by CDC, WSCC and then Highways England and was deemed to demonstrate that the updated base model was a robust and satisfactory tool on which to underpin future forecasts and Local Plan Review scenario testing.
- 3.1.4 A proportionate approach to the modelling has been undertaken and this has utilised the SATURN highway model only. Further detail on the existing model and the modelling approach to assess the new allocations, is provided in the following sections of this report.
- 3.1.5 Figure 3-1 summarises the modelling linkages from the 2014 Base Year Model, through to the 2039 Reference Case, to the 2039 Local Plan Without mitigation and finally the 2039 Local Plan With mitigation

Figure 3-1 Base Model and Linkages to Reference Case and Local Plan Model Scenarios



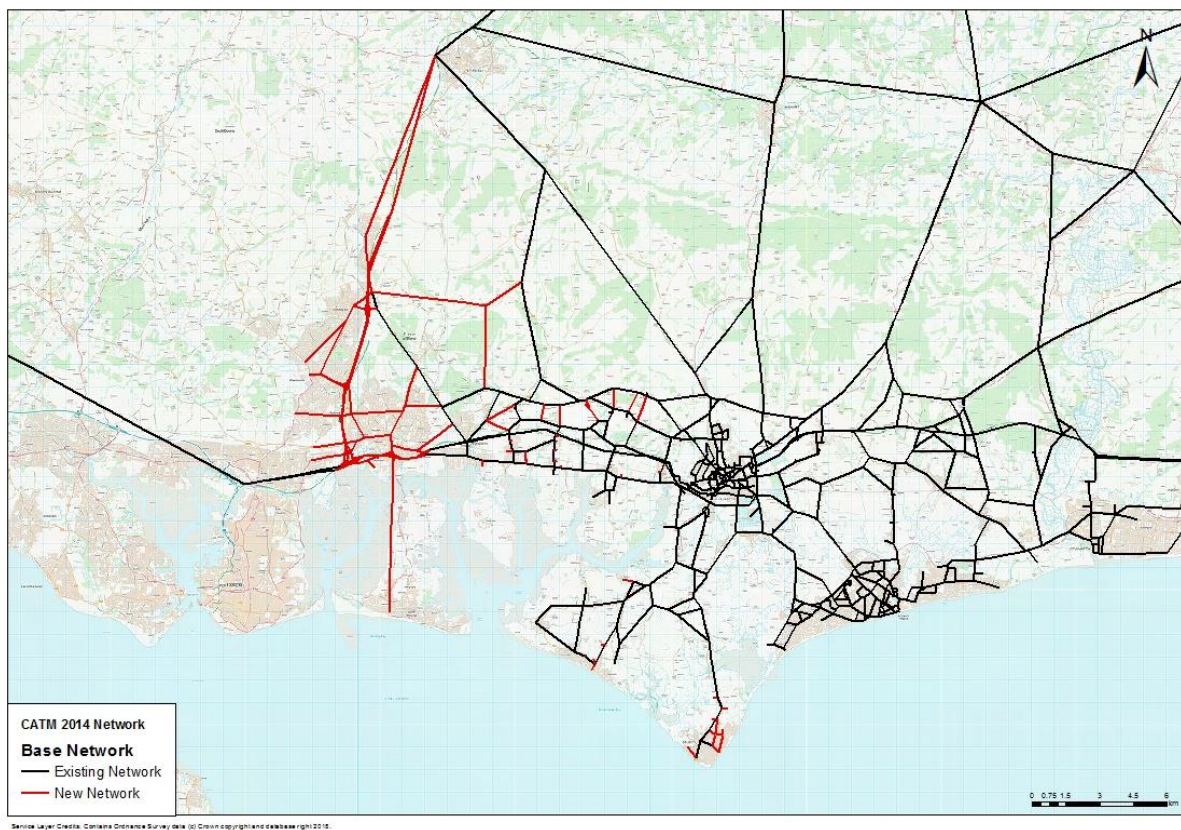
3.2 Base Year Model Development

Model Area

3.2.1 The area covered by the model is shown in Figure 3-. The updated model covers the same area with the previous CATM 2014 model but with a more detailed network as indicated in red on the figure. The additional detail has been added to the following areas:

- Western edge of the model in Havant, including the A3(M) and the A3(M)/A27 junction).
- Between the A27 and the A259 to the west of Chichester.
- North of the A27 to the west of Chichester.
- South of Chichester on the Manhood peninsula, around West and East Wittering and Selsey.

Figure 3-2 CATM 2014 Network



Model Overview

3.2.2 The CATM revised 2037 Reference Case has been developed using SATURN version 11.4.07H. This software is suitable for developing the network and assignment of the matrix. The matrix building process has been carried out within Microsoft Excel, with the final matrices output inputted into a SATURN format for assignment to the network.

3.2.3 One of the main benefits of using SATURN for the assignment process is that it is applicable to both urban and rural networks and can model peak hour congestion in sufficient detail. As a combined simulation and assignment model, SATURN also has the advantage that it enables detailed junction modelling to be undertaken.

- 3.2.4 The model in question is a highway simulation and assignment model only and does not include any multimodal or demand modelling. This is a proportionate and robust approach to assess the worst-case scenario.
- 3.2.5 The assignment element of the model predicts routes that drivers will choose and the way that traffic demand interacts with the available road capacity.
- 3.2.6 The aim of the assignment model is to reach an equilibrium where costs and flows are in balance under the assumption that individual users will seek to minimise their costs of travel through the network.

Modelled Year and Time Periods

- 3.2.7 This updated model has been developed with a base year of 2014.
- 3.2.8 This study excludes the consideration of holiday/weekend traffic and other abnormal events within the study area.
- 3.2.9 Three time periods have been represented within the model:
 - Weekday AM peak hour (0800-0900)
 - Weekday IP (inter-peak) hour (average hour 1000-1600)
 - Weekday PM peak hour (1700-1800)

Vehicle Types (UC and VC) and Travel Purposes

- 3.2.10 The model has 5 user classes as follows:
 - UC1: Cars for commuting
 - UC2: Cars for employer's business
 - UC3: Cars for other purposes
 - UC4: Lights Goods Vehicles (LGVs)
 - UC5: Heavy Goods Vehicles (HGVs)
- 3.2.11 The model aggregates the user classes into "vehicle classes" for use in reporting. The results will be reported by these vehicle classes, which can be summarised as:
 - Vehicle Class 1 (VC1): Cars
 - Vehicle Class 2 (VC2): Light Goods Vehicles (LGVs)
 - Vehicle Class 3 (VC3): Heavy Goods Vehicles (HGVs)

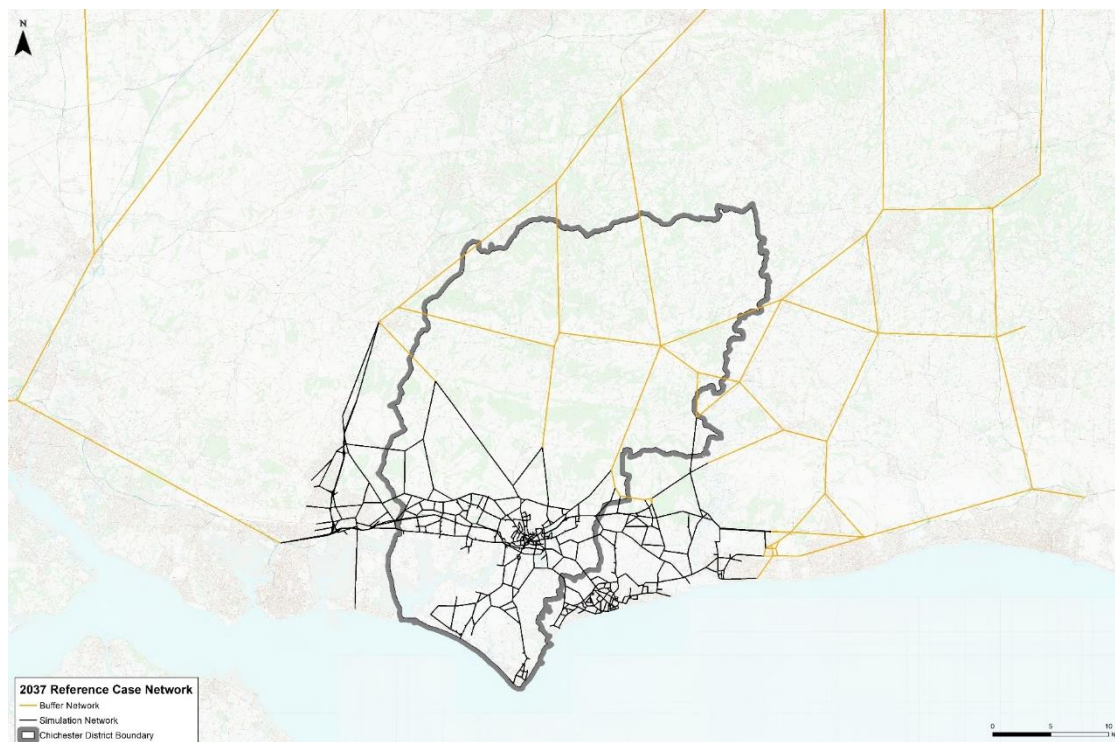
Passenger Car Units (PCU) Factors

- 3.2.12 Passenger Car Units (PCU) are used as the standard unit for demand and capacity within the model. A PCU is a measure used primarily to assess highway capacity, for modelling purposes. Different vehicles are assigned different values, according to the space they take up. A car has a value of 1; smaller vehicles will have lower values, and larger vehicles will have higher values. This allows for the impact of large vehicles which take up more road space and take longer to clear junctions to be accounted for. The factors used within the CATM are:
 - Car – 1.0
 - Light Goods Vehicle (LGV) – 1.0
 - Heavy Goods Vehicle (HGV) – 2.3

Network Extents

- 3.2.13 The model network is illustrated within Figure 3-3, the model focuses on Chichester City and the immediate strategic links in close proximity to the City, this network within the model is known as 'simulation', the network further afield, known as 'buffer' allows traffic to enter the simulation or more detailed network to allow a more accurate assessment to be undertaken within the area of interest.
- 3.2.14 The links that are coloured Black represent the simulation network, whilst those yellow represent the buffer area.

Figure 3-3 CATM Simulation and Buffer Network



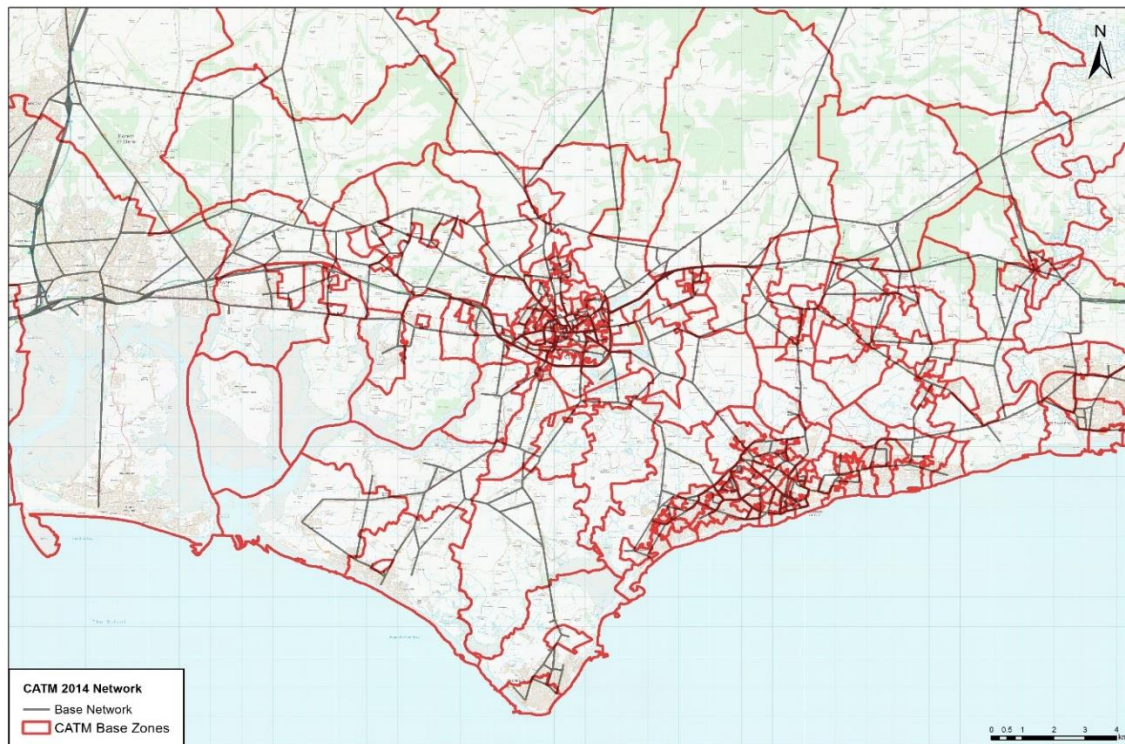
Zoning System

- 3.2.15 The zoning system used for the CATM is based on 2011 Census geography with consistency between Census Output Areas, Districts and Counties maintained where possible. The zoning system for this iteration of the CATM has largely been retained from the previous 2014 HE CATM model.
- 3.2.16 The model initially had a total of 257 zones. In anticipation of future Local Plan development zones, additional zones have been added to accommodate future Local Plan developments, thus taking the number of zones in the updated model to 296. The future Local Plan zones have no trips in the 2014 base year.
- 3.2.17 The benefit of using a zoning system based on the 2011 Census geography is the ease of use and comparison with planning data, such as population and employment estimates in both the development of the base model and for model forecasting onwards.
- 3.2.18 As noted, the CATM comprises 270 zones of which Zones 1 to 212 represent the study area zones of Chichester and Arun District, 213 to 252 are external zones and 253 to 296 are for future development. To better replicate trip distribution in the western area of the model, a comparison between the existing zone structure in the previous iteration of the CATM and

those in South East Region Traffic Model (SERTM)³ was undertaken. This resulted in the combination of some SERTM zones and trips that were subsequently used to replace or add trips onto existing zones of the CATM. As such this involved maintaining the matrices within the existing simulation network area so not to affect the overall validation in the area within Chichester.

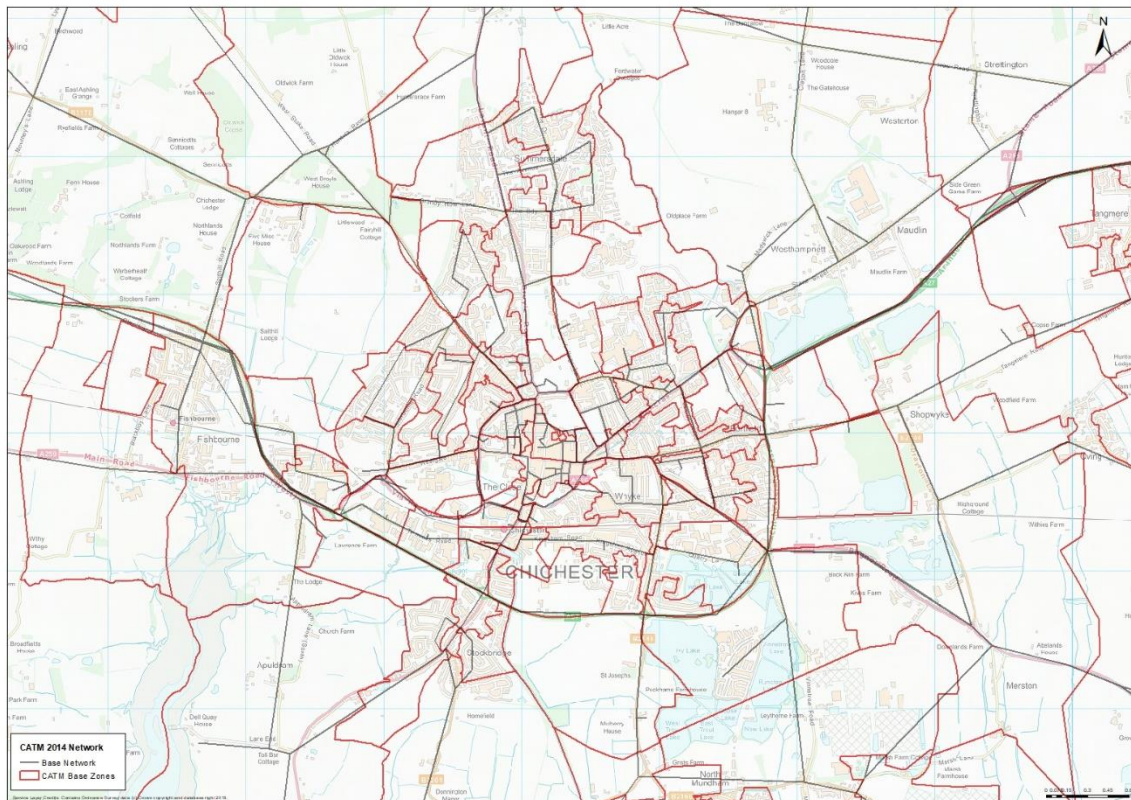
3.2.19 The revised zoning system is shown in Figure 3- for the wider model area and Figure 3- in the area around Chichester city.

