Havant Borough Council Local Plan

Final Transport Assessment

On behalf of **Havant Borough Council**

February 2019

Strategic Transport
Hampshire County Council
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CONTROL SHEET

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Glossary

Term	Definition
AM peak	The busiest hour on the highway network between 07:00 and 10:00
AQMA	Air Quality Management Area
ARCADY	A standard junction modelling package used in this Transport Assessment for assessing roundabout layouts
CIL	Community Infrastructure Levy
DfT	Department for Transport
DM	Do-Minimum scenario, providing the impacts on the highway network of the proposed Local Plan developments before any mitigation is considered
DS	Do-something scenario, includes Local Plan development and mitigation measures
GDM	The Gateway Demand Model makes up part of the Sub Regional Transport model and predicts demand for travel from ports and airports
HBC	Havant Borough Council
HBLP2036	Havant Borough Local Plan 2036
HCC	Hampshire County Council - the highways authority
HE	Highways England - responsible for operating, maintaining and improving England's motorways and major A roads
IDP	Infrastructure Development Plan
LCWIP	Local Cycling Walking Investment Plan
LEIM	The Local Economic Impact Model makes up part of the Sub Regional Transport Model and uses inputs including transport costs to forecast the quantum and location of households, populations and jobs
LEP	Local Enterprise Partnership
LinSig	A standard junction modelling package used in this Transport Assessment for assessing signalised junctions
LTP	Local Transport Plan
MDA	Major Development Area
MDM	The Main Demand Model makes up part of the Sub Regional Transport Model and predicts when (time of day), where (destination choice) and how (choice of mode) journeys are made
MSOA	Middle Super Output Area - geographic area within the Census
NCN	National Cycle Network - a network of signed paths and routes promoted by the charity Sustrans
NPPF	National Planning Policy Framework - the framework within which locally-prepared plans for housing and development should be produced
Paramics - microsimulation	Industry standard traffic modelling software developed by SYSTRA Ltd that provides microscopic traffic simulation modelling of individual vehicles within a given network area
PCT	Propensity to Cycle Tool - an evidence-based tool for planning for cycling

Term	Definition
PCU	Highway impacts are measures in terms of Passenger Car Units or PCUs. A PCU is a measure of the effect that each type of vehicle has on capacity. It is derived from the average distance between vehicles of the same type. For example, a car has a PCU value 1. A Heavy Commercial Vehicle has a PCU value of 1.75 as typically there is a greater distance between these types of vehicles than cars
PM peak	The busiest hour on the highway network between 16:00 and 19:00
PRC	Performance Ratio of Capacity - term used for signalised junction modelling output, whereby a PRC greater than 100% represents a junction operating at or over theoretical capacity.
PRoW	Public Right of Way
PTM	The Public Transport Model makes up part of the Sub Regional Transport Model and determines routes and services chosen by public transport passengers
PUSH	Partnership for Urban South Hampshire - a voluntary partnership of all the local authorities in South Hampshire together with Hampshire County Council to support the sustainable economic growth of the sub region and to facilitate the strategic planning functions necessary to support that growth
RFC	Ratio of Flow over Capacity - term used for priority junction and roundabout modelling outputs whereby a ratio of less than 0.85 represents a junction performing below its theoretical capacity
RTM	The Road Traffic Model makes up part of the Sub Regional Transport Model and determines the routes taken by vehicles through the road network and journey times, accounting for congestion
SEHRT	South East Hants Rapid Transit
SPD	Supplementary Planning Document
Solent Transport	A partnership of the four Transport Authorities in the South Hampshire Sub-Region (Hampshire County Council, Portsmouth and Southampton City Councils and the Isle of Wight Council
SRN	Strategic Road Network
SRTM	Sub Regional Transport Model - a multi-modal transport model and is compliant with Department for Transport WebTAG guidance
STATS19	Records of personal injury accidents on public roads that are reported to the police, and subsequently recorded, using the STATS19 accident reporting form
TA	Transport Assessment
V/C	A ratio of flow (volume) over capacity used to assess junction or road capacity
WebTAG	The Government's Transport Analysis Guidance which provides information on the role of transport modelling and appraisal, and how the transport appraisal process supports the development of investment decisions to support a business case

1. Introduction

This Borough Wide Transport Assessment has been produced by Hampshire Services[1] on behalf of Havant Borough Council (HBC) as part of the evidence base to support the emerging Havant Borough Local Plan (HBLP2036).

A Local Plan sets out a vision and a framework for the future development, growth and prosperity of the Borough. It also must seek to meet Government housing targets for the local area, and to that end, identify sites considered suitable for development.

Government policy requires all Local Plans to be supported by a robust transport evidence base; this is normally produced in the form of a strategic Transport Assessment (TA). Such a TA comprises an assessment of the transport implications of proposed development.

This TA describes the availability and operation of transport infrastructure and networks within the Borough, and, using scenarios tested through a sub-regional strategic transport model, reflects on the potential transport related implications of the proposed land allocations within the Local Plan. It also considers the measures that could be employed to mitigate any significant transport impacts resulting specifically from these allocations. The TA considers, but does not necessarily seek to mitigate, background growth in traffic.

As noted in other documents supporting the Local Plan, a Transport Assessment would preferably have been produced in time to inform the Regulation 18 Draft Local Plan development work (published in January 2018). However, delays in transport modelling work beyond the Borough Council's control have meant that this was not possible. Hampshire Services was commissioned in Spring 2018 to complete the Transport Assessment ready to inform the Regulation 19 Pre-Submission draft of the Local Plan.

[1] Hampshire Services is the trading name for professional consultancy services offered by Hampshire County Council. Hampshire Services does not act as the Highways Authority, who have been involved separately as a stakeholder throughout the development of this Transport Assessment.

1.1. Report structure

The report is structured as follows:

- Section 2 provides a summary of the policies and context for the HBC Local Plan and this Transport Assessment;
- Section 3 describes the existing transport infrastructure and networks within the Borough, and connections with surrounding authority areas
- Section 4 describes the scope and use of the Sub Regional Transport Model and discusses the modelling methodology used for the assessments therein;
- Section 5 provides a comparative assessment between the Baseline model scenario, providing the modelled future level of congestion without any further Local Plan development and the Do-Minimum (DM) scenario, providing the impacts on the highway network of the proposed Local Plan developments before any mitigation is considered
- Section 6 identifies and describes schemes to mitigate any "significant or severe" impacts from the DM scenario and describes the results of a final "Do-Something" model run, where mitigation options are considered, and discusses any residual impacts
- Section 7 proposes proportionate contributions from relevant developments towards mitigation schemes

1.2. Limitations and exclusions of the Transport Assessment and requirements for further study

1.2.1. Analysis and findings from assessments documented in this report should be interpreted together with an understanding of the key assumptions made in this study, as set out below.

1.2.2. The Transport Assessment considers traffic in Havant in future scenarios. It uses data provided by the Department for Transport to understand how traffic will grow in other neighbouring boroughs, and how this will impact on Havant. This government data uses housing projections from adopted Local Plans - however, neighbouring areas are also in the process of updating their Local Plans and are likely to include higher housing levels than contained within the government data.

1.2.3. The transport assessment does not directly cover Hayling Island. A separate study and modelling approach have been undertaken with regard to Hayling Island, reflecting its geography as an island, with one road bridge connecting it with the rest of the borough of Havant. Traffic impacts on the rest of Havant arising from proposed development on Hayling Island are included in the traffic modelling within this, main, Havant Transport Assessment.

1.2.4. Additionally, where the two models meet and overlap at the Langstone A27 junction up to the junction of Park Road North/ New Road/ Elmleigh Road/ B2149

junction, both model outputs have been used to assess junction capacity and propose mitigation measures.

1.2.5. The performance assessments within the Sub-Regional Transport Model (SRTM) adopt a 'worst case scenario' approach which is based on unconstrained traffic growth on the highway network as a whole, and at individual junctions. In the SRTM, unconstrained demand means that the decision to travel by car will not be constrained by other factors such as cost of travel (fuel, parking, time, etc.), comfort and safety factors, or road quality. However, this does not imply that capacity constraints along the network will not affect route choice but simply that any road users wishing to access the local highway network during a specific time can do so unconstrained. This approach ensures robustness of the assessments on the basis that, if unconstrained demand can be accommodated (along with reasonable mitigation), the Local Plan will be sound on transport grounds.

1.2.6. The assessment considers all travel demand ('demand flows' in traffic modelling terms) that intends to go through individual junctions and assumes all of the travel demand can reach the specific junction during the modelled period of time. In reality, it is commonly recognised that some of the travel demand may not materialise in the modelled hours due to congestion elsewhere in the network, which leads to lower actual flows arriving during a given period of time.

1.2.7. The SRTM used in this study allows for re-assignment of traffic. That is, it assumes that some drivers may divert if there is congestion on their intended route. However, the SRTM is a strategic model, which uses zones based on census output areas and boundaries. Therefore, the impact of the local plan development may be under- or over-estimated at the local level depending on the size of the zones and how they have been 'loaded' onto the local highway network.

1.2.8. The junctions considered in this Transport Assessment are those considered to be critical to the success of the Local Plan developments and identified by the model as most likely to require works at the strategic level to accommodate the Local Plan development. It should be noted that the list of junctions that may require mitigation is not exhaustive and other junctions and links within the modelled area may also require improvements in further studies as the Local Plan is taken forward. It is also important to note that the mitigation presented is to demonstrate that the level of development proposed is capable of mitigation – it is not intended to present a preferred package of works or to advocate specific junction designs.

1.2.9. It is the function of this TA to assess the impact, as a whole, of the development proposed through the Local Plan. Whilst this TA demonstrates that the overall Local Plan development, if accompanied by the mitigation measures proposed, can be accommodated on the network without causing severe traffic impacts within the Borough, it is not designed to test or propose mitigation to deal with the effects of individual development sites. The local transport impacts of each of the Local Plan developments will still have to be addressed in Transport Assessments accompanying planning applications in accordance with guidance in the National Planning Policy Framework (NPPF) 2018.

2. Policy overview

2.1.1. The following section sets out the relevant policy framework for this Transport Assessment at a national, regional and local level.

2.2. National Policy

National Planning Policy Framework

2.2.1. An updated National Planning Policy Framework (NPPF)[2] was released in July 2018. It sets out the Government's planning policies and how these should be applied. It establishes the framework within which locally-prepared plans for housing and development should be produced. It specifies the policies that should be followed to in relation to transport, with a strong focus on achieving sustainable development.

2.2.2. Section 102 of NPPF states that transport should be considered from the earliest stages of plan making so that:

> *"a) the potential impacts of development on transport networks can be addressed;*
>
> *b) opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised – for example in relation to the scale, location or density of development that can be accommodated;*
>
> *c) opportunities to promote walking, cycling and public transport use are identified and pursued;*
>
> *d) the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; and*
>
> *e) patterns of movement, streets, parking and other transport considerations are integral to the design of schemes and contribute to making high quality places."*

2.2.3. Furthermore, Section 104 identifies that significant development should be focused at locations which are, or can be made, sustainable e.g. by reducing the need to travel. Moreover, NPPF states that planning policies should:

> *"a support an appropriate mix of uses across an area, and within larger scale sites, to minimise the number and length of journeys needed for employment, shopping, leisure, education and other activities;*

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2 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/733637/National_Planning_Policy_Framework_web_accessible_version.pdf

b be prepared with the active involvement of local highways authorities, other transport infrastructure providers and operators and neighbouring councils, so that strategies and investments for supporting sustainable transport and development patterns are aligned;

c identify and protect, where there is robust evidence, sites and routes which could be critical in developing infrastructure to widen transport choice and realise opportunities for large scale development;

d provide for high quality walking and cycling networks and supporting facilities such as cycle parking (drawing on Local Cycling and Walking Infrastructure Plans).

e provide for any large scale transport facilities that need to be located in the area, and the infrastructure and wider development required to support their operation, expansion and contribution to the wider economy. In doing so they should take into account whether such development is likely to be a nationally significant infrastructure project and any relevant national policy statements; and

f recognise the importance of maintaining a national network of general aviation airfields, and their need to adapt and change over time – taking into account their economic value in serving business, leisure, training and emergency service needs, and the Government's General Aviation Strategy"

2.2.4. In allocating sites for development plans, NPPF states it should be ensured that:

"a appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;

b safe and suitable access to the site can be achieved for all users; and

c any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree."