Figure 3-4 CATM Simulation Area Zoning System – Chichester District



³ SERTM is one of a suite of highway models developed by Highways England which cover all of England. These models are used to assess Highways England Major Schemes. More information is available at [https://www.saturnsoftware.co.uk/ugm2015/SAT15UGM%20Highways%20England%20Regional%20Transport%20Models%20\(Final\).pdf](https://www.saturnsoftware.co.uk/ugm2015/SAT15UGM%20Highways%20England%20Regional%20Transport%20Models%20(Final).pdf)

Figure 3-5 CATM Simulation Area Zoning System – Chichester City



3.3 Adequacy of Base Model

- 3.3.1 Further information regarding the development and validation of the base model can be found within the technical note TN002 - 2014 CATM Base Model LMVR -Final_v2.1 included as Appendix B of this report.
- 3.3.2 The revalidated CATM to 2014 base year, was calibrated and validated using 2014 count and journey time data. The calibration and validation results in the three modelled peak hours have shown a good and acceptable fit between observed and modelled flows and journey times. The model has been validated against independent counts and shows an acceptable fit when measured against the acceptability guidelines in WebTAG Unit M3.1 (Highway Assignment Modelling).
- 3.3.3 The base model update concluded that the model is fit for the purpose of this study informing the traffic impacts of the additional strategic sites in the Local Plan Review. The base model is therefore a suitable tool upon which future forecasts can be based.. Although the CATM includes an average hour IP model, the Local Plan Review modelling has focussed on the AM and PM peak hours only as these are the most congested hours and hence where the impacts of the Local Plan Review are most likely to be significant. As previously indicated, the IP model has only been used, along with the AM and PM peak hour models, to inform the Air Quality and Noise Assessment.

4 Reference Case Forecast Model Development

4.1 Overview

- 4.1.1 This section provides an overview of the development of the Reference Case models. The methodology used for the development of the Reference Case forecast modelling was agreed with West Sussex, Chichester District Council and National Highways prior to the commencement of the work.
- 4.1.2 In order to inform the Local Plan Transport Evidence base, Reference Case models have been produced to represent a forecast year of 2037/38. These take into account committed growth within Chichester up to 2037/38, as well as committed development in the neighbouring authorities of Havant and Arun and general background growth.
- 4.1.3 The models for the Reference Case 2037, for the AM peak, inter peak and PM peak period have been created by using:
- Committed development information obtained from CDC, WSCC, Arun District Council and Havant Borough Council.
 - Adopted Chichester District Local Plan 2029 Strategic Development sites.
 - Adjustments for background traffic growth using DfT's National Trip End Model (NTEM) data.
 - A forecast network including any committed highway schemes.
 - A27 Chichester Bypass mitigation schemes previously agreed for the Adopted Local Plan to 2029 where these are funded.
 - For LGV and HGV growth, Road Traffic Forecasts (RTF18) from DfT National Traffic Model (NTM) have been used.
- 4.1.4 This growth in traffic resulting from the committed development has been applied to the validated 2014 Base Year model to account for forecast changes in traffic demand that is projected to occur regardless of the additional development being considered as part of this Local Plan scenario testing.
- 4.1.5 The Reference Case Forecasting is set out by establishing predicted changes between the base year model and a future year scenario or conditions. In order to establish robust traffic forecasts the Reference case model has been developed in accordance with DfT TAG forecasting guidance. The guidance helps limit and define uncertainty around assumptions 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).
- 4.1.6 The Reference Case model is used as the basis of comparison with the emerging Local Plan scenarios and will inform the transport mitigation required to deliver the Local Plan growth in transport terms. The Reference Case therefore only includes growth up to 2037 in neighbouring and within Chichester District excluding any emerging Local Plan growth. The growth included within the Reference Case is explained below.

4.2 Application to Inform 2039 Local Plan Review

- 4.2.1 This transport study is intended to inform the evidence base for the Chichester Local Plan 2021-2039, meeting the requirements of the relevant national guidance. It is noted that at the time of the transport modelling commission, the Local Plan period extended to 2037/2038 and the Reference Case models were developed based on a 2037 forecast year. The horizon year

of the Chichester Local Plan now extends to 2039. It is considered that the additional one-to-two-year background growth attributable to neighbouring authorities, would be within the uncertainties inherent in forecasting over long periods usually covered by Local Plans (i.e., 15 to 20 years).

- 4.2.2 Department for Transport (DfT) produced National Trip End Model (NTEM) growth (Dataset 7.2) indicates that growth in Chichester District is estimated at 16.4% car driver growth for the period 2014 to 2037 in the AM peak and 16.95% in the PM peak. The growth for West Sussex County is of the same order of magnitude at 16.3% in the AM peak and 16.7% in the PM peak. The corresponding level of growth for the period 2014 to 2039 is predicted to be 17.8% for both the district and county in the AM peak. In the PM peak the 2014 to 239 growth is predicted to be 18.3% for the district and 18.0% for the county. It can be seen that the NTEM growth for the district and county between 2014 to 2037 is comparable to that from 2014 to 2039. This further gives confidence that the modelled horizon to 2037/38 is robust enough to inform the extended Local Plan period to 2039 and hence it is proportionate to retain the 2037/38 Reference Case models. They are considered to be robust and adequately representative of 2039 forecasts. DfT have subsequently released TEMPro v8.0 and an Uncertainty Toolkit, which is discussed further in Section 10.
- 4.2.3 Henceforth, the Local Plan forecasts are referenced as 2039 in this study. Reporting on the transport modelling evidence base for the Local Plan period to 2039, is the main subject of this report.

4.3 Committed Development and Schemes

- 4.3.1 Forecast development that has been included within the 2037 Reference Case model includes all residential and employment development that are expected to be completed by 2037 within Chichester and the neighbouring authorities of Havant and Arun. Havant and Arun authorities were contacted to provide their development plans for inclusion in the Reference Case. The locations of the committed development were agreed with CDC and WSCC prior to the commencement of the Reference Case modelling. Other neighbouring local authorities to Chichester, include the East Hampshire District Council (EHDC), Waverley Borough Council (WBC) and Horsham District Council (HDC). Development within the South Downs National Park area has been included within the TEMPO growth. These are on the periphery of the study area within the buffer network of the model, and they are represented in the demand matrices through NTEM background growth.
- 4.3.2 A detailed list of all agreed development included in the Reference Case has been compiled into an 'Uncertainty Log' which is shown in Appendix C. The developments included in the Reference Case of the model development are based on guidance on WebTAG guidance on uncertainty, as summarised within Table A-2 of TAG Unit M-4, 'Forecasting and Uncertainty', with development in the first two categories being included within the Reference Case model.
- 4.3.3 Any development external to the core modelled area in other authorities (other than Havant and Arun) will be included within the DfT National Trip End Model (NTEM) growth assumptions. These are on the periphery of the study area within the buffer network of the model, and they are represented in the demand matrices through NTEM background growth. Trips from small sites were not explicitly modelled but are accounted for through NTEM growth factors.
- 4.3.4 Table 4-1 summarises the committed developments for Chichester District that have been assumed in the Reference Case. They are also included in the Uncertainty Log. The full list of developments included within the Reference Case, including that from Havant and Arun, is provided in Appendix C.

Table 4-1 Committed and Adopted Local Plan Development assumed in Reference Case

Local Authority Area	Dwellings	Employment (Sq. M)
Chichester	6,727	91,490
Havant	8,881	139,725
Arun	16,821	313,486
Surrey	97	0
TOTAL	32,526	404,976

4.3.5 This indicates that 32,526 dwellings have been included in the 2037 Reference Case. Of these, 6,727 are in Chichester District, of which 5,798 are attributed directly to the adopted Chichester Local Plan which runs to 2029. Trips from small sites were not modelled explicitly, these are accounted for through NTEM growth factors. Employment sites are shown for all four authorities.

Southern Gateway Scheme

4.3.6 The Reference Case also includes committed schemes assumed in the future network without the Local Plan. The list of schemes assumed is shown in Appendix D. A key point to note is that the Southern Gateway mitigation has not been included in the Reference Case. Southern Gateway development proposals has been retained in the Reference Case.

4.4 Trip Rates

4.4.1 To generate trips from these committed developments, trip rates are required to be applied to each development depending on their type and peak period. The trip rates used in this study were agreed by stakeholders including CDC, WSCC and Highways England.

4.4.2 The agreed residential trip rates were for mixed private/affordable housing, and it was agreed that they would be used as global rates for suburban and out of town sites for the study. Residential trip rates are in units of trips/dwelling while employment trip rates are in units of trips/100 square metres of gross floor area.

4.4.3 Residential trip rates are in units of trips/dwelling while employment trip rates are in units of trips/100 square metres of gross floor area. The agreed trip rates are shown in Table 4-2

Table 4-2 Trip Rates (Residential and Employment)

Peak	Trip Rate ID	Type	Arrivals	Departures	Total
AM	Residential	Residential	0.1200	0.3520	0.472
AM	Warehousing (Commercial)	Employment	0.168	0.076	0.244
AM	Business Park	Employment	1.686	0.169	1.855
AM	Fruit and Vegetable Farm	Employment	0.06	0.001	0.061
IP	Residential	Residential	0.16500	0.16500	0.33
IP	Warehousing (Commercial)	Employment	0.87	0.093	0.963
IP	Business Park	Employment	0.254	0.310	0.564
IP	Fruit and Vegetable Farm	Employment	0.005	0.004	0.009

Peak	Trip Rate ID	Type	Arrivals	Departures	Total
PM	Residential	Residential	0.31800	0.15900	0.477
PM	Warehousing (Commercial)	Employment	0.055	0.161	0.216
PM	Business Park	Employment	0.124	1.273	1.397
PM	Fruit and Vegetable Farm	Employment	0.003	0.006	0.009

4.1 Strategic Sites – Trip Reduction

4.1.1 A 5% reduction in demands has been assumed within the strategic Local Plan locations to represent a reduction in trips as a result of development-specific travel planning and behaviour change packages encompassing smarter choices. The 5% reduction assumption was retained from the tests undertaken for the adopted Local Plan and was agreed with CDC as a plausible and achievable target. These have been implemented within the modelling by reducing the matrices accordingly. The 5% car trip reduction assumption has been retained from the previous 2018 study and was agreed by WSCC, CDC and NH (then Highways England). The reduction was applied in both the Reference Case and with Local Plan scenarios.

4.2 Trip Distribution

- 4.2.1 The distribution of trips to and from the sites has been taken from an existing zone within the model which is deemed to have similar characteristics in terms of land use and location. These zones are referred as donor zones. Trip distribution refers to the trip making patterns describing where a trip starts known as its Origin zone, and where the trip ends known as its Destination zone.
- 4.2.2 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.

4.3 Reference Case Model Performance

4.3.1 The model convergence statistics for the 2037 Reference Case models are summarised within

- 4.3.2 Table 4-3. Model convergence is a measure of the stability of the model. The model will run through a number of iterations and will be deemed to converge when cost changes are seen to be stable and meet criteria set out with TAG guidance.
- 4.3.3 The statistics are provided for the final four assignment/simulation loops for each model, in line with **TAG guidance**. The results show that all the models achieve acceptable convergence and in particular all models achieve a gap value of less than 0.1%. A gap of under 1% is regarded as satisfactory and this is more than achieved by all the models. Good model convergence indicates that the models are stable and model results are considered to be robust.

Table 4-3 2039 Reference Case Convergence Statistics

AM				PM			
Iteration	% GAP Delta	% Flow	%Cost Delays	Iteration	% GAP Delta	% Flow	%Cost Delays
398	0.010	99.2	99.4	60	0.0080	99.1	99.4
399	0.0092	99.4	99.6	61	0.0074	99.1	99.4
400	0.036	99.3	99.3	62	0.0051	99.3	99.7
401	0.015	98.7	98.9	63	0.0055	99.1	99.6

- 4.3.4 The low % GAP values of all models are less than 0.1%, and the high %Flow and %Delay values indicate that a satisfactory level of convergence has been achieved within the highway model in all cases.
- 4.3.5 To provide an additional measure of the operation of the model, network summary statistics have been extracted from the 2014 Base and 2037 Reference Case models and these are shown in Table 4-4. The summary statistics are a measure of network wide performance. It is generally to be expected that as traffic growth increases in the future, network performance will deteriorate as congestion increases. The summary statistics, in addition to giving a network wide indication of performance for each of the modelled scenarios, also provides a simple and easily understandable test that the models are behaving logically.
- 4.3.6 The model summary statistics indicate that the models are behaving as expected, and that the underlying trends in the summary statistics are logical and expected.

Table 4-4 Network Summary Statistics

Scenario	Trips (PCU/hr.)	Total Travel Time (PCU/Hr.)	Total Travel Distance (PCU KM/hr.)	Average Speed (KMH/hr.)	Over Capacity Queues (PCU HRS/hr.)
AM 2014 Base	53,810	10,479	553,693	53	1,031
AM 2037 Reference Case	78,343	18,229	742,774	41	4,070
PM 2014 Base	53,001	9,923	540,535	55	803
PM 2037 Reference Case	75,527	16,523	691,771	42	3,856

5 Local Plan Scenario – No Mitigation

5.1 Introduction

- 5.1.1 This section reports on the impacts of the proposed 2039 Preferred Scenario Local Plan Review development, without any physical mitigation on place.
- 5.1.2 Analysis is provided for the AM and PM peak hours. The impacts have been assessed by looking at three main model parameters comparing the With Local Plan Scenario against the Reference Case. The parameters used are:
- Changes in Actual Link Flows in PCU/Hour.
 - A comparison and analysis of changes in Link Volume to Capacity Ratio (V/C %).
 - A comparison and analysis of changes in Link Delays in seconds.
 - A comparison and analysis of changes in queues in PCU.
- 5.1.1 Following the creation of 2039 Reference Case forecasts, the Local Plan scenario development trips (extending the plan to 2039) were added on top of the Reference Case model demands to create the 2039 Local Plan Scenario without mitigation, for assignment in the traffic model. The agreed trip rates discussed in Section 4.3 were used to derive the trip generation of these developments. Similarly, a 5% reduction in trips was applied to strategic development sites.
- 5.1.1 The distribution of the Local Plan trips was based upon land use zones of a similar nature already included within the Reference Case.

5.2 2039 Flow Changes Local Plan Without mitigation

- 5.2.1 This analysis compares the flow changes of the 2039 Local Plan Scenario without mitigation, against the 2039 Reference Case flows. An increase in flows implies that the Local Plan results in higher flows than in the Reference Case, while a decrease implies that the Local Plan results in less flows, likely because of reassignment. Appendix E show the flow changes.
- 5.2.2 The flow changes indicate that there are significant flow increases on various roads within the study area including Chichester City. This includes flow increases on radial routes into Chichester as well as on routes on the northern edge of Chichester. This is as a result of the increased demands from Local Plan development. There is evidence of traffic rat running through the local highway network instead of using the A27 likely because of capacity constraints on the A27 Chichester Bypass junctions. This includes increased traffic on New Road and Downs Road to the north of Chichester both eastbound and westbound.
- 5.2.3 Similar trends in flow changes are seen in both the AM and PM peaks with rat running through Chichester and use of roads to the north of Chichester evident as traffic assigns away from the A27 Chichester Bypass.
- 5.2.4 In both the AM and PM peaks, it is also noticeable that there are large increases in traffic volume on the network to the east of Chichester, which correlates to the Local Plan development located in this area.
- 5.2.5 More details in flow changes without mitigation are given in Appendix E.

5.3 Summary of Flow Changes

- 5.3.1 It is considered the flow changes predicted by the model across the network are logical and to expectation. In the absence of mitigation, the flow analysis indicates that there are significant flow increases on various roads within the study area including Chichester City. This includes

flow increases on radial routes into Chichester as well as on routes on the northern edge of Chichester. This is as a result of the increased demands from Local Plan development.

5.3.2 There is evidence of traffic rat running through the local highway network instead of using the A27 likely because of capacity constraints on the A27 Chichester Bypass junctions. This includes increased traffic on New Road and Downs Road to the north of Chichester both eastbound and westbound. The decreases seen on the A27 suggest traffic reassigning away from the A27 to use less suitable routes given the capacity constraints on the A27 in the absence of mitigation. This is the case in both the AM and PM peak hours.

5.4 Volume over Capacity (V/C), Delays and Queue Outputs

5.4.1 This section provides an indication of the operation of the junctions within the model by analysing the Volume over Capacity ratios (%), delays in seconds and queues in PCU. Where junctions are overcapacity (i.e., V/C greater than 100%, mitigation should provide a level of service (LOS) that is no worse than that in the Reference Case. The junctions included are shown in Figure 5-1.

5.4.2 The analysis highlights those junctions which are deemed to require mitigation, by virtue of them being over capacity with the Local Plan development in place and being significantly worse than the Reference Case outputs.

5.4.3 Table 5-1 to Table 5-6 provide a summarised tabulation of the V/C ratios, delays and queues at the key impacted junctions for the Reference Case and Local Plan without mitigation for both the AM and PM peak hours. Those junctions where the V/C indicates that with the Local Plan in place, mitigation is deemed to be required are shown in red.

5.4.4 Graphical plots of V/C are shown in Appendix F, while those of Delays are shown in Appendix G.

Figure 5-1 Junction Locations

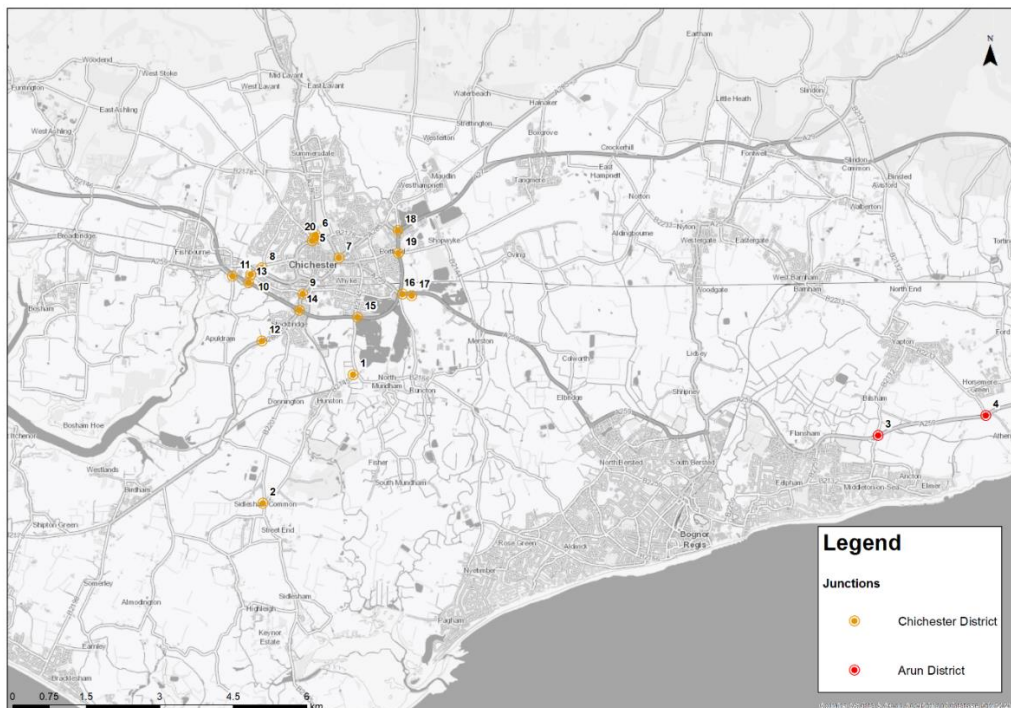


Table 5-1 AM – Max Volume to Capacity Ratio

Junction No.	Location	2039 Reference Case	2039 LP Without Mitigation
1	B2145 / B2166	81	93
2	B2145/B2201	71	78
3	A259/B2132 Comet Corner	114	121
4	A259/B2233 Oystercatcher	117	118
5	A286 Northgate / A286 Orchard Street	77	82
6	A286 Churchside / A286 Broyle Road	107	107
7	A286 New Park Road / A286 St Pancras Road	75	80
8	A259 Via Ravenna / A259 Cathedral Way Roundabout	115	123
9	A286 Stockbridge Road/ Terminus Road	48	64
10	A259 Cathedral Way/ Fishbourne Road East	129	141
11	Fishbourne Road West / Appledram Lane South	79	100
13	Fishbourne Roundabout	132	146
14	Stockbridge Roundabout	125	124
15	Whyke Roundabout	125	127
16	Bognor Road Roundabout	127	135
18	Portfield Roundabout	102	103
19	Oving Junction	94	95
20	A286 Northgate / A286 Oaklands Way	100	100

Table 5-2 PM – Max Volume to Capacity Ratio

Junction No.	Location	2039 Reference Case	2039 LP Without Mitigation
1	B2145 / B2166	91	96
2	B2145/B2201	102	103
3	A259/B2132 Comet Corner	112	114
4	A259/B2233 Oystercatcher	104	106
5	A286 Northgate / A286 Orchard Street	94	96
6	A286 Churchside / A286 Broyle Road	61	80
7	A286 New Park Road / A286 St Pancras Road	106	110
8	A259 Via Ravenna / A259 Cathedral Way Roundabout	41	56
9	A286 Stockbridge Road/ Terminus Road	151	150
10	A259 Cathedral Way/ Fishbourne Road East	63	103
11	Fishbourne Road West / Appledram Lane South	100	109
13	Fishbourne Roundabout	191	189

Junction No.	Location	2039 Reference Case	2039 LP Without Mitigation
1	B2145 / B2166	91	96
2	B2145/B2201	102	103
3	A259/B2132 Comet Corner	112	114
4	A259/B2233 Oystercatcher	104	106
5	A286 Northgate / A286 Orchard Street	94	96
6	A286 Churchside / A286 Broyle Road	61	80
7	A286 New Park Road / A286 St Pancras Road	106	110
14	Stockbridge Roundabout	136	142
15	Whyke Roundabout	136	142
16	Bognor Road Roundabout	118	126
18	Portfield Roundabout	131	142
19	Oving Junction	131	143
20	A286 Northgate / A286 Oaklands Way	105	108

Table 5-3 AM – Max Delays (Total) (seconds)

Junction No.	Location	2039 Reference Case	2039 LP Without Mitigation
1	B2145 / B2166	5.8	9.7
2	B2145/B2201	16.0	20.0
3	A259/B2132 Comet Corner	431.0	526.8
4	A259/B2233 Oystercatcher	380.9	416.4
5	A286 Northgate / A286 Orchard Street	8.7	9.7
6	A286 Churchside / A286 Broyle Road	187.4	181.7
7	A286 New Park Road / A286 St Pancras Road	6.3	7.6
8	A259 Via Ravenna / A259 Cathedral Way Roundabout	349.6	497.1
9	A286 Stockbridge Road/ Terminus Road	21.8	21.9
10	A259 Cathedral Way/ Fishbourne Road East	608.1	821.8
11	Fishbourne Road West / Appledram Lane South	13.6	21.1
13	Fishbourne Roundabout	673.4	929.5
14	Stockbridge Roundabout	528.4	512.2
15	Whyke Roundabout	523.9	558.7
16	Bognor Road Roundabout	673.8	728.4
18	Portfield Roundabout	87.9	108.3
19	Oving Junction	135.4	135.4
20	A286 Northgate / A286 Oaklands Way	27	27

Table 5-4 PM – Max Delays (Total) (seconds)

Junction No.	Location	2039 Reference Case	2039 LP Without Mitigation
1	B2145 / B2166	13.4	19.3
2	B2145/B2201	99.3	124.8
3	A259/B2132 Comet Corner	363.8	366.9
4	A259/B2233 Oystercatcher	157.1	168.2
5	A286 Northgate / A286 Orchard Street	30.2	35.4
6	A286 Churchside / A286 Broyle Road	6.6	11.1
7	A286 New Park Road / A286 St Pancras Road	169.7	223.2
8	A259 Via Ravenna / A259 Cathedral Way Roundabout	28.6	33.0
9	A286 Stockbridge Road/ Terminus Road	953.0	928.4
10	A259 Cathedral Way/ Fishbourne Road East	10.7	61.8
11	Fishbourne Road West / Appledram Lane South	40.4	196.0
13	Fishbourne Roundabout	1785.1	1740.3
14	Stockbridge Roundabout	807.7	891.2
15	Whyke Roundabout	766.0	867.7
16	Bognor Road Roundabout	386.7	519.9
18	Portfield Roundabout	679.8	864.6
19	Oving Junction	626.7	845.4
20	A286 Northgate / A286 Oaklands Way	123	176

Table 5-5 AM – Max Average Queue Total (PCU)

Junction No.	Location	2039 Reference Case	2039 LP Without Mitigation
1	B2145 / B2166	0.5	1.3
2	B2145/B2201	1.1	1.4
3	A259/B2132 Comet Corner	11.3	11.4
4	A259/B2233 Oystercatcher	29.0	32.3
5	A286 Northgate / A286 Orchard Street	1.1	1.4
6	A286 Churchside / A286 Broyle Road	23.0	23.0
7	A286 New Park Road / A286 St Pancras Road	0.8	1.1
8	A259 Via Ravenna / A259 Cathedral Way Roundabout	34.0	48.6
9	A286 Stockbridge Road/ Terminus Road	1.2	1.5
10	A259 Cathedral Way/ Fishbourne Road East	43.5	59.3
11	Fishbourne Road West / Appledram Lane South	0.8	1.3
12	Stockbridge Link Road / A286 Birdham Road	-	-

Junction No.	Location	2039 Reference Case	2039 LP Without Mitigation
13	Fishbourne Roundabout	94.9	138.6
14	Stockbridge Roundabout	40.9	36.6
15	Whyke Roundabout	58.6	75.1
16	Bognor Road Roundabout	144.4	180.4
17	Bognor Road / Vinnetrov Road	-	-
18	Portfield Roundabout	19.2	26.0
19	Oving Junction	6.5	6.6
20	A286 Northgate / A286 Oaklands Way	8	8

Table 5-6 AM – Max Average Queue Total (PCU)

Junction No.	Location	2039 Reference Case	2039 LP Without Mitigation
1	B2145 / B2166	2.0	3.0
2	B2145/B2201	9.8	11.5
3	A259/B2132 Comet Corner	9.3	10.6
4	A259/B2233 Oystercatcher	19.2	28.0
5	A286 Northgate / A286 Orchard Street	4.3	5.0
6	A286 Churchside / A286 Broyle Road	0.6	1.6
7	A286 New Park Road / A286 St Pancras Road	22.7	33.6
8	A259 Via Ravenna / A259 Cathedral Way Roundabout	0.3	0.5
9	A286 Stockbridge Road/ Terminus Road	43.4	42.3
10	A259 Cathedral Way/ Fishbourne Road East	0.8	14.0
11	Fishbourne Road West / Appledram Lane South	6.0	30.7
13	Fishbourne Roundabout	73.8	86.7
14	Stockbridge Roundabout	43.5	81.7
15	Whyke Roundabout	32.3	56.4
16	Bognor Road Roundabout	105.9	135.8
18	Portfield Roundabout	83.7	121.9
19	Oving Junction	71.4	96.3
20	A286 Northgate / A286 Oaklands Way	32	37

5.5 Summary

5.5.1 The additional trips associated with Local Plan development indicates the following junctions require consideration of mitigation:

- A259/B2132 Comet Corner (Arun District)
- A286 New Park Road / A286 St Pancras Road
- A259 Via Ravenna / A259 Cathedral Way Roundabout
- A259 Cathedral Way/ Fishbourne Road East
- Fishbourne Road West / Appledram Lane South
- A27 Fishbourne Roundabout
- A27 Stockbridge Roundabout
- A27 Whyke Roundabout
- A27 Bognor Road Roundabout
- A27 Portfield Roundabout
- A27 Oving Junction
- A286 Northgate / A286 Oaklands Way

5.5.2 It should be noted that even prior to adding in the Local Plan development, all the junctions on the A27 Chichester bypass are over capacity in one or both modelled peak hours. With the exception of Portfield Roundabout, the junctions are also shown to be over or very near capacity in the base year model (2014) before any additional background or Local Plan traffic is added, highlighting the fact that it is not just the Local Plan or committed Chichester development which leads to this situation.

5.6 700 dwellings per annum (DPA) Sensitivity Test

- 5.6.1 The LPR 2039 is planned to deliver 9,630 dwellings in the southern plan area over the Local Plan period, at an average rate of 535 dwellings per annum (dpa). This is the 'Core Scenario' of the Local Plan Review testing. An additional assessment to understand whether the mitigation infrastructure proposed to accommodate the Core Scenario proposals would also adequately accommodate an increase in southern plan area development to 700 dpa. A provision of 700 dpa over the 18-year period 2021 to 2039 would provide 12,600 dwellings over the plan period compared to 9,630 dwellings at 535 dpa. Higher levels of Local Plan development would enable higher levels of developer contributions to be raised towards funding the required Local Plan mitigation.
- 5.6.2 In particular, the focus of this 700 dpa sensitivity test was to consider whether the mitigation proposed on the Strategic Road Network (SRN) junctions on the A27 Chichester Bypass would be able to accommodate this higher level of development.
- 5.6.3 The network performance outputs analysed comprising V/C%, Delays (seconds) and Queues (PCU's) suggest that generally the proposed SRN mitigation identified for the Core Scenario, can accommodate in the most part, additional increase in development to 700dpa. As expected in some locations where mitigation is proposed and are operating close or at capacity in the Core Scenario, an increase in impacts is witnessed.
- 5.6.4 This is especially the case at the Portfield roundabout and Oving junction where it has been identified that the with Local Plan scenarios perform worse than the Reference Case. The built mitigation schemes at these junctions have been included in the Reference Case and in the with Local Plan scenarios. The evident capacity issues suggest that these junctions need a new mitigation scheme. It is noted, however, that the arm performing over capacity and worse than the Reference Case at the Oving junction is on the local highway network (i.e., B2144 Oving Road arm westbound), while the SRN arms operate better than the Reference Case. West Sussex County Council (WSSCC) has indicated that their preferred approach to mitigating impacts on their network is through sustainable mitigation with less reliance on physical mitigation.

- 5.6.5 It is concluded that in the main, the 700 dpa (southern plan area) demands can generally be accommodated by the mitigation proposed for the 535 dpa core test although at the Portfield roundabout and Oving junction, capacity issues get worse with the 700 dpa demands, with additional mitigation being required. As no schemes have been designed to date, it would be advisable to retain some costs against for future works against Portfield Roundabout as a minimum.
- 5.6.6 Full details of the 700 dpa sensitivity test can be found in Appendix H of this report.

5.7 Gypsies and Travellers

- 5.7.1 As part of the Local Plan process, CDC need to consider the needs for accommodation for Gypsies and Travellers. The main priority in the first instance is trying to achieve a 5-year supply.
- 5.7.2 89 further pitches have been identified in the first 5 years of the plan, and would include:
- 24 pitches from post 2021 consents
 - 13 pitches from intensification
 - 7 vacant/unimplemented pitches (1 additional pitch is expected to be made available on public site in Westbourne, but does not represent a net increase so not counted here),
 - 45 from windfall on the basis of the last 10 years.
- 5.7.3 There is currently an identified need for a further 68 pitches in the later part of the plan period. It is anticipated that 27 of these will be delivered on strategic sites. Other than Southbourne BLD, these will be in place of previously identified dwellings, and overall, there is no resultant increase in trips to that previously modelled across the plan area. The residual 41 pitches will be identified through a site allocations DPD or delivered through windfall.
- 5.7.4 This results in an overall provision of a further 130 pitches over the plan period in addition to a further 40 Travelling Showpeople Plots beyond the modelled scenario.
- 5.7.5 The TRICS database has been interrogated for similar sites and a single site with 10 units has been identified. The number of trips in the AM peak and PM peak hours is shown in Table 5-7.

Table 5-7 Gypsy and Traveller Site Trip Generation and Trip Rates (10 Units)

Time Period		Arrivals	Trip Rate/Hr.	Departures	Trip Rate/Hr.	Total	Trip Rate/Hr.
AM Peak		5	0.5	8	0.8	13	1.3
PM Peak		3	0.3	1	0.1	4	0.4

- 5.7.6 Given the likely dispersed nature of the allocation of units, the impacts on the local highway network are unlikely to have any significant impact on congestion or safety within the local area. If necessary, all or part of these additional units may be included as part of any analysis for the programmed monitor and manage process.