2.2.5. NPPF Section 111 also provides parameters for setting of local parking standards and states that:

"All developments that will generate significant amounts of movement should be required to provide a travel plan, transport statement or transport assessment so that the likely impacts of the proposal can be assessed".

Transport evidence bases in plan making and decision taking

2.2.6. The Government's Planning Practice Guidance for Local Plans includes guidance on 'Transport evidence bases in plan-making and decision taking"[3]. It sets out guidance for the development of a "*robust transport evidence base*" including the need to:

- *"consider the cumulative impacts of existing and proposed development on transport networks"* and
- *"assess the quality and capacity of transport infrastructure and its ability to meet forecast demands."*

Infrastructure Act (2015)

2.2.7. Parliament introduced the Infrastructure Act in 2015. This act enabled the creation of Highways England, who are a key consultee for the plan, and set out measures to streamline delivery of transport schemes. It also provided the mandate for a new Cycling and Walking Investment Strategy.

Cycling and Walking Investment Strategy (DfT 2017)

2.2.8. This first statutory strategy of its kind, published in 2017, aims to *"make cycling and walking the natural choices for shorter journeys, or as part of a longer journey"*[4]. The strategy outlines sources of funding for cycling and walking improvement schemes and provides guidance for Local Authorities to produce their own Local Cycling and Walking Infrastructure Plans (LCWIPs) to help them identify and deliver the most appropriate actions to achieve the Government's goal of doubling cycling trips by 2025.

2.3. Strategic and Sub-Regional Policy

2.3.1. Regionally, Havant Borough Council works with a number of other organisations involved in delivery and management of transport networks; these include:

- Hampshire County Council – the Highway Authority
- Highways England – responsible for operating, maintaining and improving England's motorways and major A roads, including the A3(M) and A27 cutting through Havant
- Partnership for Urban South Hampshire (PUSH) – voluntary partnership of all the local authorities in South Hampshire together with Hampshire County Council to support the sustainable economic growth of the sub region and to facilitate the strategic planning functions necessary to support that growth

[3] https://www.gov.uk/guidance/transport-evidence-bases-in-plan-making-and-decision-taking

[4] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/603527/cycling-walking-investment-strategy.pdf

- Neighbouring Local Authorities and their respective Highways Authorities, including those not in PUSH - in particular, Chichester and West Sussex
- Solent Transport - coordinates strategic transport planning in the PUSH area
- Solent Local Enterprise Partnership (LEP) - a private/public partnership working with local partners to promote economic growth across the region
- Public Transport Operators and Network Rail

2.3.2. Policies developed by, or with, these organisations relevant to the Local Plan, are set out below.

Hampshire Local Transport Plan 2011-2031 (LTP3)

2.3.3. Highways England (HE) is responsible for the A3/A3(M) and A27 which route through Havant. Hampshire County Council (HCC) is the Highway Authority for the remaining highway network in Havant. Hampshire's Local Transport Plan 3 (LTP) is therefore applicable to development in Havant. The Hampshire LTP includes a broad strategy for South Hampshire, which was jointly developed with the other Solent Transport partners (2.3.12). Specific local measures and policies are contained in the Hampshire LTP.

2.3.4. The LTP contains a long-term strategy, covering the period 2011-2036, and a short term implementation plan (2014-2017), which taken together provide the transport policy context for the Local Plan. The LTP sets out three main priorities and 14 policy objectives for transport in Hampshire as a whole to 2031, these are set out in Table 1 below.

Table 1 LTP3 Priorities and Policy Objectives

Three main transport priorities of LTP3	
1	*"To support economic growth by ensuring the safety, soundness and efficiency of the transport network in Hampshire.*
2	*Provide a safe, well-maintained, and more resilient road network in Hampshire as the basic transport infrastructure of the county on which all forms of transport directly or indirectly depend, and the key to continued casualty reduction.*
3	*Manage traffic to maximise the efficiency of existing network capacity, improving journey time reliability and reducing emissions, thereby supporting the efficient and sustainable movement of people and goods*
Policy objectives of LTP3	
1	*Continue to work to improve road safety through targeted measures that deliver reductions in casualties, including applying a speed management approach that aims to reduce the impact of traffic on community life and promote considerate driver behaviour.*
2	*Work with district authorities to agree coherent policy approaches to parking, including supporting targeted investment in 'park and ride' to provide an efficient and environmentally sustainable alternative means of access to town centres, with small-scale or informal park and ride arrangements being considered as well as major schemes;*

3	*Promote, where they are stable and serve our other transport priorities, the installation of new transport technologies, including navigational aids, e-ticketing and smartcards, delivery of public transport information over the internet and on the move, and electric vehicle charging points.*
4	*Work with bus and coach operators to grow bus travel, seek to remove barriers that prevent some people using buses where affordable and practical, and reduce dependence on the private car for journeys on inter- and intra-urban corridors;*
5	*Maintain a 'safety net' of basic accessibility to services and support for independent living in rural areas, with Community Transport services as the primary alternative to the private car, including car-based provision such as Neighbourcare schemes, car clubs and shared taxis;*
6	*Work with rail industry partners and Community Rail Partnerships to deliver priorities for long-term rail investment; including improved parking and access facilities at railway stations, movement of more freight by rail, upgrades of existing routes and stations and (where viable) new or re-opened stations or rail links;*
7	*Ensure that travel from home to school affordably serves changing curriculum needs, underpins sustainable schools and maximises individual opportunities for education and training;*
8	*Improve co-ordination and integration between transport modes through better local interchanges, for example at rail stations.*
9	*Introduce the 'shared space' philosophy, applying Manual for Streets design principles to support a better balance between traffic and community life in towns and residential areas;*
10	*Contribute to achieving local targets for improving air quality and national carbon targets through transport measures, where possible and affordable;*
11	*Reduce the need to travel through encouragement of a highspeed broadband network, supporting the local delivery of services and in urban areas the application of 'Smarter Choices' initiatives;*
12	*Invest in sustainable transport measures, including walking and cycling infrastructure, principally in urban areas, to provide a healthy alternative to the car for local short journeys to work, local services or schools; and work with health authorities to ensure that transport policy supports local ambitions for health and well-being.*
13	*Over the longer term, develop bus rapid transit and high quality public transport provision in South Hampshire as a strategic transport direction, to reduce car dependence and improve journey time reliability;*
14	*Outline and implement a long-term transport strategy to enable sustainable development in major growth areas."*

2.3.5. Chapter 7 of the LTP sets out the South Hampshire Joint Strategy. This chapter sets out a localised strategy covering the South Hampshire area, including Havant. It was developed jointly by the three Local Transport Authorities for the area - Hampshire County Council, Portsmouth City Council and Southampton City Council, working together as Transport for South Hampshire, now known as Solent Transport.

2.3.6. The strategy establishes the policy background for this part of the sub-region and sets a vision for:

> *"A resilient, cost effective, fully-integrated sub-regional transport network, enabling economic growth whilst protecting and enhancing health, quality of life and environment"*[5]

2.3.7. The strategy also sets out the following outcomes in order to deliver this vision (Figure 1)

Figure 1 South Hampshire Joint Strategy Outcomes

Outcome
Reduced dependence on the private car through an increased number of people choosing public transport and the 'active travel' modes of walking and cycling
Improved awareness of the different travel options available to people for their journeys, enabling informed choices about whether people travel, and how
Improved journey time reliability for all modes
Improved road safety within the sub-region
Improved accessibility within and beyond the sub-region
Improved air quality and environment, and reduced greenhouse gas emissions
Promoting a higher quality of life

HCC Highway Asset Management Policy and Strategy 2018

2.3.8. This strategy sets out Hampshire's priorities towards asset management of the highway network to ensure that roads are safe and accessible, and that maintenance provides good value for money.[6]

[5] http://documents.hants.gov.uk/transport/HampshireLTPPartALongTermStrategy2011-2031RevisedApril2013.pdf
[6] http://documents.hants.gov.uk/highways/ManagementPolicy.pdf

HCC's Walking and Cycling Strategies

2.3.9. These two separate strategies[7], introduced in late 2015 and early 2016, set out Hampshire County Council's aspirations for walking and cycling for the period to 2025.

HCC's Developer Travel Plan Guidance

2.3.10. The guidance[8] shows that travel plans are required for all planning applications where a Transport Assessment is required. The exception is residential applications where a travel plan is required for an application of 100 or more households.

PUSH Spatial Position Statement 2016

2.3.11. PUSH has a strong track record of working across boundaries to address development needs. Working through PUSH, the local authorities in the Solent prepared and published the PUSH Spatial Position Statement[9], which was adopted in June 2016. It sets out the overall need for and distribution of development in South Hampshire (although it should be noted that national guidance has since superseded the housing need and distribution assumptions developed by PUSH).

Solent Transport

2.3.12. Solent Transport is a partnership of the four Transport Authorities in the South Hampshire Sub-Region (Hampshire County Council, Portsmouth and Southampton City Councils and the Isle of Wight Council.

2.3.13. As noted above, the Solent Transport Authorities (excluding Isle of Wight, who were not members at that time) developed a joint strategy which is contained in all, and sets the context for, their respective LTPs.

2.3.14. The Solent Transport authorities are committed to the Transport Delivery Plan (2012-2036)[10] which sets out a scope of schemes to deliver within the period, and an overall approach to achieving this. Associated with this is a Public Transport Delivery Plan (2014-2036)[11] which contains details of aspirations for improvements to public transport in Havant including an expectation to see proposals from the West of Waterlooville development; creation of five public transport hubs (including one at Havant rail station); and, in the longer term, extension of an existing bus rapid transit (BRT) network to include links between Havant and Portsmouth.

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[7] https://www.hants.gov.uk/transport/strategies/transportstrategies
[8] https://www.hants.gov.uk/transport/developers/travelplans/travelplanrequired
[9] https://www.push.gov.uk/work/planning-and-infrastructure/push-position-statement/
[10] http://documents.hants.gov.uk/transport-for-south-hampshire/TransportDeliveryPlan.pdf
[11] http://www.solent-transport.com/images/reports/transport-delivery-plan/public-transport-delivery-plan-140314.pdf

Solent Local Enterprise Partnership policy

2.3.15. Transforming Solent – Solent Strategic Economic Plan 2014-2020[12] sets out priorities for investment in transport infrastructure including recently delivered improvements to connectivity to the key employment site, Dunsbury Hill Farm, in Havant.

Network Rail Route Studies

2.3.16. The current adopted strategic plan for Network Rail's Wessex Route, which covers all lines / stations in Havant borough, is the Wessex Route Study[13], which looks as far forward as 2043. Route studies identify potential future schemes rather than solid plans for improvement. Points of relevance to Havant include:

- Proposals for a flyover at Woking which could provide a slight improvement in journey times, and some additional train paths on the Portsmouth to London route (via Havant)
- Passing loops between Havant and Guildford to enable trains to overtake each other which could offer generalised journey time reductions on the London to Portsmouth route.
- Potential for additional hourly east-west services on the Brighton-Havant-Southampton route.

2.3.17. Given that the future of these schemes is unknown and unfunded, they have not been considered through the modelling work undertaken in this TA. However, to note if these were implemented, they could result in several extra hourly train services in each direction via Bedhampton, and extra movements through Warblington Station where the level crossings can sometimes generate considerable queues. Insufficient data is available to support testing of any scenarios at the time of completion of this transport assessment.

2.3.18. The train operating company South Western Railway had developed some shorter-term proposals for timetable enhancements for December 2018 onwards which would have introduced an additional hourly off-peak train service between Waterloo and Portsmouth via Havant (stopping service) as well as capacity enhancements via additional rolling stock. However, this timetable enhancement is now delayed and may be revised[14]. Independent of any timetable change, there will be some seat capacity enhancements on Portsmouth-Havant-Waterloo introduced late 2018 into 2019 through train lengthening.

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[12][12] https://solentlep.org.uk/media/1335/transforming-solent.pdf

[13] https://cdn.networkrail.co.uk/wp-content/uploads/2016/11/Wessex-Route-Study-Final-210815-1.pdf

[14] https://www.raildeliverygroup.com/media-centre/press-releases/2018/469774201-2018-07-09.html

South East Hampshire Rapid Transit

2.3.19. There are longer term proposals for a step-change on public transport provision in South Hampshire as part of the South East Hampshire Rapid Transit (SEHRT) project, developed through Solent Transport (2.3.12). This would have significant potential to reduce the number of car-based trips within the local area, including the number of trips from new development. The proposals, including schemes in the Havant area, are included in a funding proposal to the Department for Transport (DfT) under the 'Transforming Cities' fund. The DfT has accepted an Expression of Interest for these proposals however as the details of the proposals are not finalised, they have not been able to be considered within this TA. . This position might need to be revisited if any funding announcement is made in the future.