6 Consideration of Sustainable Mitigation Measures

6.1 Introduction

- 6.1.1 As noted in Section 4.6, a 5% reduction in demands has been assumed within the strategic Local Plan locations to represent a reduction in trips as a result of development-specific travel planning and behaviour change packages encompassing smarter choices. There has been a general shift in government policy towards travel demand management and sustainable transport solutions since at least the 1990's and this has taken on renewed urgency with the need to tackle the Climate Change emergency. Therefore, sustainable travel is likely to play a more significant role in the mid to long term than the site specific 5% car trip reduction assumed in the modelling which is considered proportionate and justified but may err on the conservative side.
- 6.1.2 In 2019, the UK passed laws to end its contribution to global warming by 2050. The target will require the UK to bring all greenhouse gas emissions to net zero by 2050, compared with the previous target of at least 80% reduction from 1990 levels. This will require additional action to reduce emissions across the whole economy including transport. The Climate Change Committee's 6th Carbon budget makes assumptions about how surface transport will contribute towards the Balanced Net Zero Pathway. A major contribution towards meeting this Balanced Net Zero Pathway is travel behavioural change and reduction in travel demand. The Pathway assumes a reduction of 9% in total car miles by 2035 and 17% by 2050.
- 6.1.3 It is generally now considered that potential sustainable mitigation measures should have priority over highway capacity mitigation and hence a need to shift away from a 'Predict and Provide' approach towards a 'Monitor and Manage' approach. Given the long-term horizon of the Local Plan, there will always be uncertainty about the level of growth in travel that may materialise. Some significant changes in travel behaviour alongside technology advances have been seen in recent times, and the COVID-19 pandemic has accelerated these changes with significantly more people working at home and shopping online (virtual mobility). While the long-term impacts on travel behaviour are unknown, it has been demonstrated during these challenges that the potential exists to undertake activities remotely without the need to travel, by working from home or shopping online.
- 6.1.4 This section provides an overview of options which could be considered in the medium term to long term as an alternate or complementary mitigation measure to the highway mitigation considered for the Chichester plan area. The section provides an overview whether they are viable sustainable transport options. The 2018 study considered sustainable options in the context of Chichester District and these issues remain pertinent and are included in this report.

6.2 Sustainable Mitigation

- 6.2.1 This study has also considered potential future sustainable transport solutions centred around walking and cycling initiatives, public transport, parking management and possible park and ride as outlined below.

Car Park Management

- 6.2.2 There would be an associated need for measures to reduce the appeal/availability of city centre car parking spaces to promote use of other sustainable forms of travel or possible park and ride scheme. This could be through amending the charging scheme for both long- and short-term parking thought the city centre or through the removal of car park spaces which could lead to future development areas becoming available.

Office Space Charging

- 6.2.3 Another option would be to charge businesses for their private parking spaces. This could increase revenues for CDC/WSCC subject to whoever implements the policy. Alternatively, it could lead to an uplift of sustainable modes of travel, thus removing vehicle trips relating to office businesses within Chichester City Centre. In turn, this could lead to more sustainable trips on existing public transport services or generate the number of trips required to make an employment-based park and ride scheme viable. A major risk to this option is that this could diminish the attraction of Chichester City as a workplace if this is not carefully managed.

Walking and Cycling

- 6.2.4 The funds generated from the car parking management and office space charging schemes and other funding sources including developer contributions discussed above can be utilised to fund potential extension and enhancements of the current walking and cycling network within Chichester City. It could also fund potential regeneration of key movement areas within the city centre through the promotion of initiatives such as 'Healthy Streets.' Such initiatives could lead to an increase in sustainable modes of travel due to reduced reliance on driving.
- 6.2.5 'Healthy Streets,' alongside reducing vehicle trips within the city centre, could also help to reduce air and noise pollution, improve mental health, help combat social isolation and bring economic benefits to local shops through increased footfall.
- 6.2.6 Alongside the benefits noted above, Healthy Streets can also be used to focus on minimising road dangers, which will help to address the safety fears that people have about walking and cycling, supporting a longer-term movement away from reliance on the car to more sustainable travel modes.

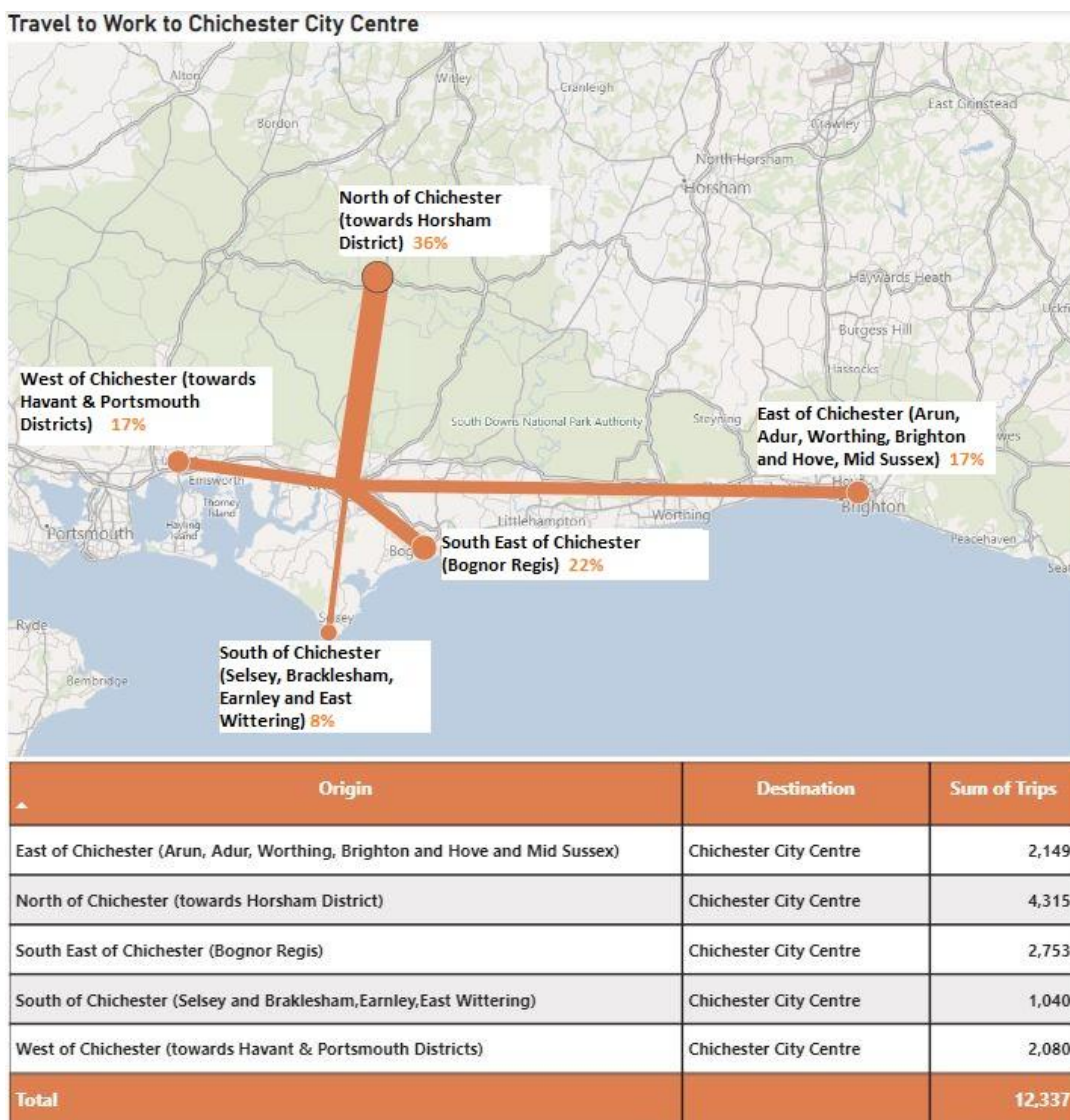
Public Transport

- 6.2.7 The funds generated from the parking management schemes, local/nation funding schemes and developer contributions could also be utilised to fund potential public transport enhancements within the city centre including an expansion of the bus priority lane system within Chichester City Centre. This could reduce reliance on the car in the longer term towards sustainable public transport. A park and ride scheme could be incorporated within a bus priority lane network in the future depending on the uptake and successfulness of early bus priority trials.
- 6.2.8 Chichester City centre has a constrained existing public highway network. Therefore, any proposed dedicated public transport or light transit corridors that could be implemented would be at the expense of existing highway. This could be managed through a time-based system where certain routes are restricted to public transport only during specific times. E.g., peak hours.

Park and Ride (P&R)

6.2.9 To inform the potential demand for an employment-based Park and Ride, which could remove some traffic through the junctions on the A27, the 2011 Census data for CDC area had been interrogated. This is the latest available data source and is now quite aged and will not take into account any impacts from increased home working. Figure 6-1 shows the location of origin of car driver trips into the Chichester Urban area.

Figure 6-1 Usual Residence to Place of Work



6.2.10 The data shows the maximum potential demand who could switch to Park and Ride and indicates the dispersed nature of the trips. The trips from the North are the greatest, however it is likely these would be dispersed across a number of routes coming into Chichester. The data does not take into account the availability of free parking at the destination, nor any shift working, which could deter people from using Park and Ride. In addition, realistically Park and Ride would not be able to serve the whole of Chichester but would most likely focus on the city centre and potentially large employment areas (although these are likely to currently have free car parking). The city centre is well served by existing rail from the east and west of Chichester and from Bognor Regis (with an interchange at Barnham). Therefore, the likely in-

scope demand for an employment Park and Ride could be quite small, but would require further investigation.

6.2.11 Locations for potential Park and Ride are also deemed to be limited.

Possible Issues

6.2.12 The District Council's emerging Parking Strategy considers a single 400 space P&R facility located to the west of the city, around the Fishbourne Roundabout. This would be signed to capture those visiting the city from the west only, to minimise pulling additional trips along the A27 from the east. This would need to consider additional bus priority from the site into the city.

6.2.13 The site construction costs and allowance for facilities, based on a cost per space, could be in the region of £3,000 to £5,000 per car parking space with operational costs being £500k to £1million a year. These costs exclude the additional bus priority required from the P&R facility to the city centre.

6.2.14 The outlay, operational and maintenance costs need to be balanced with the revenue return from the scheme to support the long-term viability of the scheme.

6.2.15 There are a number of potential issues to promoting a Park and Ride scheme or similar sustainable options as outlined below:

- Schemes will not work in isolation.
- Cost of schemes compared to benefit are likely to be initially lower than highway schemes.
- Schemes address local issues only.
- To achieve schemes may need highway to converted to bus priority/cycle scheme.
- Multiple schemes would be needed to capture east/west demand

Possible Benefits

6.2.16 There are a number of potential benefits to promoting a Park and Ride scheme or similar sustainable options as outlined below:

- Schemes may offer benefit to off peak demands (Retail/Tourist).
- Potential schemes could be used to assist seasonal peaks.
- As part of a wider linked City Strategy there would be scope to lower vehicle trips in the city centre leading to clear streets and potential less noise and air pollution within the city centre.
- Out of town provision would support reduction of parking in the city centre.

7 Highway Mitigation

7.1 Introduction

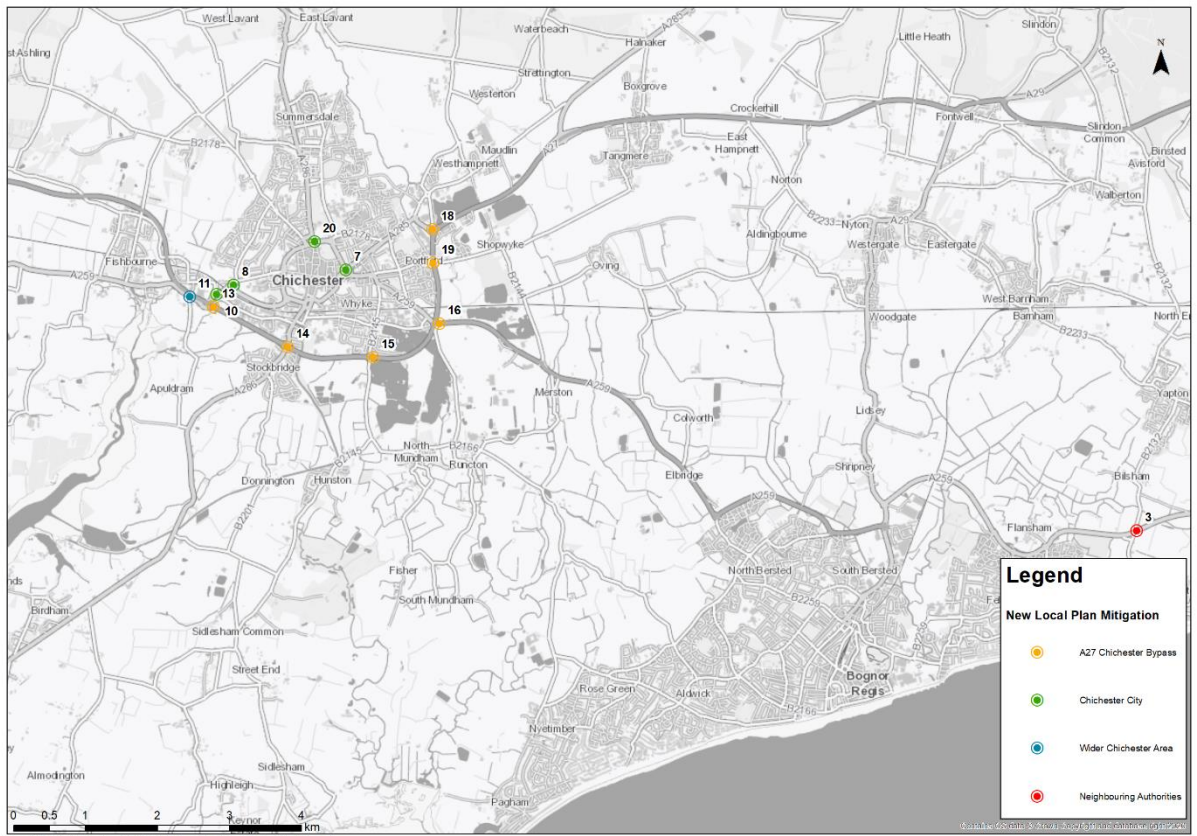
7.1.1 Having created the 2039 Local Plan Scenario without mitigation models, it was necessary to consider highway mitigation requirements to accommodate the Local Plan demands.

7.1.2 Eleven junctions were identified as being likely to require mitigation as listed in Section 5.5. Six of these are on the A27 corridor, plus a new link road scheme known as the Stockbridge Link. The results also indicate that there are five local highway network mitigation schemes covering the city and wider Chichester District locations.

7.1.3 For ease of analysis, the mitigation schemes were broken down into four components as per below and their locations are illustrated in Figure 7-1:

- A27 Chichester Bypass
- Chichester City
- Wider Chichester Area
- Neighbouring Local Authorities

Figure 7-1 Location of Proposed Mitigations Junctions



7.1.4 The adopted Chichester Local Plan (LP) 2014-2029, included a set of mitigation measures at the six principal junctions along the A27 corridor. Although, there have been works at the Portfield Roundabout in this timeline, no other mitigation schemes have been completed along the A27 corridor, as such the mitigation schemes defined in this report will also be required to consider the development from this plan period.