Other public transport policies

2.3.20. All public transport operators in the Borough were consulted through this TA process to understand if any further policies or significant changes to public transport were expected to be brought forward over the Local Plan period to 2036. No committed or funded policies or schemes were identified.

2.4. Local Policy

Havant Borough Core Strategy (March 2011)

2.4.1. The current adopted Core Strategy[15] , together with the Site Allocations Plan (2014) is Havant's adopted Local Plan, which describes the council's long-term vision and objectives for 2026. It contains a number of transport related policies:

- Policy CS20 sets out the Borough's policy on Transport and Access.
- DM11 "Planning for More Sustainable Travel" outlines how the council aims to increase integration of sustainable travel modes
- DM12 "Mitigating the Impacts of Travel" outlines how new developments must aim to mitigate their travel impacts

15 http://www.havant.gov.uk/sites/default/files/documents/ADOPTED%20CORE%20STRATEGY%20.pdf

Havant Borough Transport Statement (September 2012)[16]

2.4.2. The Havant Borough Transport Statement is a Hampshire County Council document developed in consultation with Havant Borough Council. It sets out the transport objectives and delivery priorities for the HBC area. A table listing opportunities for future transport schemes in the area is also contained in the statement[17].

Parking Supplementary Planning Document (SPD)

2.4.3. Havant's Parking Supplementary Planning Document (SPD)[18] was adopted 27th July 2016 and sets out the standards for car and cycle provision in the borough.

Havant Infrastructure Delivery Plan

2.4.4. The Infrastructure Delivery Plan sets out the types of infrastructure - facilities, installations and services - needed to ensure that the development being planned can be delivered and support the new and expanding communities. It sets out details of the current transport infrastructure, and planned provision/anticipated needs for the Local Plan period. A draft IDP was published on December 2017[19], alongside the draft Local Plan. The final IDP will reflect the findings of this TA report and the Hayling Island Microsimulation report.

Havant Developer Contribution Guide (2013, updated in April 2018)

2.4.5. This guide[20] is aimed principally at agents and developers who are involved in discussions on developer contributions on a regular basis. It explains how the Community Infrastructure Levy (CIL) will work alongside other types of developer contributions, such as planning obligations or highway agreements, that may be necessary to make a proposal acceptable.

2.4.6. The level of CIL payable, or "Chargeable Amount" is determined by the size and use of the proposed development and is set out in the Council's CIL Charging Schedule[21].

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16 http://documents.hants.gov.uk/transport/HBCTransportStatementDecember2013.pdf

17 http://documents.hants.gov.uk/transport/HBCTransportStatementPostAdoptionLiveSchemesDecember2013.pdf

18 http://www.havant.gov.uk/planning-and-environment/planning-policy/supplementary-planning-documents/parking-supplementary

19 https://www.havant.gov.uk/sites/default/files/documents/Draft%20Infrastructure%20Delivery%20Plan%20%28December%202017%29.pdf

20 http://www.havant.gov.uk/planning-and-environment/planning-policy/community-infrastructure-levy/developer-contributions-guide

21 http://www.havant.gov.uk/planning-and-environment/planning-policy/community-infrastructure-levy

3. Existing transport network and operation

3.1. Description of existing transport networks/corridors/demand

3.1.1. This section sets out details of the existing transport networks; road, rail, bus, cycling, walking and airports, as well as details on existing levels of accessibility, commuting, road safety and air quality. Section 6.4 discusses some potential opportunities with the greatest potential to make further improvements to the transport network in the future – notably bus and cycle networks.

3.1.2. The Borough of Havant has very good connections to the National Strategic Route Network and routes of sub-regional importance. These routes are shown with the proposed sites allocations (overleaf in Figure 2) and described below (traffic volumes are included where available):

- The A3(M) provides a motorway connection at the southern end of the A3 route connecting Portsmouth and London. The A3(M) offers connections to Havant at junctions 2,3,4 and 5. The A3(M) caters for up to 94,000 vehicles a day[22]
- The original A3 London Road[23] is to the west of the A3 (M) and routes from Portsmouth to London. It experiences up to 31,000 vehicles movements a day
- The A27 connects Havant to Portsmouth, the M27 motorway to the west, and Chichester and beyond to the east. In the vicinity of Havant, the A27 caters for an estimated 70,000 vehicles a day[24]
- A259[25] (known locally as 'the old A27' or Havant Road) runs between Emsworth and Folkestone in Kent. Close to Havant borough, it routes almost parallel with the A27 with an estimated 19,000 vehicle movements a day
- A2030 Bedhampton[26] Havant Road (west of Rusty Cutter) links Portsmouth with Havant with an estimated 23,000 daily vehicle movements close to Havant
- A3023 links Havant town with Hayling Island via a road bridge with an average of c.26,000 vehicles per day[27]
- B2147 New Brighton Road/Westbourne Road links Emsworth with more rural settlements to the east, with an average flow of up to 6,000 vehicle movements a day[28]

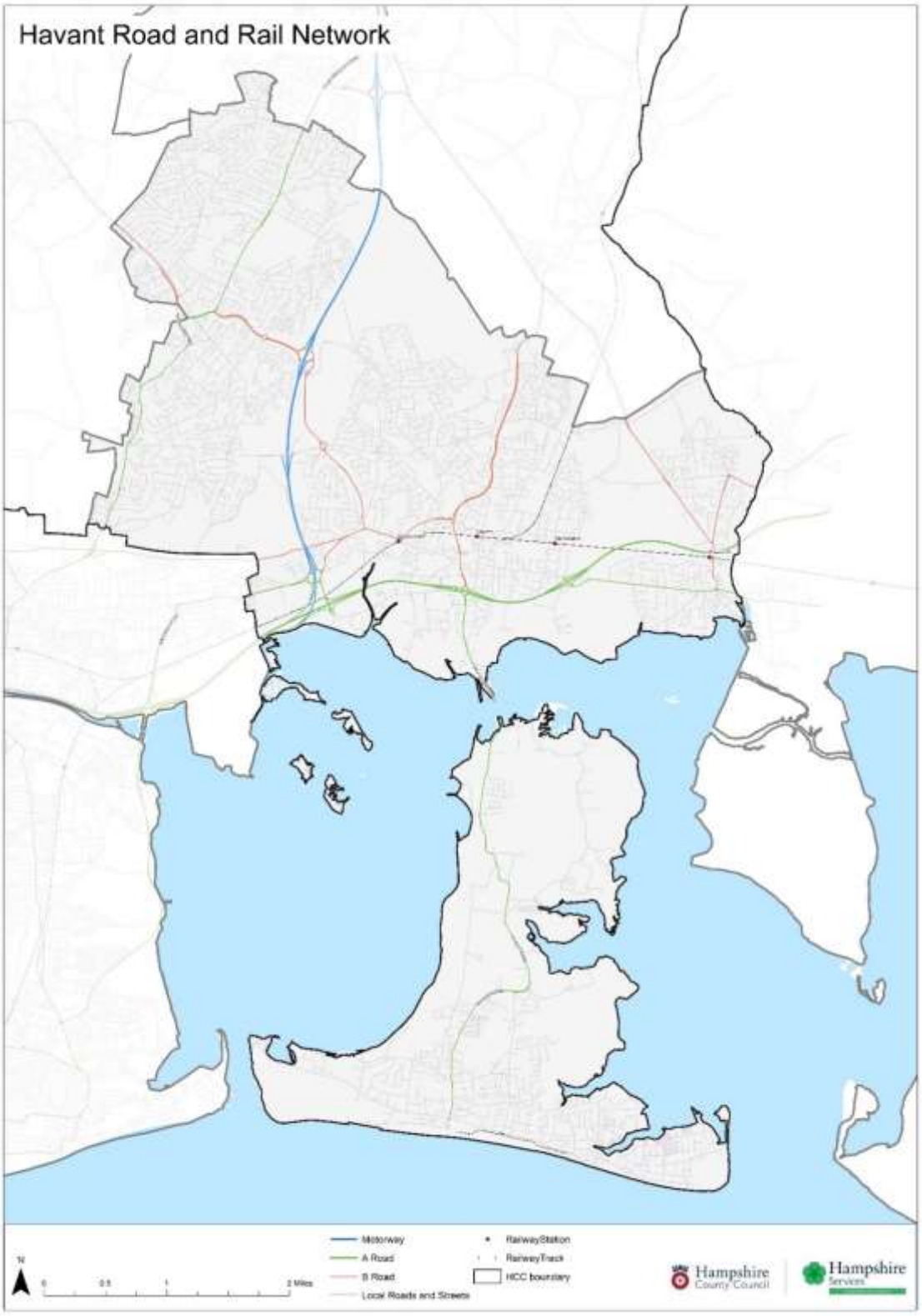
[22] https://www.dft.gov.uk/traffic-counts/cp.php?la=Hampshire#73577 Site 73577 2017 count data
[23] https://www.dft.gov.uk/traffic-counts/cp.php?la=Hampshire#48316 Site 48316 count data
[24] https://www.dft.gov.uk/traffic-counts/cp.php?la=Hampshire#36296 Site 36296 2017 estimated flows
[25] [25] https://www.dft.gov.uk/traffic-counts/cp.php?la=Hampshire#73581 Site 73581 estimated flows

[26] https://www.dft.gov.uk/traffic-counts/cp.php?la=Hampshire#73579 Site 73579 estimated flows
[27] HCC Permanent count survey data Site No: 71040001 2018
[28] HCC Automated Traffic Count survey data Site No: 8205 March 2018

- B2148 (Horndean Road/Comley Road/Whichers Gate Road/Manor Lodge Road links Emsworth with Rowlands Castle, with an average 12,000 vehicle movements a day[29]
- B2149 (Bedhampton Road/Petersfield Road) links Bedhampton with Rowlands Castle and Horndean
- B2150 (Hulbert Road/Hambledon Road) links Bedhampton with Waterlooville and areas to the west of the borough, with an average 31,000 vehicle movements a day[30]
- B2177 (Portsdown Hill) links the Borough with Wickham and Fareham (via the A32). Anecdotally this route is used as a popular commuter route and by some as an alternative to the A27/M27

[29] HCC Automated Traffic Count survey data Site No: 7876 September 2016 Manor Lodge Road
[30] HCC Automated Traffic Count survey data Sites: 8080 and 8081 July 2017 Hambledon Road

Figure 2 Havant Borough Road and Rail network



3.2. Rail Services

3.2.1. There are four rail stations in the Havant Borough (Figure 3); Bedhampton, Havant, Warblington and Emsworth. Bedhampton, Havant and Emsworth stations are managed by South Western Railway; Warblington station is managed by Southern.

Figure 3 Rail stations in Havant Borough

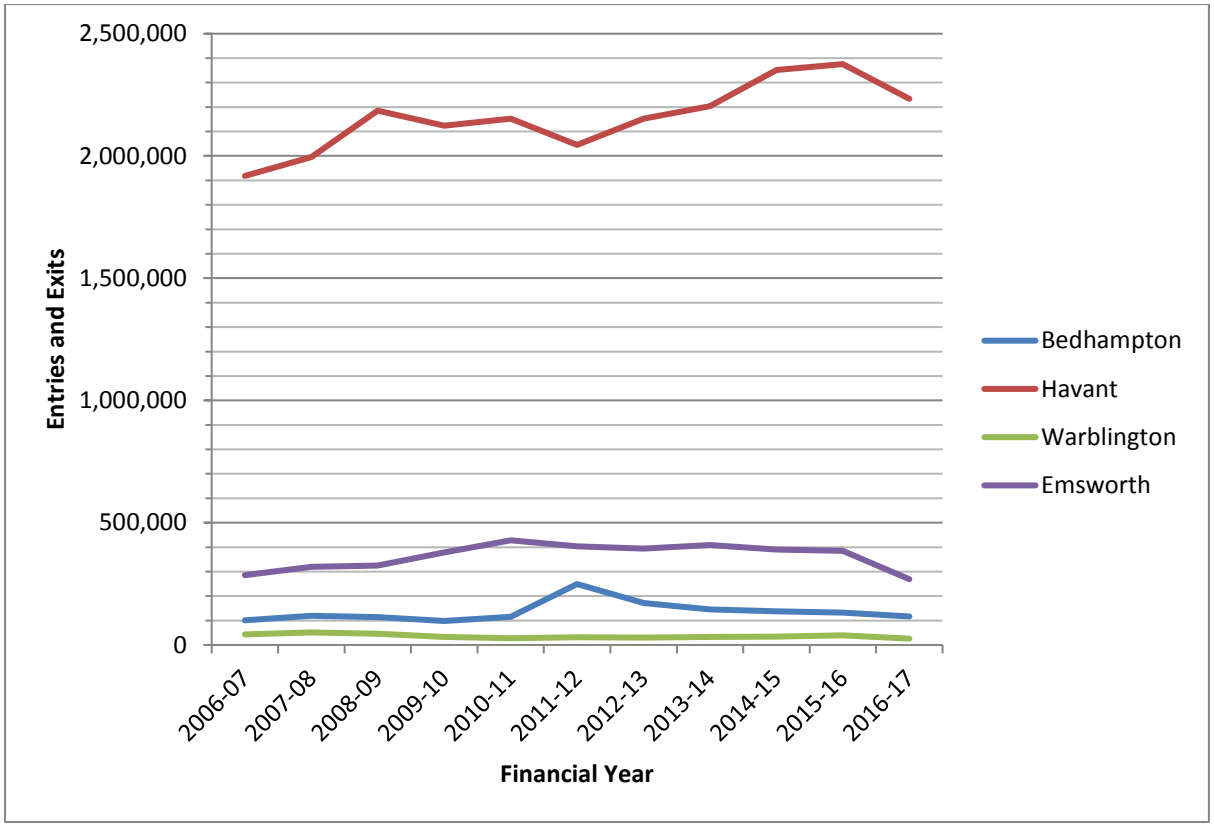
3.2.2. Passenger numbers at Bedhampton and Emsworth stations have remained fairly constant over the past decade. Patronage at Warblington station increased between 2013 and 2016 but saw a large decrease in 2016/17, along with Emsworth, in part, due to industrial action and timetable changes related to the train operating company, Southern[31]. Havant station has seen a steady increase in passenger numbers.

[31] http://orr.gov.uk/statistics/published-stats/station-usage-estimates

Table 2 Passenger numbers for Bedhampton, Havant, Warblington and Emsworth rail stations[32]

	Bedhampton		Havant		Warblington		Emsworth	
Year	Entries and Exits	% Change on Previous Year	Entries and Exits	% Change on Previous Year	Entries and Exits	% Change on Previous Year	Entries and Exits	% Change on Previous Year
2006-07	101,576		1,918,386		43,830		285,966	
2007-08	119,484	17.6%	1,995,906	4.0%	51,283	17.0%	318,992	11.5%
2008-09	113,680	-4.9%	2,184,698	9.5%	45,472	-11.3%	325,128	1.9%
2009-10	98,120	-13.7%	2,124,274	-2.8%	32,690	-28.1%	378,422	16.4%
2010-11	115,866	18.1%	2,153,160	1.4%	27,176	-16.9%	428,034	13.1%
2011-12	249,212	115.1%	2,045,494	-5.0%	31,204	14.82%	402,994	-5.9%
2012-13	171,554	-31.2%	2,152,396	5.2%	29,770	-4.60%	394,830	-2.0%
2013-14	145,468	-15.2%	2,203,114	2.4%	33,232	11.63%	408,364	3.4%
2014-15	136,952	-5.9%	2,351,802	6.7%	34,040	2.43%	390,052	-4.5%
2015-16	132,926	-2.9%	2,375,640	1.0%	38,764	13.88%	384,490	-1.4%
2016-17	117,084	-11.9%	2,233,776	-6.0%	25,932	-33.10%	269,038	-30.0%

Figure 4 Entries and Exits for Bedhampton, Havant, Warblington and Emsworth rail stations.



[32] Data courtesy of The Office of Rail and Road: http://orr.gov.uk/statistics/published-stats/station-usage-estimates

Table 3 Key destinations, location and access for Havant, Bedhampton, Warblington and Emsworth rail stations[33]

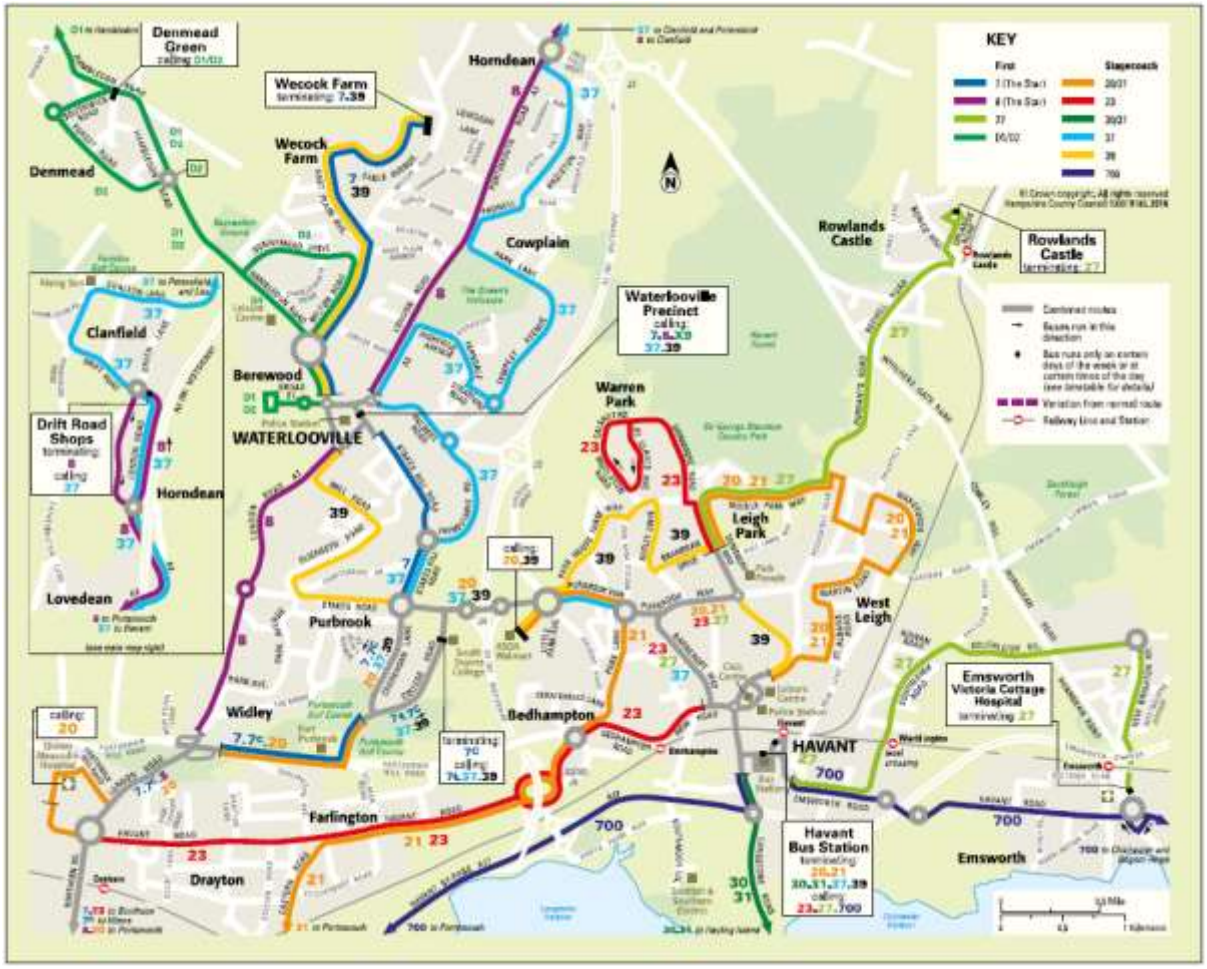
Station	Key destinations	Location and Access
Havant	Portsmouth, Southampton, London (Victoria and Waterloo), Littlehampton and Brighton	• Havant station is located within the Town Centre, approximately five minute walk from the bus station. • Due to its central location, the station is easily reached on foot or by car from elsewhere in Havant. • Car parking is available adjacent to both entrances, consisting, in total, of 492 spaces. 8 of these are allocated to accessible parking. • Compound and wheel rack bicycle parking is available at this station for a maximum of 92 bicycles. • The station is wheelchair accessible from Leigh Road or North Street. A footbridge (with lifts) connects the two platforms.
Bedhampton	Portsmouth, Littlehampton and London	• Bedhampton station is located approximately 1km West of Havant rail station, and South of most residential areas in Bedhampton. • The station can be accessed via footpath from the rest of Bedhampton. • There are no car parking facilities on site. • Wheel racks for up to 20 bicycles are provided on site, with CCTV security. • Although both platforms are wheelchair accessible via ramps, there are no staff help available for boarding trains alighting at this station.
Warblington	Portsmouth and Littlehampton	• Warblington station is situated approximately 1km East of Havant rail station. • The station is accessible by foot from Southleigh Road. • There are no car parking facilities at Warblington Station. There is no footbridge at the Station. • Bicycle storage is available for up to 30 cycles with CCTV security. • Both platforms are wheelchair accessible, and staff help is available for boarding trains.
Emsworth	Portsmouth, Southampton, London Victoria, Littlehampton and Brighton.	• Emsworth station is located approximately 3km East of Havant rail station. • The station is accessible on foot from North Street and Sultan Road. • Car parking is available on site via Sultan Road. • There are 15 cycle storage spaces available with CCTV security. • Both platforms are wheelchair accessible, and staff help is available for boarding trains.

[33] Station information sourced from http://www.nationalrail.co.uk/stations_destinations

3.3. Bus Services

3.3.1. Havant has an excellent bus network with links to other local urban centres such as Portsmouth, Petersfield, Emsworth, Hayling Island, Waterlooville, Drayton and Rowlands Castle. Most routes are operated by either Stagecoach or First Bus.

Figure 5 Bus routes in the Havant area[34]



3.3.2. Bus services in the Havant Borough link to the key trip attractors of Havant Town Centre, Havant Rail Station, Portsmouth (and onward connections to Gosport and the Isle of Wight), and the Queen Alexandra Hospital. Table 4 shows the primary services and destinations on the bus routes within the Havant Borough.

[34] http://documents.hants.gov.uk/passenger-transport/HavantTravelGuideApril2018.pdf

Table 4 Bus services in the Havant Borough

Operator	Service	Route
First Bus	7	Southsea - City Centre - Cosham - Crookhorn - Waterlooville - Wecock Farm
First Bus	8	Gunwharf - City Centre - Waterlooville - Cowplain - Clanfield
First Bus	27	Rowlands Castle - Havant - Emsworth
First Bus	7A	Southsea - City Centre - Cosham - Oaklands School
First Bus	7C	Gunwharf - City Centre - Cosham - South Downs College
First Bus	D1/D2	Waterlooville - Denmead - Hambledon
Meon Valley Community Bus Association	Route 4	West Meon - Soberton - Waterlooville
National Express	31	Portsmouth - Waterlooville - Guildford - London
Stagecoach	20	Havant - Q.A. Hospital - Portsmouth
Stagecoach	21	Havant - Leigh Park - Farlington - 21 Anchorage Park - Copnor - Portsmouth
Stagecoach	23	Leigh Park - Havant - Cosham - North End - Portsmouth - Southsea
Stagecoach	39	Havant - Leigh Park - Waterlooville - Wecock Farm
Stagecoach	54	Petersfield to Chichester
Stagecoach	700	Bognor Regis - Chichester - Havant - Portsmouth The Hard
Stagecoach	30/31	Havant - Hayling Island circular
Stagecoach	37/37X/38	Havant - Waterlooville - Clanfield - Petersfield Petersfield - Liss - Greatham - Selborne - Alton