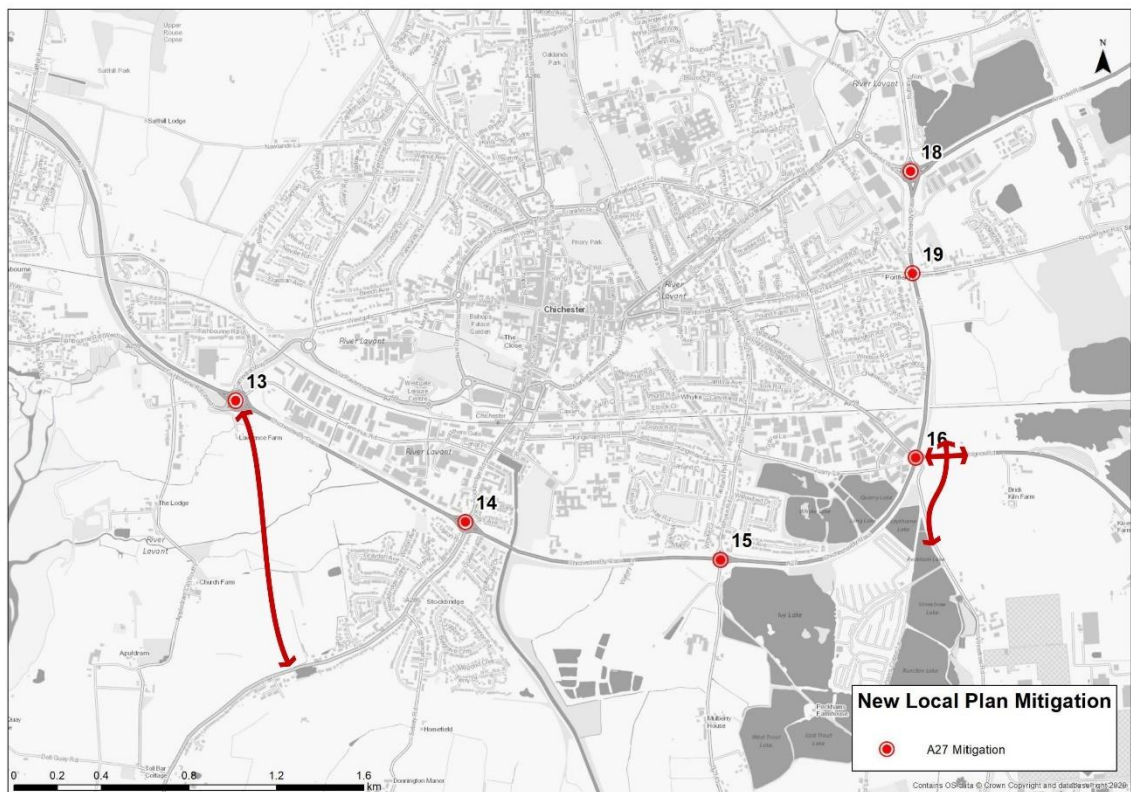
7.2 A27 Chichester Bypass (SRN) Mitigation

7.2.1 Figure 7-2 shows the location of the six A27 mitigation schemes proposed on the SRN. The junctions are:

- Fishbourne Roundabout (Junction 13)
- Stockbridge Roundabout (Junction 14)
- Whyke Roundabout (Junction 15)
- Bognor Road Roundabout (Junction 16)
- Portfield Roundabout (Junction 18)
- Oving Junction (Junction 19)




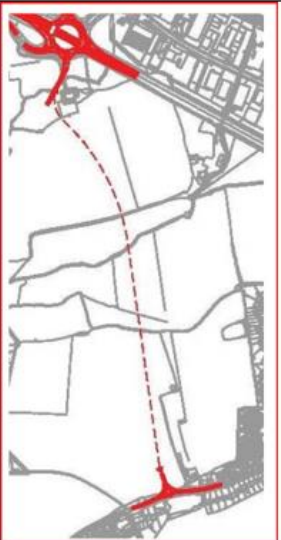



7.2.2 The Stockbridge Link also forms part of the mitigation package. This a local link that would connect to Fishbourne Roundabout by way of a new arm to Fishbourne Roundabout and link to the A286 Birdham Road, south west of Stockbridge.

Figure 7-2 Location of A27 Mitigation Junctions



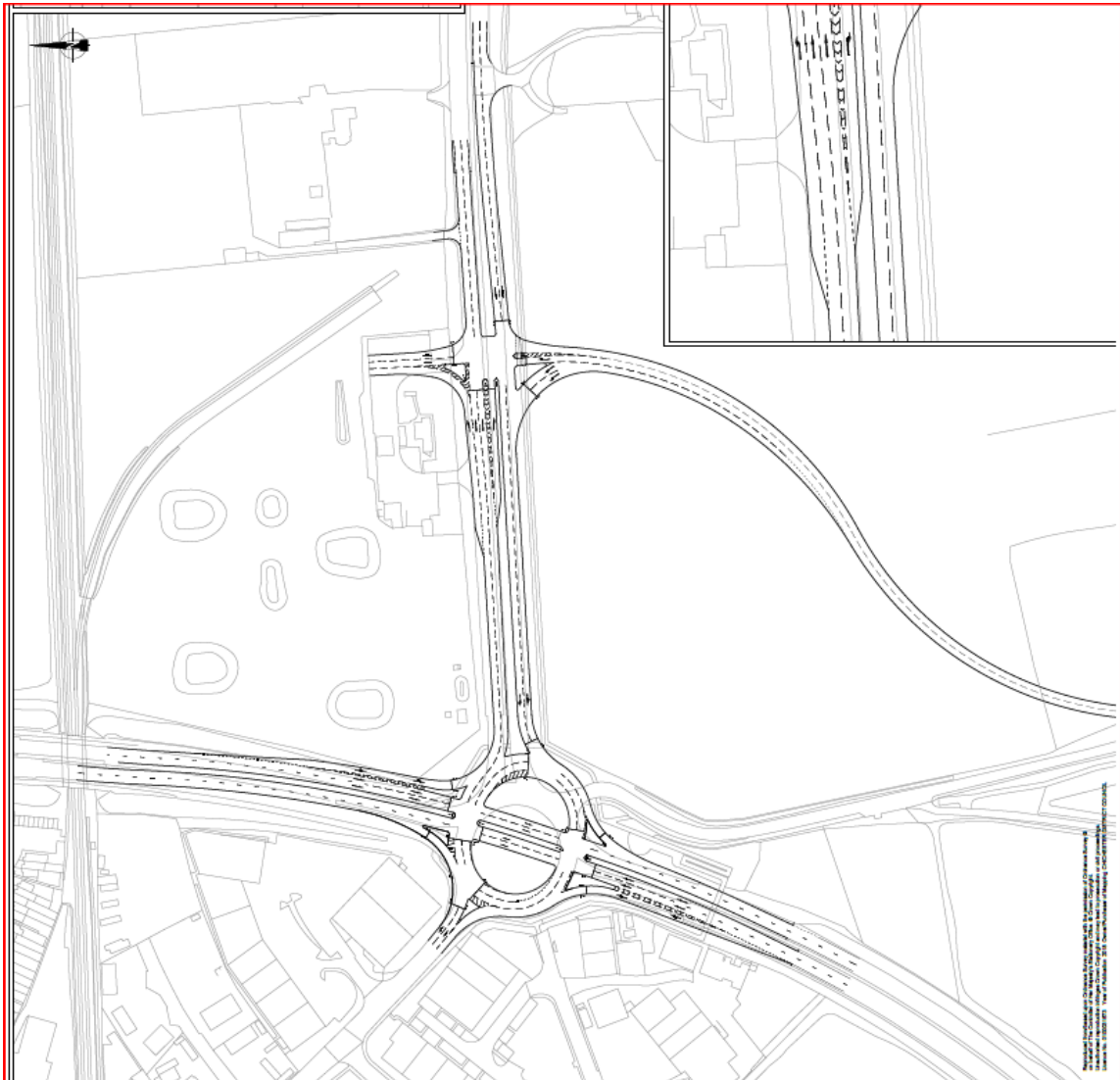
7.2.3 Figure 7-3 further illustrates the provisional A27 Chichester Bypass concept mitigation schemes. The Stockbridge Link Road is also illustrated. Also shown are the individual previously estimated costs of each scheme.

Figure 7-3 A27 Junction Provisional Concept Schemes

Fishbourne (Only) £5.95m	Stockbridge Road Jct £5.85m	Whyke Junction £5.24m	Stockbridge Link £25.2m
			
Bognor Road Jct (Only) £10.3	Oving Road Jct £1.4m	Portfield Road Jct £2.51m	
			

7.2.4 The Bognor Road scheme includes the modification of the junction into a 4-arm hamburger signalised junction, with the removal of the Vinnetrow Road link and its replacement link onto the Bognor Road at a new signalised Junction as shown in Figure 7-4.

Figure 7 4 Bogor Road and Vinnetrow Road combined Concept Schemes



7.3 Chichester City Junction Mitigation

7.3.1 The Local Plan assessment has indicated that the following junctions within Chichester city would require mitigation:

- A286 New Park Road / A286 St Pancras Road (Junction 7)
- A259 Via Ravenna / A259 Cathedral Way Roundabout (Junction 8)
- A259 Cathedral Way / Fishbourne Road East (Junction 10)

7.3.2 The lower development buildout has resulted in a lower requirement for mitigation, with some junctions operating within capacity or no worse than the Reference Case within the new assessment. Illustrative figures for the above mitigation schemes now follow. In light of the new West Sussex Transport Plan (WSTP) policies, WSCC's preference for mitigation for Chichester City Centre is to consider improvements to sustainable transport rather than additional highway capacity. Nevertheless, this report has provided physical mitigation schemes with a view to providing indicative costings that would be required for Chichester city centre mitigation.

Junction 7 A286 New Park Road / A286 St Pancras Road

7.3.3 The mitigation proposed for the New Park Road/St Pancras Road Junction is outlined in Figure 7-5 A286 New Park Road/ A286 St Pancras Road Proposed Mitigation

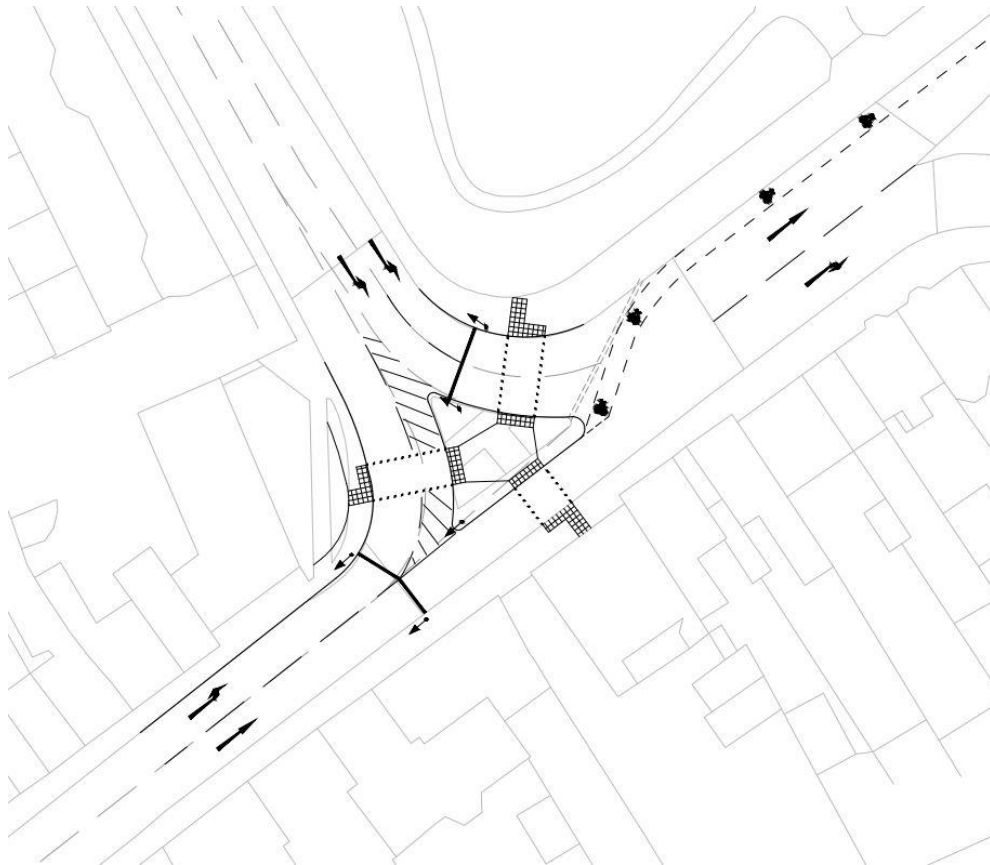
7.3.4 The mitigation scheme includes:

- New signalised junction between New Park Road southbound traffic and St Pancras Road eastbound traffic

7.3.5 Key constraints of this mitigation scheme:

- Statutory utility apparatus
- Existing street furniture
- Pavement/ kerb space for traffic signals

Figure 7-5 A286 New Park Road/ A286 St Pancras Road Proposed Mitigation



Junction 8 Via Ravenna / A259 Cathedral Way Roundabout

7.3.6 The mitigation proposed for the Via Ravenna/Cathedral Way Roundabout is outlined in Figure 7-6 Via Ravenna/ A259 Cathedral Way Roundabout Proposed Mitigation. This will be subject to sustainable mitigation measures being prioritised and a monitoring and manage approach confirming the need for the mitigation.

7.3.7 The mitigation scheme includes:

- New signalised arm between A259 Cathedral Way eastbound traffic and northbound traffic toward Westgate Road.

- Widening of Via Ravenna arm exit to two lanes before merging back to one lane 50m along Via Ravenna.

7.3.8 In the case of the first of these junctions, the mitigation may be required to avoid queuing back towards the A27, as well as for capacity issues.

7.3.9 Key constraints of this mitigation scheme:

- Statutory utility apparatus
- Existing street furniture
- Existing vegetation

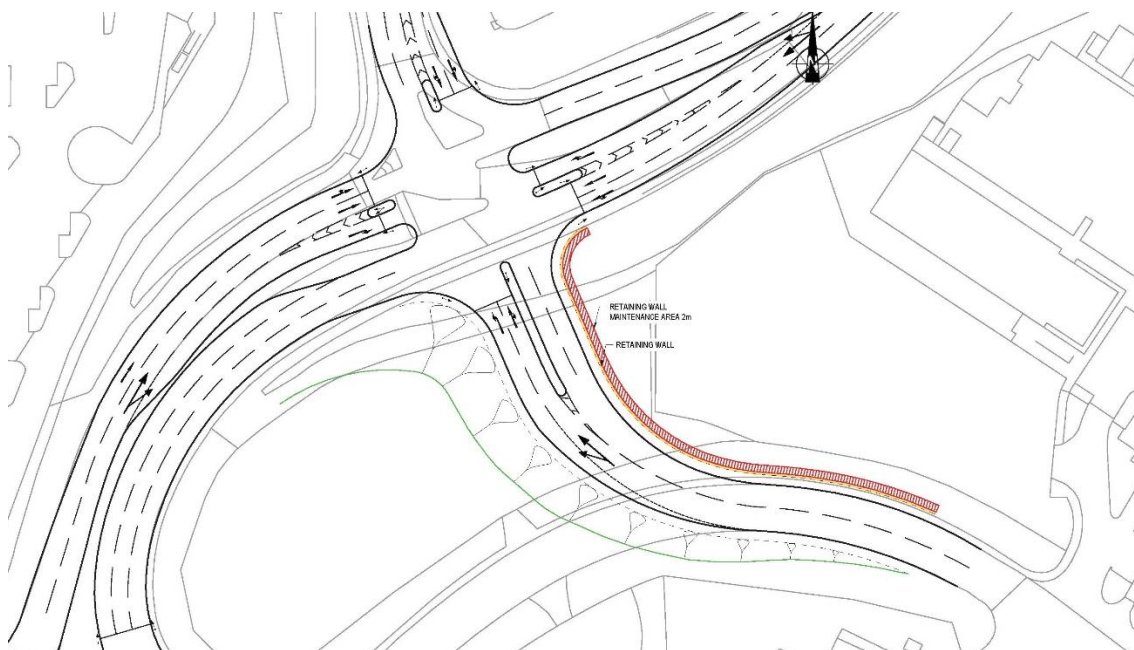
Figure 7-6 Via Ravenna/ A259 Cathedral Way Roundabout Proposed Mitigation



Junction 10 A259 Cathedral Way / Fishbourne Road / Terminus Road

7.3.10 The mitigation proposed for the Cathedral Way/Fishbourne/Terminus Road Junction is outlined in Figure 7-7 A259 Cathedral Way/ Fishbourne Road/Terminus Road Proposed Mitigation

Figure 7-7 A259 Cathedral Way/ Fishbourne Road/Terminus Road Proposed Mitigation



7.3.11 The mitigation scheme includes:

- Realignment of Terminus Road to create new junction onto Cathedral Way.
- Earthworks and retaining wall embankment to raise Terminus Road up to Cathedral Way.
- New signalised 4-way traffic signal junction.
- Removal of existing traffic islands to facilitate all movement crossroad junction.
- Widening of northbound Cathedral Way to facilitate dedicated right turn lane into Terminus Road.
- Widening of southbound Cathedral Way to facilitate dedicated right turn lane into Fishbourne Road East.

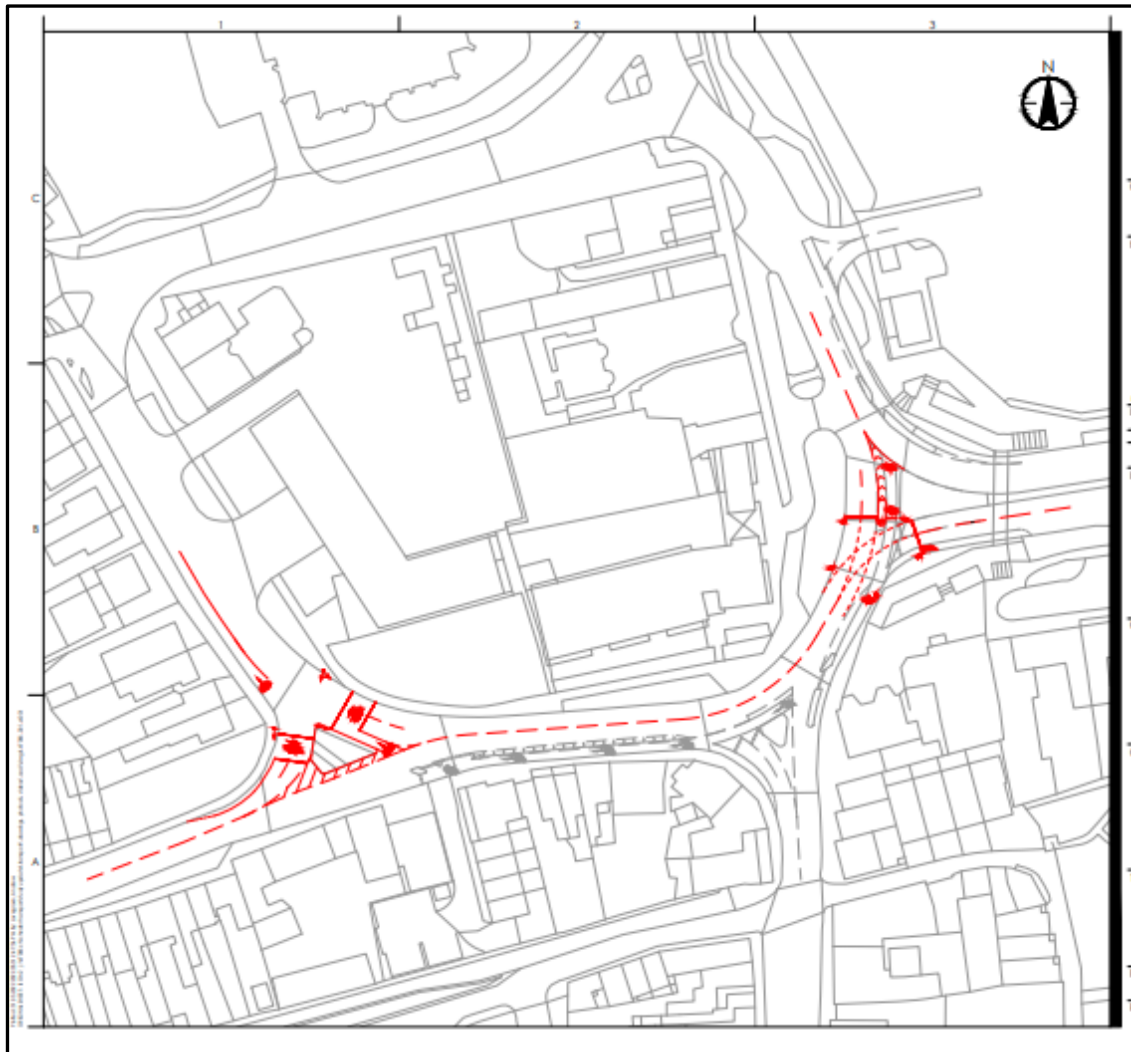
7.3.12 Key constraints of this mitigation scheme:

- Highway boundary and land ownership
- Statutory utility apparatus
- Existing street furniture
- Existing trees and vegetation
- Ground Conditions

Additional Mitigation due to removal of Southern Gateway Scheme

7.3.13 An additional mitigation scheme has been identified in Chichester City as a result of the removal of the Southern Gateway Mitigation Scheme from the Reference Case. The scheme, which is located at the A286/B2178 Churchside gyratory (junction 20) involves signalising the A286 Oaklands Way approach arm junction from a priority junction, which would also provide more gaps for the northbound traffic to egress from the Northgate arm at the gyratory where capacity issues were also identified. The scheme is illustrated in Figure 7-8.

Figure 7-8 A286 Northgate/Oaklands Way Proposed Mitigation Scheme



7.4 Wider Chichester Area

7.4.1 Only one junction in the wider Chichester area has been identified as requiring mitigation:

- Fishbourne Road West / Appledram Lane South (Junction 11).

7.4.2 However, this mitigation is only required without the Stockbridge Link Road (SLR) in place. As the SLR is a proposed mitigation scheme, a scheme at Junction 11 is not required. This is because the SLR has the potential to offer an alternate route to Appledram Lane. The modelling suggests that if the link was not provided, then the Appledram Lane and Fishbourne Road junction would require significant improvement, however, Appledram Lane itself is a narrow road of sub-standard width and alignment, with a significant number of residential properties on either side of the road. It also forms the eastern boundary of the Chichester Harbour Area of Outstanding Natural Beauty. It is therefore considered to be unsuitable for further improvement and has not been taken forward as a preferred mitigation measure.

7.5 Neighbouring Authorities

7.5.1 The neighbouring councils of Havant and Arun were consulted, and their Local Plan and proposed mitigation elements have been included in this assessment. This includes a mitigation scheme at the A259/B2132 Comet Corner junction in Arun (Junction 3).

- 7.5.2 This report does not at this time define cross boundary contributions associated with impact, this would be the subject of a further review. The study has also considered the other neighbouring local authorities comprising the South Downs National Park Authority (SDNPA), East Hampshire District Council (EHDC), Waverley Borough Council (WBC), and Horsham District Council (HDC).

Havant BC

- 7.5.3 The modelling has shown limited requirement for improvements along the A27 corridor until the A3(M) junction. The majority of junctions along this corridor are already grade separated and as such have a lesser impact on the A27 through movement, compared to those at grade junctions that support Chichester.
- 7.5.4 The A3(M) junction is considered a key decision point, with respect to trips traveling east west or north/south. As such there is a concentration of trips at this junction, hence it is the key junction to experience issues in the future to the west.
- 7.5.5 The impact of the emerging Local Plan development results in a negligible impact on the operation of the A27 Havant Bypass roundabout and its slip roads and the A3(M)/A27 junction, while witnessing a slight improvement in operation during the mitigated Local Plan scenario. The majority of traffic within the area is identified to run east west and north south along the A3(M) and the A27 thus not effecting the local road network within Havant itself.

8 Local Plan – With Mitigation

8.1 Introduction

- 8.1.1 Following the creation of the 2039 Reference Case models and the 2039 Local Plan Scenario Without Mitigation, the highway mitigation schemes highlighted in Section 7 were coded into 2039 Local Plan Scenario Without Mitigation models in order to create the 2039 Preferred Local Plan Scenario with Mitigation to determine whether the mitigation was adequate:
- 8.1.2 The comparisons have again looked at flow changes in PCU/hour, link delays in seconds and Link Volume to Capacity ratio (V/C) as percentage (%) units

8.2 2039 Flow Changes Local Plan with Mitigation

- 8.2.1 This analysis compares the flow changes of the Local Plan with mitigation, against the Reference Case flows for the AM and PM peaks, respectively. Appendix E shows the flow changes graphically.
- 8.2.2 With mitigation in place, it is noted that there are large decreases in flows on northern routes in Chichester mainly on New Road and Downs Road as traffic that was running away from the A27 reassigns to use the A27. Consequently, the A27 Chichester Bypass shows an increase in flows throughout its length.
- 8.2.3 Similar trends in flow changes are seen in the PM peak with mitigation in place. These include large decreases in flows on northern routes in Chichester mainly on New Road and Downs Road as traffic that was running away from the A27 reassigns to use the A27.
- 8.2.4 Detailed flow changes with mitigation are shown in Appendix I.

8.3 Summary of Flow Changes

- 8.3.1 With mitigation in place, it is noted that there are large decreases in flows on northern routes in Chichester mainly on New Road and Downs Road as traffic that was running away from the A27 reassigns to use the A27. Consequently, the A27 Chichester Bypass shows an increase in flows throughout its length. This is the case in both the AM and PM peaks.

8.4 Volume over Capacity (V/C), Delays and Queue Outputs

- 8.4.1 The outputs are shown in Table 8-1 to Table 8-6. The results are only shown for those junctions where mitigation is required. Junctions 12 and 17 are also included as these are additional junctions resulting from the Stockbridge Link Road and Bognor Road Roundabout mitigation schemes, respectively. No specific mitigation scheme has been included at Junction 11, but this has benefited from the provision of the SLR as can be seen in the outputs.

Table 8-1 AM – Max Volume to Capacity Ratio

Junction No.	Location	2039 Reference Case	2039 LP Without Mitigation	2039 LP With Mitigation
3	A259/B2132 Comet Corner	114	121	89
7	A286 New Park Road / A286 St Pancras Road	107	107	71
8	A259 Via Ravenna / A259 Cathedral Way Roundabout	115	123	75

Junction No.	Location	2039 Reference Case	2039 LP Without Mitigation	2039 LP With Mitigation
10	A259 Cathedral Way/ Fishbourne Road East	129	141	108
11	Fishbourne Road West / Appledram Lane South	79	100	77
12	Stockbridge Link Road / A286 Birdham Road	-	-	36
13	Fishbourne Roundabout	132	146	102
14	Stockbridge Roundabout	125	124	96
15	Whyke Roundabout	125	127	85
16	Bognor Road Roundabout	127	135	92
17	Bognor Road / Vinnetrow Road	-	-	93
18	Portfield Roundabout	102	103	110
19	Oving Junction	94	95	107
20	A286 Northgate / A286 Oaklands Way	100	100	99

Table 8-2 PM – Max Volume to Capacity Ratio

Junction No.	Junction Location	2039 Reference Case	2039 LP Without Mitigation	2039 LP With Mitigation
3	A259/B2132 Comet Corner	112	114	76
7	A286 New Park Road / A286 St Pancras Road	106	110	110
8	A259 Via Ravenna / A259 Cathedral Way Roundabout	41	56	40
10	A259 Cathedral Way/ Fishbourne Road East	63	103	117
11	Fishbourne Road West / Appledram Lane South	100	109	75
12	Stockbridge Link Road / A286 Birdham Road	-	-	97
13	Fishbourne Roundabout	191	189	106
14	Stockbridge Roundabout	136	142	61
15	Whyke Roundabout	136	142	60
16	Bognor Road Roundabout	118	126	84
17	Bognor Road / Vinnetrow Road	-	-	84
18	Portfield Roundabout	131	142	136
19	Oving Junction	131	143	109
20	A286 Northgate / A286 Oaklands Way	105	108	98

Table 8-3 AM – Max Delays (Total) (seconds)

Junction No.	Location	2039 Reference Case	2039 LP Without Mitigation	2039 LP With Mitigation
3	A259/B2132 Comet Corner	431.0	526.8	6.7
7	A286 New Park Road / A286 St Pancras Road	6.3	7.6	19.0
8	A259 Via Ravenna / A259 Cathedral Way Roundabout	349.6	497.1	41.9
10	A259 Cathedral Way/ Fishbourne Road East	608.1	821.8	197.6
11	Fishbourne Road West / Appledram Lane South	13.6	21.1	24.5
12	Stockbridge Link Road / A286 Birdham Road	-	-	3.9
13	Fishbourne Roundabout	673.4	929.5	65.0
14	Stockbridge Roundabout	528.4	512.2	141
15	Whyke Roundabout	523.9	558.7	130
16	Bognor Road Roundabout	673.8	728.4	36.0
17	Bognor Road / Vinnetrow Road	-	-	29.3
18	Portfield Roundabout	87.9	108.3	289.6
19	Oving Junction	135.4	135.4	230.3
20	A286 Northgate / A286 Oaklands Way	27	27	13

Table 8-4 PM – Max Delays (Total) (seconds)

Junction No.	Location	2039 Reference Case	2039 LP Without Mitigation	2039 LP With Mitigation
3	A259/B2132 Comet Corner	363.8	366.9	5.8
7	A286 New Park Road / A286 St Pancras Road	169.7	223.2	197.3
8	A259 Via Ravenna / A259 Cathedral Way Roundabout	28.6	33.0	45.3
10	A259 Cathedral Way/ Fishbourne Road East	10.7	61.8	363.3
11	Fishbourne Road West / Appledram Lane South	40.4	196.0	33.4
12	Stockbridge Link Road / A286 Birdham Road	-	-	22.0
13	Fishbourne Roundabout	1785.1	1740.3	136.9
14	Stockbridge Roundabout	807.7	891.2	124
15	Whyke Roundabout	766.0	867.7	352
16	Bognor Road Roundabout	386.7	519.9	29.2
17	Bognor Road / Vinnetrow Road	-	-	31.9
18	Portfield Roundabout	679.8	864.6	773.7
19	Oving Junction	626.7	845.4	222.5
20	A286 Northgate / A286 Oaklands Way	123	176	22

Table 8-5 AM – Max Average Queue Total (PCU)

Junction No.	Location	2039 Reference Case	2039 LP Without Mitigation	2039 LP With Mitigation
3	A259/B2132 Comet Corner	11.3	11.4	0.7
7	A286 New Park Road / A286 St Pancras Road	0.8	1.1	2.7
8	A259 Via Ravenna / A259 Cathedral Way Roundabout	34.0	48.6	3.4
10	A259 Cathedral Way/ Fishbourne Road East	43.5	59.3	31.4
11	Fishbourne Road West / Appledram Lane South	0.8	1.3	1.0
12	Stockbridge Link Road / A286 Birdham Road	-	-	0.1
13	Fishbourne Roundabout	94.9	138.6	34.7
14	Stockbridge Roundabout	40.9	36.6	21.3
15	Whyke Roundabout	58.6	75.1	27.6

Junction No.	Location	2039 Reference Case	2039 LP Without Mitigation	2039 LP With Mitigation
16	Bognor Road Roundabout	144.4	180.4	3.6
17	Bognor Road / Vinnetrow Road	-	-	11.5
18	Portfield Roundabout	19.2	26.0	40.2
19	Oving Junction	6.5	6.6	10.0
20	A286 Northgate / A286 Oaklands Way	8	8	8

Table 8-6 PM – Max Average Queue Total (PCU)

Junction No.	Location	2039 Reference Case	2039 LP Without Mitigation	2039 LP With Mitigation
3	A259/B2132 Comet Corner	9.3	10.6	0.6
7	A286 New Park Road / A286 St Pancras Road	22.7	33.6	53.2
8	A259 Via Ravenna / A259 Cathedral Way Roundabout	0.3	0.5	0.9
10	A259 Cathedral Way/ Fishbourne Road East	0.8	14.0	36.4
11	Fishbourne Road West / Appledram Lane South	6.0	30.7	1.6
12	Stockbridge Link Road / A286 Birdham Road	-	-	4.5
13	Fishbourne Roundabout	73.8	86.7	69.6
14	Stockbridge Roundabout	43.5	81.7	12.4
15	Whyke Roundabout	32.3	56.4	20.4
16	Bognor Road Roundabout	105.9	135.8	4.1
17	Bognor Road / Vinnetrow Road	-	-	9.8
18	Portfield Roundabout	83.7	121.9	44.7
19	Oving Junction	71.4	96.3	29.8
20	A286 Northgate / A286 Oaklands Way	32	37	9

8.4.2 The outputs shown within the tables indicate that in most cases, the proposed mitigation will mitigate the impacts of the Local Plan development traffic. There are three junctions where impacts are still shown.

Portfield and Oving Junctions

8.4.3 Portfield and Oving junctions show some worsening with the mitigation in place. This is due to the fact that improvements at Bognor Roundabout increase the northbound throughput and more traffic reaches the junctions to the north. There is likely to be an opportunity to reduce or

omit this impact through better linking of signals or metering flows at Bognor, which would need to be considered in more detailed analysis.

A286 New Park Road / A286 St Pancras Road

- 8.4.4 The mitigation scheme does not fully mitigate the impacts of Local Plan traffic at this junction. However, the delays are not that substantial. The mitigation scheme includes improvements for pedestrians and cyclists which will lead to increased use of active travel modes and reduce the need for physical mitigation here.

A259 Cathedral Way/ Fishbourne Road East

- 8.4.5 The highest V/C is seen on the new link from Terminus Road at the new Cathedral Way/Fishbourne Road East Junction in the PM peak. The AM peak operates adequately. There is potential to optimise the traffic signal better, whilst confirming that traffic does not block back on Cathedral Way to Fishbourne Roundabout. The V/C for the northbound approach is below 70%.
- 8.4.6 A sensitivity test has shown that increasing the flare length will reduce the V/C on this approach to below 100% and does not cause additional queuing on other arms. Therefore, there may be potential to increase the flare on the new link as the highest flows seen on this arm are turning left from Terminus Road towards the A27.