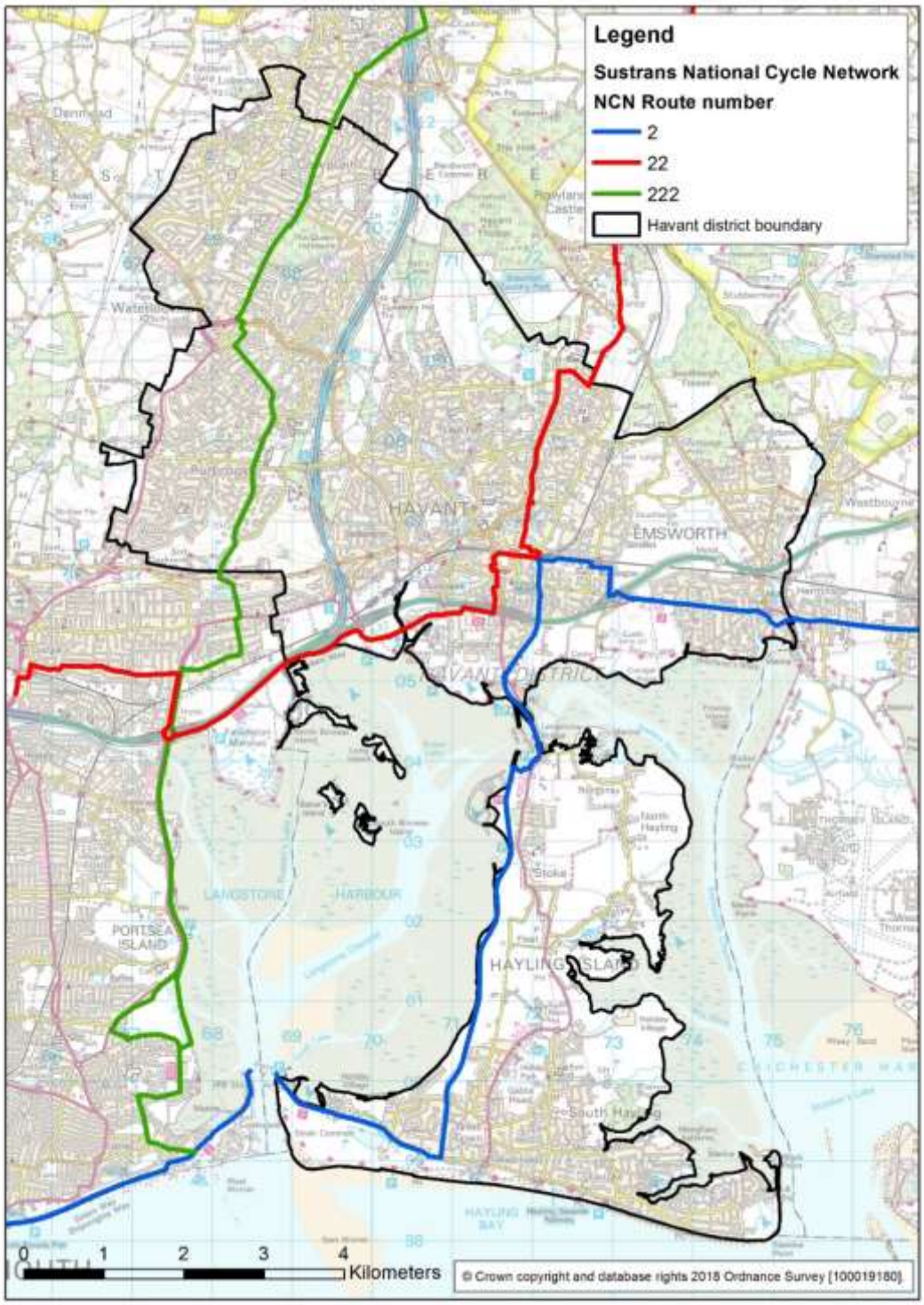
3.3.3. Havant Bus Station is situated in the centre of Havant and serves the majority of routes in the Borough.

3.3.4. In addition, there are community car share initiatives in Havant Borough: Hayling Island Carshare, Clanfield Carshare, Lovedean and Catherington Carshare.

3.4. Cycling

3.4.1. Cyclists in the Havant Borough have direct access to two long-distance cycle routes; Sustrans National Cycle Network (NCN) Routes 2 and 22. When completed, Route 2 will provide a cycle link from Dover in Kent to St Austell in Cornwall. Route 22 will connect London with Portsmouth through mostly on-road cycling. Figure 6 shows the NCN routes within the Havant area.

Figure 6 Sustrans National Cycle Network in the Havant area.



3.4.2. Local cycleway infrastructure in the Borough consists of a mix of on and off-road cycle routes. Havant's latest cycle network map can be found on Havant's website[35]

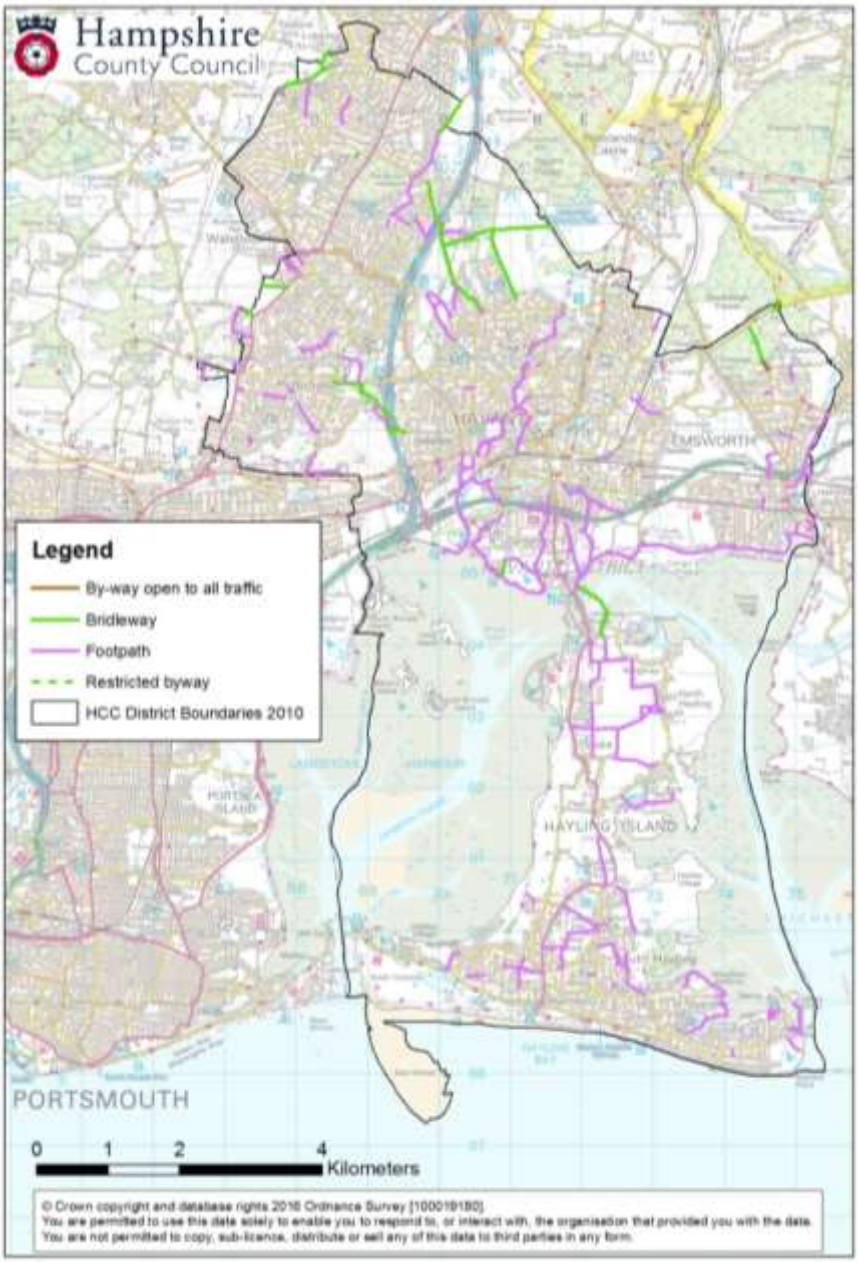
[35] https://www.havant.gov.uk/havant-borough-cycle-network-map-2017

3.5. Public Rights of Way

3.5.1. Public Rights of Way (PRoW) are paths, bridleways and tracks which allow members of the public to cross privately-owned land. Havant Borough contains:

- 48.6km of footpaths;
- 9.8km of restricted bridleways;
- 495m of restricted byways; and
- 137m of byways open to all traffic.

Figure 7 Rights of Way in the Havant Borough



3.6. Airports

3.6.1. Southampton Airport is located approximately 35.5km north west of Havant. It provides short-haul national and international flights to around 40 destinations. With 1.96 million passengers in 2016, it is a significant trip attractor in Hampshire[36].

3.6.2. The airport is accessible via the M27, a journey of around 30 minutes, and by rail, with an average journey time of around 1 hour, as the Southampton Airport Parkway station is immediately adjacent to the terminal.

3.6.3. Gatwick Airport is a key attractor of trips originating from Havant given its high volume of passengers and relatively close proximity. In 2017, a total of 45.6 million passengers flew from Gatwick to 228 destinations[37].

3.6.4. The airport is easily accessed by car along either the A3 or A27, a trip of around 1.5 hours. Passengers from Havant can also travel by direct train to Gatwick; a service leaves every 30 minutes Monday to Saturday, with hourly services on Sunday. The duration of this journey is around 70 minutes.

3.7. Accessibility

3.7.1. Walking and cycling distances and times from town and district centres have been identified and mapped (Figure 8 and Figure 9). Town and district centres included were:

- Havant
- Waterlooville
- Leigh Park
- Cowplain
- Emsworth

3.7.2. Walking and cycling maps are based on the road network, and relevant urban paths identified by the Ordnance Survey. Walking speed is plotted at 3mph and cycling at 12mph.

3.7.3. The driving map is based on the road network only, with turn restrictions applied. The speeds of roads were taken as the posted speed limits.

It can be seen that most residential areas can access the town and district centres for a range of goods and services within a thirty-minute walk or ten-minute cycle. Local centres offering a smaller range of goods and services are not mapped but offer an enhanced level of accessibility within the Borough. Figure 10 shows that almost all areas of the Borough are within a five to ten-minute drive of a town or district centre.

[36] https://www.southamptonairport.com/about-us/facts-figures/
[37] https://www.gatwickairport.com/business-community/about-gatwick/company-information/gatwick-by-numbers/