9 Mitigation Scheme Costs

9.1 Introduction

- 9.1.1 The current CDC Local Plan proposes a significant mitigation strategy for the district and specifically the A27 corridor. The mitigation proposals across the district are generally minor works. This document considered potential mitigation measures at the junctions identified to be impacted by the Local Plan development forecast for up to 2039.
- 9.1.2 Nine junctions have been identified as requiring mitigation as identified in Section 7.
- 9.1.3 In addition a new link road scheme known as the Stockbridge Link and modification to the Vinnetrov Road link has also been identified to support the delivery of the Local Plan.
- 9.1.4 Work undertaken by Stantec in 2018 set out the proposed mitigation schemes as well as a set of high-level costs for each of the schemes. The total cost of the A27 Corridor and link road was estimated at between £50 to £65 million based on lower and upper cost rates. For the purpose of consistency these costs have been retained within this report.

9.2 Approach to Scheme Cost Estimates

- 9.2.1 The mitigation costs were based on the previous work by Jacobs, Highway Agency (now National Highways) and understanding of similar recent projects and the locality. No industry standard references (such as SPONS or similar) have been used, as the level of design at this stage is not progressed to a detailed enough level for their use to be appropriate. SPONS is an industry series of publications giving guidance on scheme cost estimation for civil engineering, architectural and various other professions and trades.
- 9.2.2 Since the 2018 review, construction costs have fluctuated considerably, but as stated for consistency the same outline costs have been maintained for reporting purposes.
- 9.2.3 No investigation has been carried out into specific land ownership details, or into the location details or cost of moving statutory undertakers and utility apparatus within the areas of the scheme. No design assessments were carried out at this stage to ascertain the deliverability of the proposals except where any Health and Safety concerns were raised.
- 9.2.4 Design fees, assumed legal fees, process fees, risk etc. have been included as a provisional sum only as detailed estimates cannot be calculated at this stage. Third Party compensation has **not** been included.
- 9.2.5 All proposals and associated cost are estimates and are subject to future detailed site investigations, detailed design and real price increases.

9.3 Local Plan Mitigation

- 9.3.1 There are three defined areas which are projected to require mitigation works (A27 Corridor, Inner Chichester and Wider Chichester). These lie across two highway authorities, namely National Highways (with respect to the A27) and West Sussex County Council (with respect to the Inner and Wider Chichester areas).
- 9.3.2 The scale of the changes to the junctions (especially along the A27) will inevitably also address, in part, the current issues.
- 9.3.3 In terms of the previous Local Plan process the following document and updates included policy for securing contributions for mitigations along the A27, 'The Planning Obligations & Affordable Housing Supplementary Planning Document (SPD)' was adopted by the Council on

26 January 2016 and took effect from 1 February 2016 at the same time as the CIL Charging Schedule. The SPD replaced “The Provision of Service Infrastructure Related to new Development in Chichester District” adopted in December 2004.

- 9.3.4 On 19 July 2016, the Council adopted a formal amendment to the SPD which added wording at Paragraphs 4.46 – 4.54 setting out the Council’s approach for securing development contributions to mitigate additional traffic impacts on the A27 Chichester Bypass. A detailed explanation of the methodology used for calculating A27 contributions is provided in a study undertaken for the Council by Jacobs. Paragraph 4.74 of the SPD stated that the off-site access management mitigation will be funded from S106 Contributions within the zone of influence of Chichester and Langstone Harbour. These figures will be increased on 1 April each year in line with the Retail Price Index (RPI) rounded to the nearest whole pound.
- 9.3.5 Evidence from the previous Local Plan process, suggests that for mitigation schemes along the A27, individual financial contributions to junctions result in a significant time delay in securing sufficient funds to complete those works and often lead to money spread across multiple junctions. As such it is recommended that the A27 contributions be pooled into a corridor fund, which seeks to fund individual junctions based on their deemed priority. This is likely to require a policy review of the current SPD to consider this option.
- 9.3.6 Table 9-1 provides a ranking of the 6 key junctions along the A27 in priority. The premise is that the ranking is reviewed as junction mitigation schemes are completed, as their changes may have a material impact on the ranking. This offers a means of managing contributions more efficiently to secure works as early as possible as developments are forthcoming. The A27 is the primary corridor east/west for the region and as such the majority of developments will have trips utilising this corridor, therefore the ability to deliver improvements as required is inherent to reducing delay across the wider network.

Table 9-1 A27 Junctions ranking

Stantec Ranking	Junction No.	Junction Name
1	13	Fishbourne Roundabout
2	16	Bognor Road Roundabout
3	18	Portfield Roundabout
3	–	Stockbridge Link
4	19	Oving Junction
5	14	Stockbridge Roundabout
6	15	Whyke Roundabout

- 9.3.7 Stantec’s suggested phasing would allow the junctions to be built out over the plan period subject to funding so as to maintain economic growth. This phasing focuses on the gateways to Chichester (Fishbourne Roundabout & Bognor Road Roundabout) and seeks to generate the greatest benefits to future strategic development and as such provides the best balance between unlocking development and the improvements to the strategic highway network. WSCC and National Highways are in general agreement that this is the preferred phasing of the A27 mitigation schemes.

9.4 Chichester Scheme Costs Summary

- 9.4.1 The proposed mitigation scheme costs have been produced for the three junctions not on the SRN and are provided at 2018 estimate in Table 9-2. As stated in the report, there has been a fourth scheme added, which has brought the estimated contributions to around £2.6 million for localised mitigations.

Table 9-2 Chichester Proposed Mitigation Costs – New Local Plan

Scheme	2018 Costs		2020 Costs	
	Construction Costs	Project Costs*	Construction Costs	Project Cost
A286 New Park Road / A286 St Pancras Road	£250,000	£372,500		
Via Ravenna / A259 Cathedral Way Roundabout	£250,000	£372,500		
A259 Cathedral Way / Fishbourne Road East	Included in Fishbourne Rbt Scheme			
A259 Fishbourne Road W / Appledram Lane	£550,000	£819,500		
A286 Northgate/Oaklands Way			£675,000	£1,000,000
Overall Total	£1,050,000	£1,564,500	£1,725,000	£2,564,500

*Project costs include construction costs

9.5 A27 Scheme Costs Summary

- 9.5.1 The construction costs for the schemes on the SRN have undergone a number of reviews which is discussed in this section.
- 9.5.2 Ongoing consultation with CDC, WSCC and NH resulted in a high-level analysis of the Jacobs CDC Local Plan Costs (March 2013) and the Highways England A27 improvements costs (October 2016).
- 9.5.3 Stantec reviewed the National Highways schemes and used them as a basis to inform the proposed mitigation schemes for the A27 junctions outlined above. NH provided Stantec with additional cost information which provided a more detailed breakdown of the estimated costs associated with each junction. A review of the NH costs highlighted that two junction's costs, previously costed separately by Stantec, had been combined. The two junctions that had been combined under the NH schemes are outlined below:
- Fishbourne Mitigation Scheme – Incorporated both the Fishbourne Roundabout Scheme and Cathedral Way/ Terminus junction and road diversion scheme.
 - Bognor Mitigation Scheme – Incorporated both Bognor Road Roundabout Scheme and Vinnetrow/ Bognor Road junction and road diversion scheme.
- 9.5.4 The above junction's costs are now shown combined to provide a more robust mitigation cost for each scheme given that both elements of each mitigation scheme would need to be fully constructed in order to achieve the desired benefits.
- 9.5.5 The NH costs were analysed and incorporated into the Stantec estimated costs to provide a cost range for each proposed mitigation scheme along the A27.
- 9.5.6 The proposed A27 mitigation costs are summarised in Table 9-3. All A27 mitigation schemes would be required to be implemented in Scenario 1. Stantec has applied an optimum bias⁴ of 1.49 to the Stantec estimated construction costs. Stantec optimism bias includes an estimated cost for design fees, assumed legal fees, process fees and risk. The NH costs and OPT Bias

⁴ [Microsoft Word - GreenBook_optimism_bias.doc \(publishing.service.gov.uk\)](#)

have been extracted from the A27 Chichester Option Cost breakdown table and modified to reflect the proposed Stantec junction mitigation schemes.

Table 9-3 A27 Proposed Mitigation Costs (£m)

Junction Name	Construction Costs only (£m)			Lower Construction	Upper Construction	Lower OPT Bias Stantec	Upper OPT Bias NH *	Lower Project Cost	Upper Project Costs
	Jacobs (2013)	National Highways Cost (2014)	Stantec Costs (2018)	Stantec (£m)	NH (£m)	1.49	Varies	Stantec (£m)	NH (£m)
Fishbourne including Cathedral Way / Fishbourne Road East	£1.734** (£1.93)	£3.4 (£3.7)	£4.61	£3.4 (£3.7) (NH)	£4.61 (Stantec)	1.61* (NH)	1.49 (Stantec)	£5.48 (£5.95) (NH)	£6.87 (Stantec)
Stockbridge Roundabout	£2.644 (2.94)	£4.8 (£5.22)	£3.09	£3.09	£4.8 (£5.22)	1.49	1.12	£4.61	£5.38 (£5.85)
Whyke Roundabout	£2.225 (£2.48)	£4.3 (£4.68)	£2.52	£2.52	£4.3 (£4.68)	1.49	1.12	£3.76	£4.82 (£5.24)
Bognor Road Roundabout including Bognor Road / Vinnetrov Road Diversion	£1.22*** (£1.36)	£10**** (£10.87)	£6.93	£6.93	£10 (£10.87)	1.49	1.61	£10.33	£16.1 (£17.51)
Oving	£0.459 (£0.51)	£0.8 (£0.87)	£0.5	£0.5	£0.8 (£0.87)	1.49	1.61	£0.75	£1.29 (£1.4)
Portfield	£0.619 (£0.69)	£1.8***** (£1.96)	£0.66	£0.66	£1.8 (£1.96)	1.49	1.28	£0.99	£2.31 (£2.51)
Stockbridge Link Road	-	£18.1**** (£19.68)	£14.84	£14.84	£18.1 (£19.68)	1.49	1.28	£22.12	£23.17 (£25.19)
Overall Total	£8.901 (£9.91)	£43.2 (£46.98)	£33.15	£31.94 (£32.24)	£44.41 (£47.89)			£48.04 (£48.51)	£59.94 (£64.57)

Note: construction costs are at a price base of Q3, 2018 – inflation to 2018 for NH (8.74%) and Jacobs (11.31%) costs have been included table in the brackets

*OPT Bias for NH schemes based on chosen options growth factor

** Costs does not include Terminus Road/ Cathedral Way Junction

*** Cost does not include new junction at Vinnetrov / Bognor Road or hamburger roundabout.

****Estimated cost for section been proposed in Stantec mitigation scheme. Assumptions taken to reduce original £38.1m NH cost to £18.1m

*****Estimated cost for NH with no flyover constructed and associated earthworks/ retaining structures and widening

*****NH scheme dedicated slip lane. Stantec scheme includes widening of exiting carriageway.

Note

The NH **construction and project costs** exclude:

- Options and Development Phase Costs
- Land costs
- Statutory Undertakers Costs
- Employers Agent Supervision Costs
- Non-Recoverable VAT Allowances
- Inflation beyond Q3 2018
- Portfolio Risks

Note

The Stantec **construction and project costs**

exclude:

- Options and Development Phase Costs
- Land costs
- Statutory Undertakers Costs
- Employers Agent Supervision Costs
- Non-Recoverable VAT Allowances
- Inflation beyond Q3 2018
- Portfolio Risks
- Land Contamination and Remediation costs

9.6 Overall Proposed Mitigation Costs Summary

9.6.1 Table 9-4 shows a summary of the estimated project costs.

Table 9-4 Overall Summary of Mitigation Costs (Rounded Up)

Mitigation Area	Full Implementation	
	Lower Project Cost	Upper Project Cost
Chichester City and Wider Area	£1,564,500	£1,564,500
City and Wider Area Revised	£2,564,500	£2,564,500
A27 Corridor including Stockbridge Link Road	£48,040,000 (£48,510,000)	£59,940,000 (£64,570,000)
Overall Total Project Costs	£50,540,000 (£51,010,000)	£62,440,000 (£67,070,000)

Note: NH Inflation adjusted costs included in brackets

9.6.2 The total cost for the implementation of proposed mitigation works was estimated to be between approximately £50-70 million subject to the options.

9.7 National Highways A27 Estimated Maintenance Costs

9.7.1 Alongside a further review of the estimated scheme costs, further information has been requested by CDC and WSCC about potential maintenance costs that NH could seek for each proposed junction scheme over a 60-year period. A review of the A27 Chichester Bypass – Economic Assessment Report (July 2016) was undertaken to inform a high-level assumption of potential NH operation and maintenance costs. Therefore, a high-level assumption based on 25% of the project costs over a 60-year appraisal period has been calculated and is shown in Table 9-5. These costs would need to be discussed and confirmed with National Highways.

Table 9-5 National Highways A27 Estimated Maintenance Costs

Junction Name	Lower Maintenance	Upper Maintenance
	Stantec (£m)	NH (£m)
Fishbourne including Cathedral Way / Fishbourne Road East	£1.37	£1.72
Stockbridge Roundabout	£0.69	£0.81
Whyke Roundabout	£0.56	£0.72
Bognor Road Roundabout including Bognor Road / Vinnetrov Road Diversion	£1.55	£2.42
Oving Junction	£0.11	£0.19
Portfield Roundabout	£0.15	£0.35
Stockbridge Link Road	£3.32	£3.48
Overall Total	£7.75	£9.68

9.7.2 The maintenance cost for the A27 junctions over a 60-year period is estimated to be between **£7.75m - £9.68m**. It would be expected that there would be no maintenance costs for the first 5-to 10 years and the existing operation and maintenance costs are not considered, so these would be considered as a saving to NH not included within the figure above.

9.8 CDC Chichester A27 Mitigation assessment of Costs

- 9.8.1 Further review of the scheme costs was undertaken by CDC in September 2022 for agreement. The costs put forward by CDC are shown in Table 9-6 and started from the Stantec estimates in Table 9-3 above.

Table 9-6 CDC Scheme estimates seeking agreement

Works	2018 Pref App.	2022 (incl. BCIS = 23.6%)	20% Design Risk	2022 Total (with design risk included)
Fishbourne Junction	£5.95m	£7.3m	£1.46m	£8.76m
Bognor Junction	£10.3m	£12.73m	£2.55m	£15.28m
Stockbridge Link	£25.2m	£31.15m	£6.23m	£37.38m
Stockbridge Roundabout	£5.85m	£7.23m	£1.45m	£8.68m
Whyke Roundabout	£5.24	£6.48m	£1.3m	£7.78m
City Centre	£2.36m	£3.09m	£0.62m	£3.71m
Portfield Roundabout	£2.51m	N/A-Complete	N/A-Complete	N/A-Complete
Oving Junction	£1.4m	N/A-Complete	N/A-Complete	N/A-Complete
Total	£58.81	£67.98m	£13.61m	£81.59m

- 9.8.2 The WSCC review of the CDC costs provide a lower and upper Cost range based on the Lower Construction and Upper Construction figures in Table 9-3. This culminated in an estimate of scheme costs at Quarter 2 2022 prices. The WSCC review looked at the SRN mitigation schemes and not the city centre schemes. A summary of the scheme costs is shown in Table 9-7. Appendix J shows more details of how the costs were updated.

Table 9-7 WSCC Scheme estimates – Lower and Upper Estimate (A27 schemes)

Works	Lower Estimate	Upper Estimate
Fishbourne Junction including Terminus and Cathedral Way	£9.52m	£12.90m
Bognor Road Roundabout including Bognor Road / Vinnetrow Road Diversion	£19.39m	£30.42m
Stockbridge Link	£41.53m	£55.08m
Stockbridge Roundabout	£8.65m	£14.61m
Whyke Roundabout	£7.05m	£13.10m
Portfield Roundabout	£1.85m	£5.49m
Oving Junction	£1.40m	£5.49m
Total	£89.39m	£134.03m

9.9 Apportionment of A27 Scheme Costs

- 9.9.1 The modelling methodology not only considers the traffic growth from the Local Plan, but also considers other growth associated with trips travelling to/from and through Chichester. This section seeks to demonstrate how much the proposed Local Plan and committed development contributed to flow increases on the SRN junctions compared to background growth and hence inform cost apportionment of the schemes.