Figure 8 Walking times from town and district centres

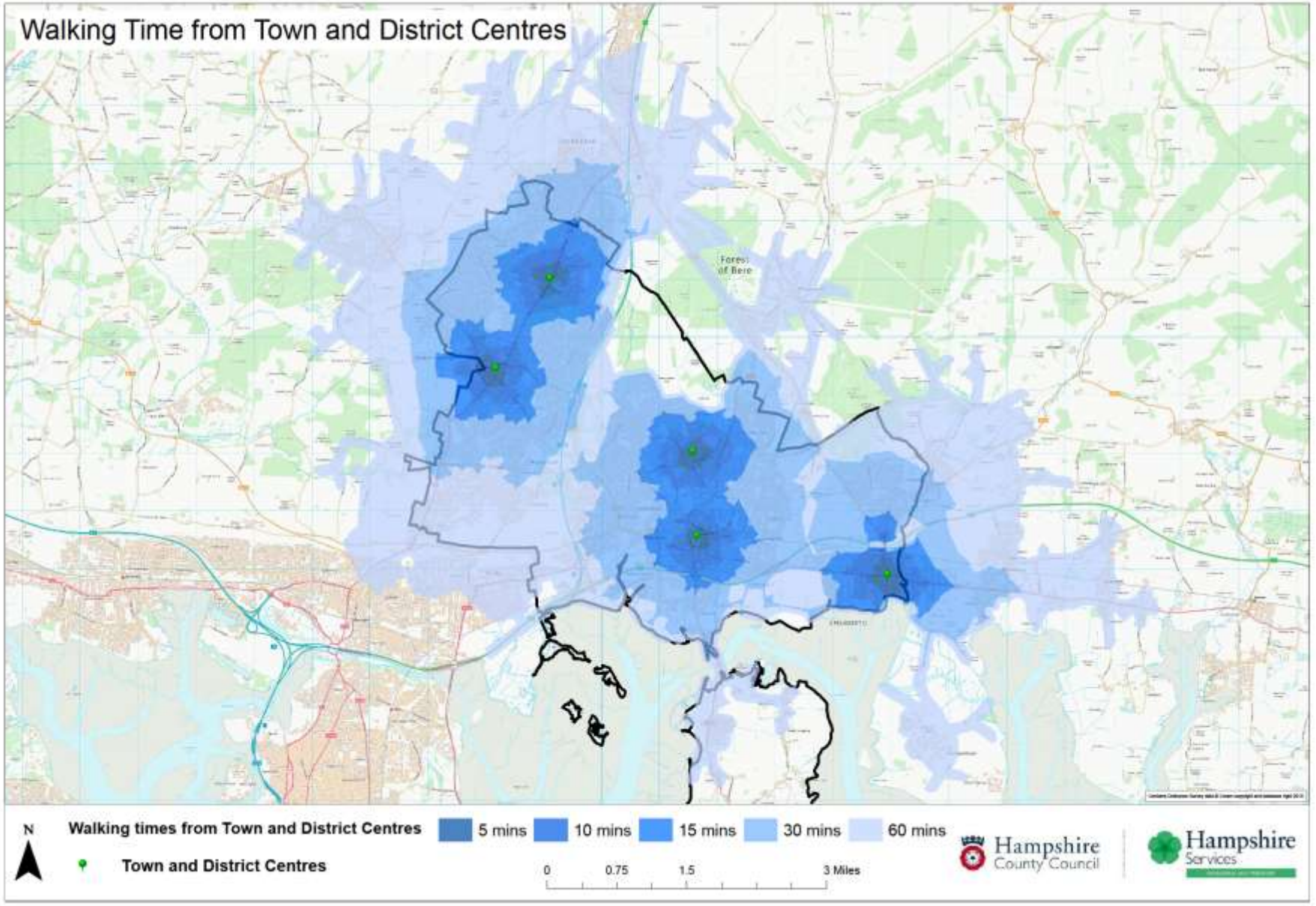


Figure 9 Cycling times from town and district centres

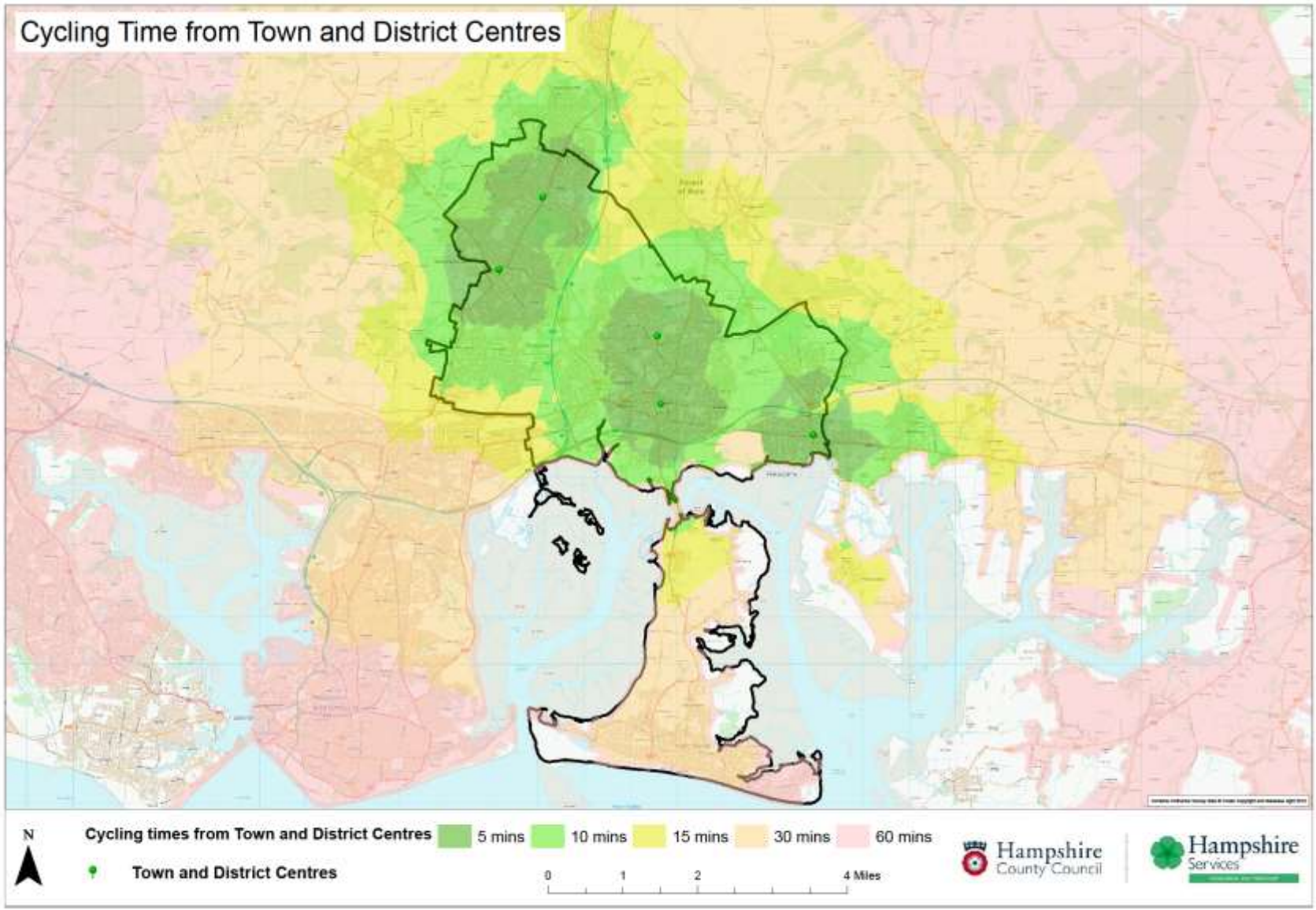
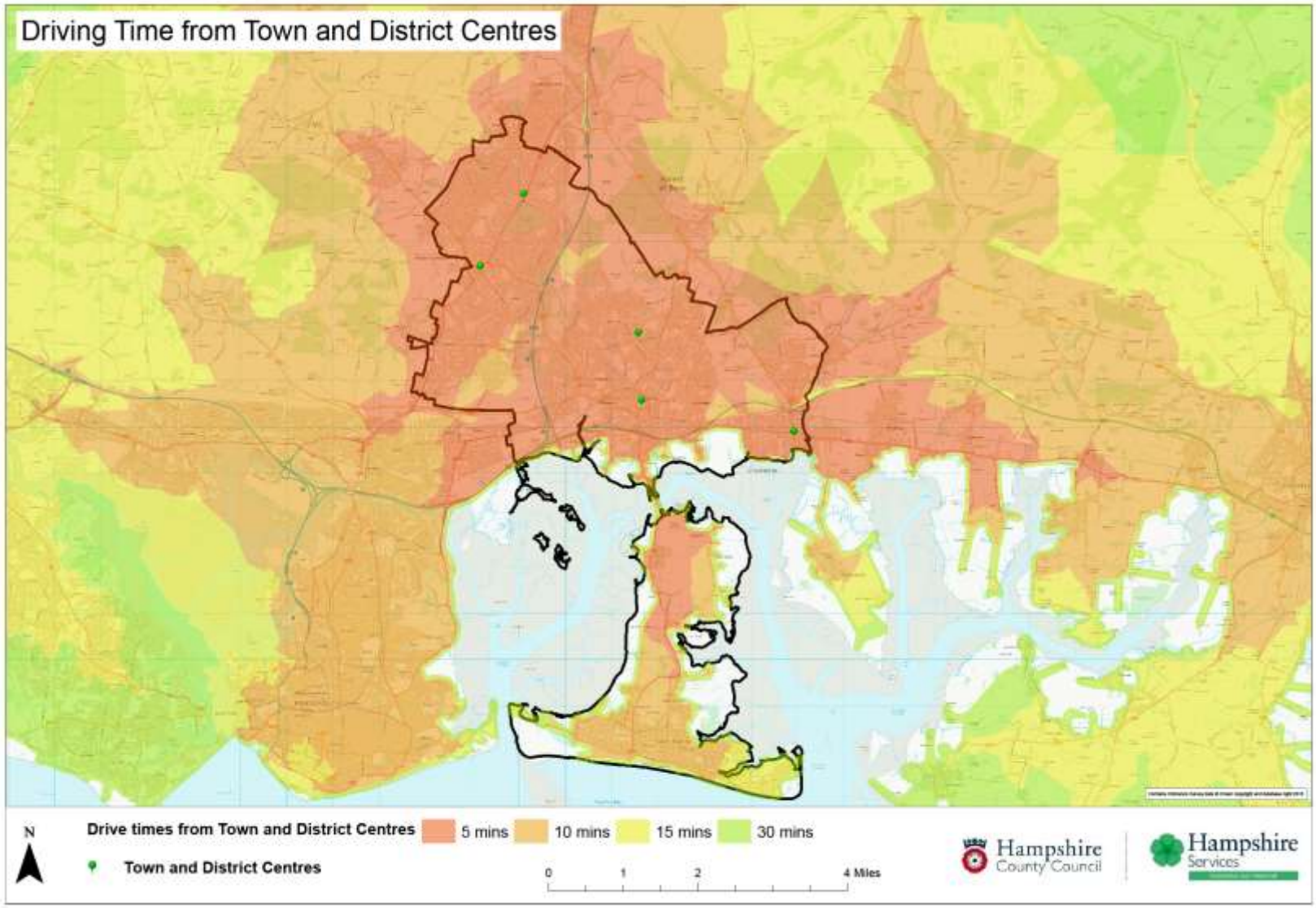


Figure 10 Driving time from town and district centres

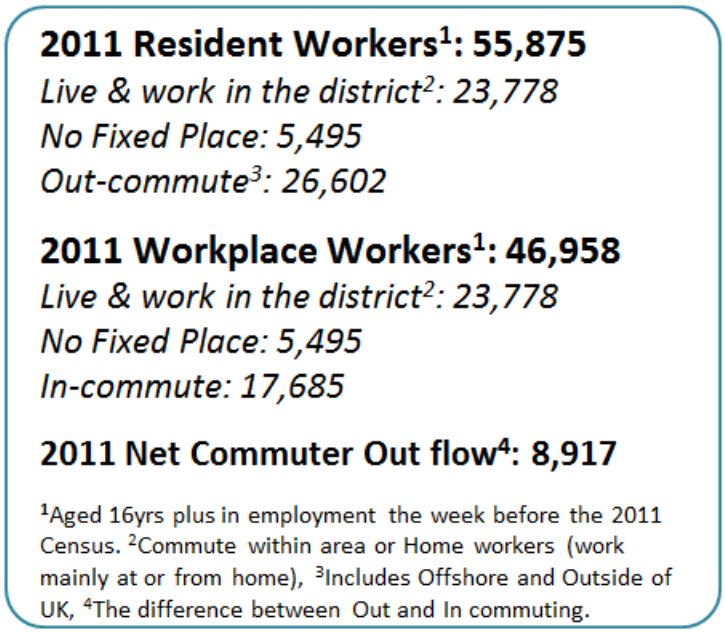


3.8. Journey to work data

3.8.1. The 2011 Census provides journey to work data by mode for residents of the Borough of Havant and people who travel from elsewhere and work in Havant.[38] The data is summarised in the figures below.

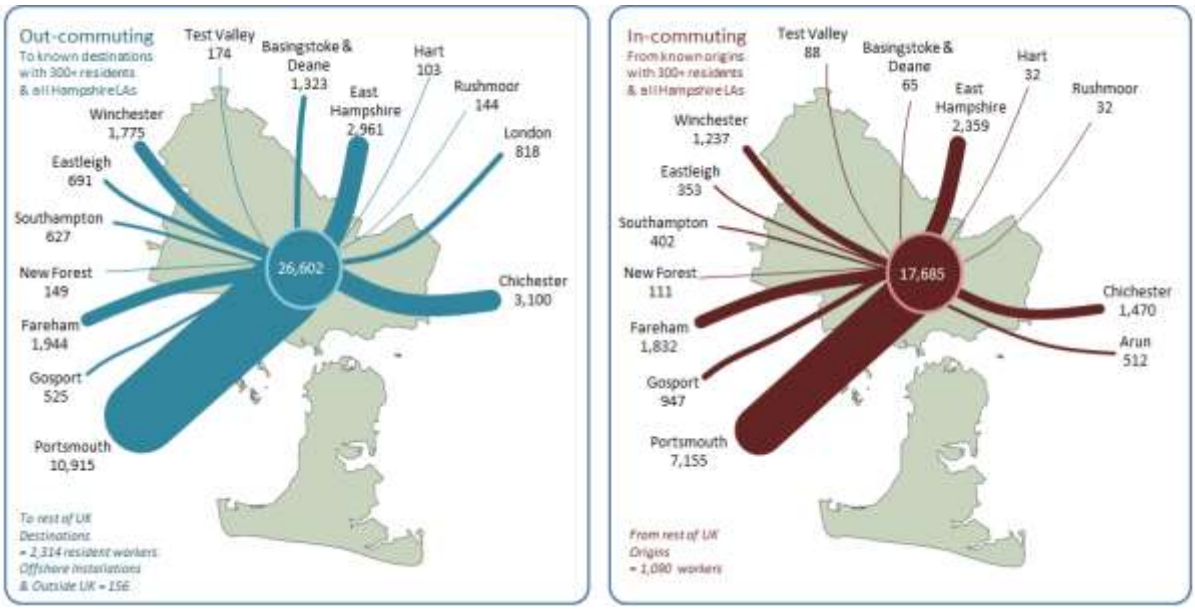
3.8.2. Figure 11 shows that at the 2011 Census there were 55,875 Havant residents in employment (resident workers). Of these, 23,778 work in the Borough, and 26,602 commute to other locations for work. In total, there were 46,958 people who worked within the Borough (including resident workers), of these, 17,685 commute in from other locations.

Figure 11 Commuting levels



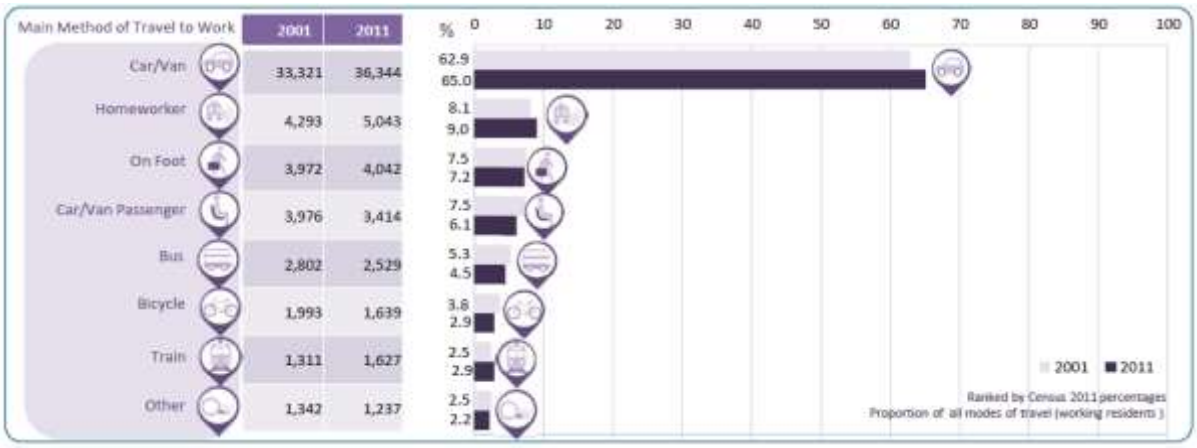
[38] Data sourced from 2001 and 2011 Census, with analysis undertaken by Hampshire County Council

Figure 12 Out and In Commuting



3.8.3. Figure 12 shows that Portsmouth attracts the most workers from Havant, and vice versa. Chichester, East Hampshire and Winchester also exchange large numbers of commuters with Havant, although "in commuting" is lower than "out commuting" in these cases.

Figure 13 Method of travel to work



3.8.4. Figure 13 shows that travelling to work by car or van as a driver is the most popular mode for Havant residents at 65%, followed by 9% of people who work from home. A further 6.1% of resident workers travel as a passenger in a car or van.

3.9. **Road Safety**

3.9.1. Monitoring of road safety in Havant is completed using data sources including police casualty data “STATS19”. This data is reviewed and assessed by Hampshire County Council as the Highway Authority.

3.9.2. Where there are patterns of casualties in one location, or a serious or fatal incident is recorded, measures for casualty reduction are investigated. The level to trigger an investigation is set at three or more injury accidents over a five year period.

3.9.3. Where casualty patterns occur over longer stretches of road, Route Studies can be considered. Figure 14 shows the locations of casualties over the last five years (1st April 2013 to 31st March 2018) as well as locations of targeted casualty reductions schemes delivered and planned. Table 5 provides more details as to the location of these schemes, and the timeframe for delivery.

Figure 14 Casualty clusters and locations of targeted casualty reduction schemes

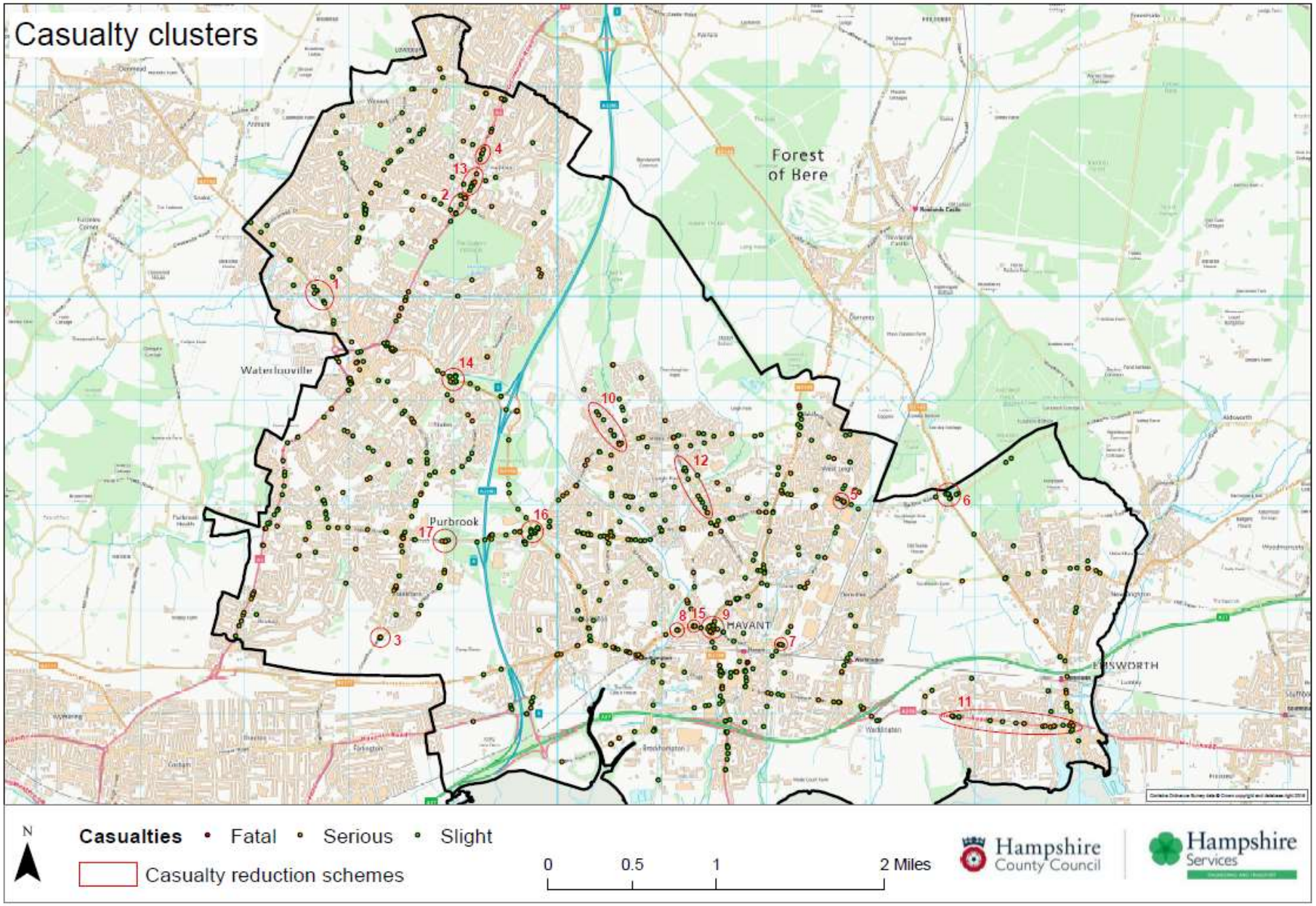


Table 5 Road Safety Schemes: delivered and planned

Ref no	Location	Year of delivery (planned)
Low Cost Programme		
1	B2150 Hambledon Road / McDonalds	(2019/20)
2	A3 London Road / Park Road	2016/17
3	College Road / Crookham Lane	2016/17
4	A3 London Road / Longwood Avenue	2016/17
5	Bartons Road / New Road	2017/18
6	B2148 Horndean Road / Bartons Road	(2018/19)
7	Eastern Road / New Lane	(2018/19)
8	B2149 New Road / Stockheath Lane	(2019/20)
Casualty Reduction Programme		
9	B2149 Petersfield Road / New Road	2015/16
Route Assessment Programme		
10	Woolston Road from Middle Park Way to Freeley Road Roundabout	(2018/19)
11	A259 Havant Road	(2018/19)
12	Dunsbury Way	(2018/19)
Other Schemes		
13	A3 London Road / Durley Avenue	2015/16
14	B2150 Hulbert Road / Tempest Avenue	(to be confirmed)
15	B2149 New Road / Barncroft Way	(2017/18)
16	B2150 Hulbert Way / Purbrook Way Roundabout – Major Scheme	2016/17
17	Purbrook Way / College Road	(2018/19)

3.9.4. The programme as set out above demonstrates that casualty patterns are actively monitored and feed directly into assessing and prioritising of the programme schemes.

3.10. Air Quality

Whilst HBC has identified exceedances against annual mean objectives at kerbside locations on the Park Road corridor in Havant, and the A3/Maurepas Way in Waterlooville, there are no currently no Air Quality Management Areas (AQMAs

declared within Havant Borough. It is therefore not considered that air quality analysis is required of this TA.

4. Modelling Methodology

4.1. Background to SRTM

4.1.1. This Transport Assessment utilises an existing Strategic Transport Model for the area (the SRTM, see below) to assess the projected impact of traffic growth and additional travel demands associated with proposed development to the end of the plan period. The model is a multi-modal transport model and is compliant with Department for Transport WebTAG guidance. The results of the various model runs, reflecting the position both with and without development for comparison purposes, are discussed in detail below.

4.1.2. The Sub-Regional Transport Model (SRTM) forms the basis of the assessment work for this Transport Assessment (TA). It is used to model the proposed development to identify key transport implications resulting from the scale and location of the proposals in the Havant Borough Local Plan 2036 (HBLP2036) and to test suggested transport interventions.

4.1.3. Solent Transport (a partnership of Hampshire County Council, Portsmouth City Council, Southampton City Council and Isle of Wight Council) commissioned the SRTM to support a wide-ranging set of interventions across the Solent Transport area. It can:

- Forecast changes in travel demand, road traffic, public transport patronage and active mode use over time as a result of changing economic conditions, land-use policies and development, and transport improvement and interventions (schemes);
- Test the impacts of land-use and transport policies and strategies; and
- Test the impacts of individual transport interventions in the increased detail necessary for preparing submissions for inclusion in funding programmes.

4.1.4. The integrated forecasting approach contains a suite of linked transport models which comprises the following components:

- The Main Demand Model (MDM) predicts when (time of day), where (destination choice) and how (choice of mode) journeys are made;
- The Gateway Demand Model (GDM) predicts demand for travel from ports and airports;
- The Road Traffic Model (RTM) determines the routes taken by vehicles through the road network and journey times, accounting for congestion;
- The Public Transport Model (PTM) determines routes and services chosen by public transport passengers, and;

- The Local Economic Impact Model (LEIM) uses inputs including transport costs to forecast the quantum and location of households, populations and jobs.

4.1.5. This set of models has been developed to assist in the ongoing investigation, appraisal and assessment of different policies, strategies and infrastructure, management and operational interventions on land-use policies and transport provision.

4.1.6. The modelled area of the SRTM is divided into four '*regions*', shown on Figure 15, which differ by zone size and modelling detail and it can be seen that Havant Borough is within the Core Fully Modelled Area (the most detailed region of the model). The SRTM zone structure representing the Borough is shown in Figure 16 with the zone boundaries developed in accordance with Census output areas and boundaries.