- 9.9.2 The mitigation in the context of this study refers to the improvements required to offset identified impacts from the Local Plan development proposals, which would be a matter for the plan. However, further infrastructure that would be required to address existing issues or those created by background traffic fall outside the plan. It is fair to say that the level of existing congestion identified in the modelling, means that forecast impacts of the Local Plan developments and scale of infrastructure required to make the network not severely worse off are disproportionately greater than they would be if the without-plan scenario was not already congested.
- 9.9.3 If CDC were able to consider the impact of their own development traffic on the network the impact would be far less than the modelled forecast indicates. The majority of growth in demand is due to background growth, however this cannot be easily separated from growth attributable to the Chichester Local Plan and therefore this, alongside the existing congestion issues influences the required mitigation schemes, even though this is not a direct impact from the Local Plan development proposals alone.
- 9.9.4 The SATURN model was used to estimate demands impacting the SRN A27 Chichester Bypass split into LPR and committed development and background growth. SLA was undertaken at each of Fishbourne, Bognor, Whyke and Stockbridge Roundabouts on the SRN. For each junction, the SLA (2 way by direction) was undertaken for each approach arm in the 2014 Base Model and in the 535 DPA scenario Plan Year model (assumed to be 2039). This was used to estimate growth due to CDC proposed development and due to background growth. This also included an analysis of through traffic on the A27 by undertaking SLA.
- 9.9.5 In order to circumvent modelling limitations such as suppressed trips in the more congested AM and PM peak hours, the flow analysis was undertaken at AADT level by converting model AM and PM peak flows accordingly.
- 9.9.6 The results indicate that at Fishbourne junction, Chichester development contribute only 28% of the growth at the junction between 2014 Base Year and 2038 Local Plan year. At Bognor Junction this figure is also estimated at 28%. The figures at Stockbridge and Whyke Roundabouts are 14% and 18% respectively. This will be proportionately less when considering only new development proposed by the emerging Local Plan (i.e. that which is not already committed), which is approximately a third of the overall development envisaged by the Plan.
- 9.9.7 It is considered therefore, that CDC would be expected to contribute these proportions towards scheme mitigation costs. It should also be noted, as stated in Section 5.5, the majority of the A27 Chichester bypass are over capacity in the base year model (2014), with the exception of Portfield Roundabout. All the junctions are shown to be over capacity without the Local Plan traffic added in. Therefore, it is clear that the issues seen at these junctions are not just a result of the Local Plan and committed development traffic, but other background and existing traffic also impact on performance of the junctions.

9.10 Further work

- 9.10.1 The schemes outlined above are high level concept designs with estimated high-level costs which would require further assessments to finalise design and costs as per below:
- Possible planning application
 - Detailed design
 - Possibly a business case
 - C2 and C3 utility searches/ diversions / costings
 - land ownership confirmation
 - Environmental and Ecology assessments

- Ground investigation exercises

9.10.2 The next steps are likely be a business case assessment to be undertaken for each of the proposed A27 mitigation schemes in order to refine the cost into more developed estimates which can then be used to direct, and in some cases secure, funding streams.

9.11 Current Status of SPD

9.11.1 The SPD which secures the developer contributions is unlikely to have sufficient funding to secure the initial works for Fishbourne and Bognor Road schemes in the short term and it is not forecast to secure sufficient funds to support the entire A27 and City Centre mitigation package by the end of the Local Plan period of 2039.

9.12 RIS 3 Process

9.12.1 The Department for Transport (DfT) has begun preparing for the next road investment period for RIS 3 as published in December 2021 which covers the Road Investment Strategy 3 (RIS3), period for 1 April 2025 to 31 March 2030.

9.12.2 The report outlined the objectives for developing RIS3, which are improved safety for all, improved environmental outcomes, improved network performance, growing the economy, managing and planning the Strategic Road Network for the future and develop a technology-enabled network.

9.12.3 As part of the 32 projects being developed the National Highways have listed the A27 Chichester improvements which covers all the junction set out in this report. There is no certainty on securing budgets beyond the current feasibility stage, however CDC and WSCC are working with NH to promote the scheme coming forward.

10 Modelling Uncertainty and Monitor and Manage

10.1 Introduction

- 10.1.1 The modelling undertaken for the Local Plan, has utilised national guidance and methodologies (issued by DfT) to produce a traffic model to assess the trips generated by the proposed development in Chichester, the neighbouring Councils and the level of background growth which come from wider based trips travelling to/from and through the area.
- 10.1.2 The Local Plan Review covers the eighteen-year period 2021 to 2039. To estimate future impacts using the transport model, forecast data from the DfT's National Trip End Model (NTEM) model is extracted using a programme called TEMPro. At the time of undertaking the modelling TEMPro v7.2 was utilised, as the latest version. DfT formally released V8.0 in December 2022. The latest version has lower levels of growth as discussed further in Section 6.2.
- 10.1.3 In addition, DfT have also developed an Uncertainty Toolkit which explores a number of alternative possible future scenarios in terms of trip making patterns. In terms of impacts within the Chichester area, the two scenarios which are potentially likely to have the greatest impacts are:
- **Behavioural Change:** This makes assumptions on issues such as future way of working and develops further the impacts that have been seen during the COVID pandemic, with home working becoming more prominent. It is assumed that this trend will continue in the future.
 - **Regional:** This assumes that there will be a tendency for reduced levels of growth away from London, the South East and the East and more in the North and West
- 10.1.4 The datasets relating to these alternative scenarios was also released in December 2022. DfT have also stated that whilst NTEM is based on a Core Scenario, no one scenario is more likely to come forward than any other. Therefore, the consideration of alternative future scenarios should be considered, and this is discussed further in Section 6.2.
- 10.1.5 Given the long period of time of the Local Plan any change in forecasting factors as a result if the uncertainty in future travel patterns and behaviour could gave a material impact on the Local Plan outputs and therefore a Monitor and Manage approach is recommended.

10.2 TEMPro Growth Factors

As stated above, the current modelling used to inform the transport study is based DfT's TEMPro software version 7.2 and associated NTEM dataset 7.2. However, now that DfT have released NTEM version 8, a comparison of data has been undertaken to understand how this may impact upon the modelling outputs. A comparison of traffic growth factors for AM peak, inter peak and PM peak is shown in Table 10-1.

Table 10-1 TEMPro 7.2 and 8.0 Growth Factors – Car Driver 2019 to 2031

Time Period	TEMPro 7.2		TEMPro 8.0	
	Origin	Destination	Origin	Destination
AM Peak	1.090	1.097	1.071	1.080
Inter Peak	1.120	1.121	1.088	1.088
PM Peak	1.097	1.093	1.079	1.073

- 10.2.1 The data indicates that the level of growth is lower in TEMPro 8.0, when compared to TEMPro 7.2 between 2019 and 2031. DfT have indicated that whilst the number of dwellings may not be substantially different between the two datasets, there is reduced traffic growth as a result

of falling population and small household size. As a result there is a need to review and comment and define the possible differences in predicted changes in travel demand in the future for each scenario used for the Chichester Local Plan, as the model may have overestimated the potential future impacts.

10.3 Dealing with Uncertainty

10.3.1 A comparison of the TEMPro 7.2 data used within the modelling and the growth rates associated with Behavioural Change and Regional Change Scenarios, included within DfT's Uncertainty Toolkit are provided in Table 10-2 and Table 10-3

Table 10-2 TEMPro 7.2 and 8.0 Growth Factors – Car Driver 2019 to 2031 (Behavioural Change)

Time Period	TEMPro 7.2		TEMPro 8.0	
	Origin	Destination	Origin	Destination
AM Peak	1.090	1.097	0.997	1.004
Inter Peak	1.120	1.121	1.032	1.031
PM Peak	1.097	1.093	1.013	1.007

Table 10-3: TEMPro 7.2 and 8.0 Growth Factors – Car Driver 2019 to 2031 (Regional Change)

Time Period	TEMPro 7.2		TEMPro 8.0	
	Origin	Destination	Origin	Destination
AM Peak	1.090	1.097	1.057	1.067
Inter Peak	1.120	1.121	1.075	1.075
PM Peak	1.097	1.093	1.066	1.060

10.3.2 The data indicates that the levels of traffic growth expected within Chichester are lower in each of these scenarios than has currently been modelled.

10.4 Way Forward

10.4.1 Given the uncertainty in future demand and whether the current model forecasts will be realised and also whether the mitigation schemes will be required, it is considered that a monitor and manage approach will be adopted. This will monitor network performance in future with a view to informing whether and when mitigation schemes should be implemented.

10.4.2 Discussions with NH and WSCC have estimated that the Fishbourne scheme would be implemented first as is preferred by NH. It is also a more affordable scheme to implement and therefore will allow an element of the SRN infrastructure improvement to come forward earlier in the Local Plan period (funded by 2028), rather than the Bognor Junction scheme (which may not be fully funded until 2036).

10.4.3 Monitor and Manage would then determine whether additional mitigation, beginning with Bognor roundabout should be implemented subject to whether network operations on the SRN determined so. The work undertaken by Stantec to inform the Monitor and Manage approach is provided as Appendix K.

10.4.4 The likely changes in forecasting and better understanding how uncertainties in forecasting, and subsequent impacts on the Local Plan Review is key moving forward. As stated above the current Local Plan Review has used historical methodology and data to reach the forecast outputs and define the required mitigation works. The revised 'Core' TEMPro data, along with the data included within alternative scenarios, demonstrated that growth is likely to be lower than is currently predicted within the models. The outcome of this is that the mitigation identified may not actually be required within the future. This will particularly be the case

where the junctions are currently shown to be just over capacity in the current modelling. With reduced levels of growth, these may operate within capacity.

11 Summary and Conclusions

11.1 Introduction

- 11.1.1 This report has set out the findings of a considerable body of work undertaken by Stantec, to understand the likely impacts of a future development growth option considered for the Local Plan Review in relation to the operation of the highway network. Using modelling techniques and assumptions which are based on approved methodologies and best practice, the growth scenario has been appraised against a Reference (baseline) position. The Local Plan period extends to 2039, with Local Plan development proposals for the period 2021 to 2039. The CATM 2014 Base year model has been used as the basis from which 2037 Reference Case forecasts have been developed. It is considered that the 2037 Reference Case forecasts are sufficiently robust to account for the two-year period between 2037 and 2039. This was explained in Section 4.2.
- 11.1.2 The focus of the modelling is on the impacts in the south of Chichester District, with a separate assessment and report produced, examining impacts in the north of Chichester District.
- 11.1.3 The study follows on from work undertaken in 2018 that looked at three Local Plan scenarios. This study has focussed and tested a single Local Plan spatial scenario for the period to 2039.
- 11.1.4 The study has considered and tested mitigation options that include all mitigation proposed in the 2018 study that considered mitigation across four geographic areas of the study area. These include the A27 Corridor, Chichester City, Wider Chichester Area and Neighbouring Local Authorities. The study has indicated that the 19 junctions identified as requiring mitigation in the 2018 study, are still relevant and this mitigation is still required to accommodate the proposed Local Plan development to 2039. The study has also identified the A286 Northgate/Oaklands Way junction mitigation in Chichester City, as additional mitigation as a result of the removal of the Southern Gateway scheme. This proposes signalling the existing priority junction.

11.2 Conclusion

- 11.2.1 In summary the key findings are that:
- The emerging Local Plan transport study evidence base has followed best practice to update the CATM model, develop future forecasts and undertake testing in order to understand the network impacts of the potential development scenario considered for the Local Plan Review to 2039.
 - In the baseline scenario without the emerging Local Plan development, a number of junctions already experience capacity issues. This is projected to get worse, when the traffic generation anticipated from the proposed development scenario considered for the Local Plan Review, without mitigation are included.
 - The study has indicated that, the impact of the forecast development up to 2039, requires a significant mitigation package, the majority of which is focused on the A27.
 - With the proposed mitigation in place, the network conditions are generally projected to be comparable to those in the baseline suggesting that the proposed junction mitigation has the potential to mitigate and accommodate the growth provided for in this scenario.
 - In total, 20 junctions have been identified to require mitigation across all three scenarios. They are broken down into four components comprising the A27 Corridor Junction, Chichester City, Wider Chichester Area and Neighbouring Local Authorities.
 - The anticipated costs of the overall highway mitigation are estimated at £89m to £134m for the A27 schemes (based on latest WSCC estimates) and £2.6m for schemes on

WSSC network within Chichester. A ranking or prioritisation of the provision of mitigation on the A27 has been proposed. This prioritises the mitigation of the A27 Fishbourne junction and Bognor junction as the top two junctions that would require mitigation first.

- An analysis of impacts of traffic from committed and Local Plan developments on the SRN junctions has been undertaken. This helps to understand the impact of the development as a proportion of all traffic growth, and hence inform an apportionment of costs. This concludes that up to 28% of traffic growth between the base year and end of plan period, can be linked to committed and proposed (but not currently committed) Local Plan developments in Chichester. The modelling shows that all the junctions on the A27 Chichester bypass are well over capacity, even before adding in the Local Plan development and with the exception of Portfield Roundabout are actually shown to be over capacity in the base model year (2014) in one or both peaks.
- In respect of the neighbouring Councils of Arun District and Havant Borough, the study suggests that, with mitigation in place, the impacts of the emerging Local Plan development on network performance, are likely to be comparable to the baseline scenario.
- In respect of Arun District, the A259 is the main link connecting Bognor Regis and Littlehampton. The A259/B2132 Comet Corner junction and the nearby A259/Yapton Road junction will require mitigation to accommodate even the Reference Case and 2039 Local Plan. The agreed mitigation measures for the A259/B2132 Comet corner junction included in the Arun Local Plan are included in the 2039 Mitigated Local Plan scenario and the capacity of the junction is anticipated to be adequate if the previously agreed mitigation measures are implemented.
- In respect of Havant Borough, the impact of the Local Plan Review development results in a negligible impact on the operation of the A27 Havant Bypass roundabout and its slip roads and the A3(M)/A27 junction. The majority of traffic within the area is identified to run east west and north south along the A3(M) and the A27 thus not effecting the local road network within Havant itself.
- The study has also considered the other neighbouring local authorities comprising the South Downs National Park Authority (SDNPA), East Hampshire District Council (EHDC), Waverley Borough Council (WBC) and Horsham District Council (HDC). The latter three authorities are on the periphery of the plan area although projected demands from all four local authorities are included in the background growth of future travel demand.
- The study has undertaken an overview of options which could be considered in the medium term to long term as alternate or complementary mitigation measures to the junction schemes proposed for Chichester. The report provides an overview of the sustainable options particularly as to whether they are a viable sustainable option. The sustainable options considered are centred around mode change away from the car such as through potential to use park and ride, bus, cycling and walking as well as parking management to encourage this modal shift where possible.

11.2.2 It is generally now considered that potential sustainable mitigation measures should have priority over highway capacity mitigation and hence a need to shift away from a 'Predict and Provide' approach towards a 'Monitor and Manage' approach. Given the long-term horizon of the Local Plan, there will always be uncertainty about the level of growth in travel that may materialise. Some significant changes in travel behaviour alongside technology advances have been seen in recent times, and the COVID-19 pandemic has accelerated these changes with significantly more people working at home and shopping online (virtual mobility). While the long-term impacts on travel behaviour are unknown, it has been demonstrated during these challenges that the potential exists to undertake activities remotely without the need to travel, by working from home or shopping online.

11.2.3 A sensitivity test with 700 dpa has been undertaken. It is concluded that in the main, the 700 dpa demands can generally be accommodated by the mitigation proposed for the 535 dpa core test, although at the Portfield roundabout and Oving junction, capacity issues get worse

with the 700 dpa demands and these junctions may need to consider further mitigation. As no schemes have been designed to date, it would be advisable to retain some cost against for future works against Portfield Roundabout as a minimum. It is unlikely there would be significant capacity in the network beyond 700 dpa, considering full mitigation package.

11.2.4 A high-level review of requirements for Gypsy and Traveller sites has been undertaken and concludes that given the dispersed nature of the sites these are very unlikely to have any significant impact on the highway network.

11.2.5 In conclusion, subject to securing the mitigation identified, the scale and distribution of development provided for in the emerging Local Plan is considered to have an acceptable impact on the highway network through the plan period up to 2039.

11.3 Monitor and Manage

11.3.1 Given the level of uncertainty in relation to travel making patters, as supported by recent work undertaken in developing an Uncertainty Toolkit, it is recommended that a Monitor and Manage approach is adopted to review the mitigation requirements going forward. This approach should be agreed with National Highways and West Sussex County Council.

Appendix A Northern Sites Review

Appendix B Base Model Local Model Validation Report

Appendix C Reference Case Development List Assumptions

Appendix D Reference Case Scheme List Assumptions

Appendix E 2039 Flow Changes Without Mitigation

Appendix F 2039 Volume to Capacity (V/C%) Outputs

Appendix G 2039 Link Delay Outputs

Appendix H 700 DPA Sensitivity Test

Appendix I 2039 Flow Changes With mitigation

Appendix J A27 junction cost estimation uplifts for 2022 Rev A WSCC review

Appendix K Monitor and Manage Approach