Figure 15 Regions of the SRTM

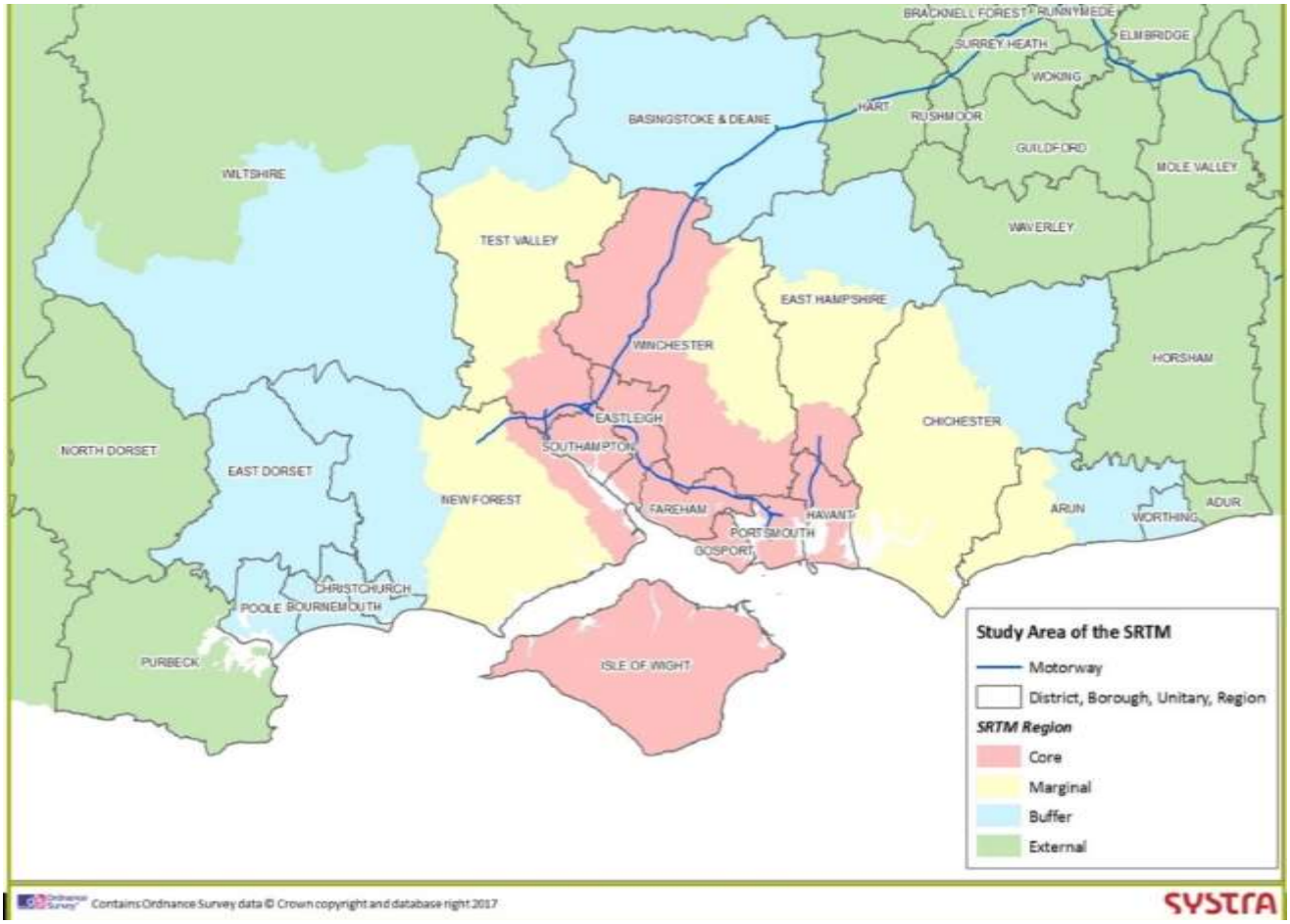


Figure 16 SRTM study area

4.1.7. Due to its island geography, with one road bridge linking to the rest of the Borough, Hayling Island has been considered through a separate microsimulation model and, as noted above, is outside the direct scope of this TA. The results of this will be published in a further report. The work will assess the impacts of development proposals on Hayling Island and will be used to inform its own mitigation proposals. The two models (SRTM and the Hayling Island microsimulation model) overlap at the Langstone A27 junction up to the junction of Park Road North/ New Road/ Elmleigh Road/ B2149 junction. At relevant locations the model outputs have been compared to ensure appropriate assessment and to support development of a co-ordinated range of mitigation measures.

4.1.8. A SRTM Modelling Report has been produced (Appendix 1) that presents the results of the SRTM model runs undertaken. The SRTM Modelling Report provides details of the scenario assumptions and model results, which are presented in summary in this TA.

4.2. **Overview of SRTM modelling**

4.2.1. In accordance with guidance, three weekday periods are modelled in the SRTM, although it should be noted that this TA focusses on the AM and PM peaks.[39]

- AM peak: busiest hour between 07:00 and 10:00,
- Inter peak: average of 10:00 to 16:00 and
- PM peak: busiest hour between 16:00 and 19:00

4.2.2. The SRTM has a base year of 2015, and forecast years of 2019, 2026, 2031, 2036, and 2041. For the Havant Local Plan assessment, scenarios were forecast to 2036 and three scenarios have been developed as follows:

- Scenario 1 – 2036 Baseline – Demand from existing land uses plus background growth – i.e. no Havant Local Plan development
- Scenario 2 – 2036 Do-Minimum (DM) – Includes Havant Local Plan development but no mitigation measures
- Scenario 3 – 2036 Do-Something (DS) – Includes Havant Local Plan development and mitigation measures

[39] Whilst only three hours are modelled (an hour for each of the AM, PM and inter-peak), this represents 94% of the total daily flows (for vehicles), i.e. a fair representation of how the network behaves throughout the day. AM busiest hour is defined as 40.5% of the three hours for Highway and 40% for Public Transport. Interpeak busiest hour is defined as 16.7% of the six hours for both modes. PM busiest hour is defined as 36.8%of the three hours for Highway and 40% for Public Transport

4.2.3. Details of the above scenarios in terms of development land use assumptions and highway network modelled (including any consented committed schemes up to 2036) are presented in the SRTM Modelling Report but summarised below.

4.3. 2036 Baseline Model

4.3.1. The Baseline scenario has been developed as the reference case for all known existing development and infrastructure within the Borough of Havant (including Hayling Island (see Section 1.2), in addition to all committed development and infrastructure through to 2036.

4.3.2. It assumes no further major development within Havant up to 2036 except for those sites already benefiting from planning permission as of April 2017 (latest update to the 2015 SRTM) or allocated in the adopted local plan. Outside of Havant, development growth is assumed to continue 'as normal' and in accordance with the adopted Local Plans for the respective Local Planning Authority areas, and in accordance with TEMPro v7.2 growth projections.

4.3.3. As detailed in the SRTM Modelling Report a number of transport schemes have already been developed to address future and expected future traffic conditions and these are reflected along with Havant Borough and neighbouring counties' completion and committed development/land use assumptions. Those schemes that are considered as "committed" i.e. funded, and approved by the Highway Authority, are included in all the modelled scenarios including the Baseline. These schemes are shown in Figure 17 and detailed in Table 6 below.

Figure 17 Committed transport schemes in SRTM

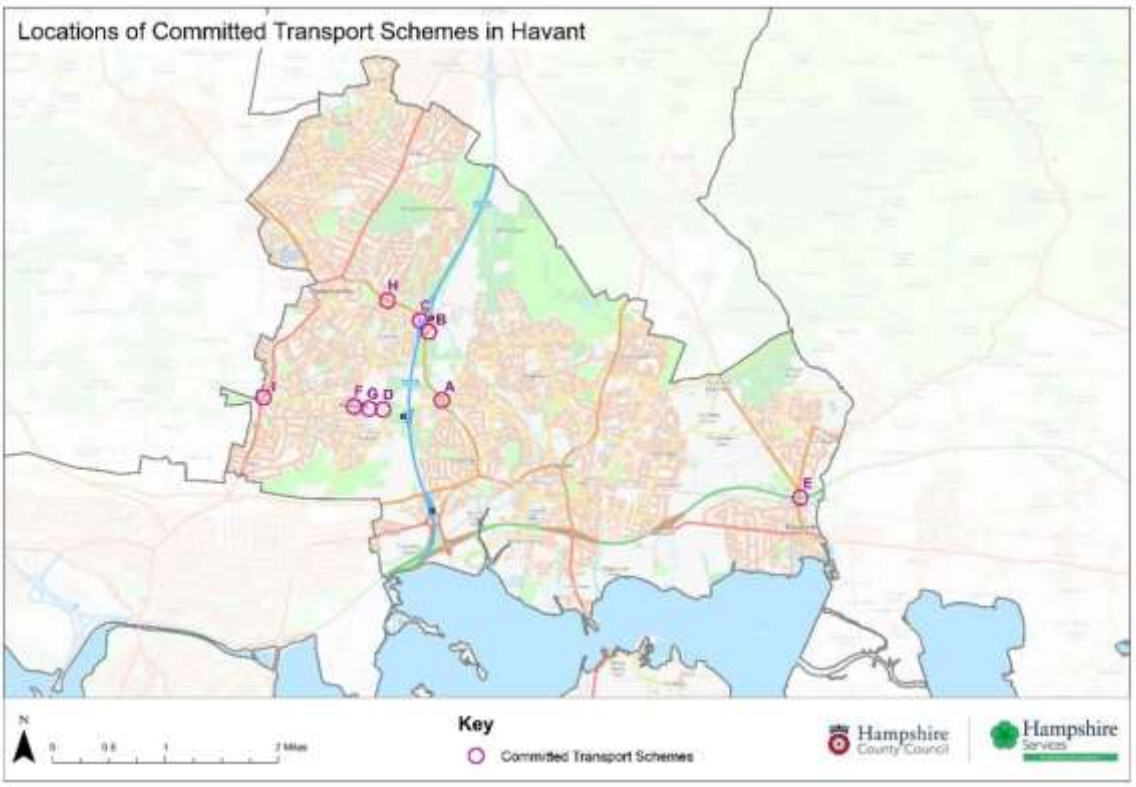


Table 6 Schemes committed in the Sub Regional Transport Model

Ref	Location	Committed scheme
A	Hulbert Rd / Purbook Way Junction (Dunsbury Hill)	Major redesign and partial signalisation of 'ASDA' roundabout.
B	Dunsbury Hill Farm Business Park	Tested using the SRTM in 2014 - currently being constructed
C	A3(M) J3	Signalisation of northbound off-slip onto roundabout
D	Purbook Way / College Road	Signalisation of priority junction
E	Interbridges	New signal access
F	Purbrook Way / Stakes Hill Road	Replacement of roundabout with traffic signals.
G	Purbrook Way from Stakes Hill Road to College Road	Dual carriageway to replace single carriageway.
H	Hulbert Rd / Frendstaple Rd / Tempest Ave	Enlarge and modify existing roundabout.
I	Ladybridge Road/London Road Roundabout	Committed scheme from Waterlooville Major Development Area (MDA)
	Level Crossing “down time”	Set at 50% of the time at Warblington (Southleigh Road) and 66% at Bedhampton (West Street) with New Lane modelled as closed all the time, in all cases)

4.3.4. As stated in the Modelling Report “It should be noted that the 2036 Baseline scenario serves a purpose to help isolate and appraise the impact of the proposed Local Plan Growth. Because it assumes no development within Havant over an approximate 20-year period (except for those sites already with planning permission) it is considered to be a theoretical scenario and one that is very unlikely to develop in reality.”

4.3.5. Notwithstanding, the baseline scenario is still important to allow a full assessment of the impacts of both background growth and traffic increases arising from proposed development.

4.4. 2036 Do-Minimum Model

4.4.1. The Do-Minimum (DM) scenario is the Baseline scenario with the addition of the proposed Havant Local Plan allocations (as assumed at September 2017 – see 1.2) added, which includes those on Hayling Island (as above in Section 4.1.7, the impacts on Hayling Island itself are considered in a separate report). There are no changes to the baseline road network or neighbouring counties’ development growth and as a result, this scenario enables the impacts of the Local Plan allocations to be isolated and addressed as required.

4.4.2. Other than potential land use and boundaries little information is known at this stage in respect of the details of each Local Plan allocation site and, specifically, details of possible access arrangements are not available. It is likely that in practice, some local improvements or new connections to specific sections of the road network may be required to provide suitable access to each of the Local Plan

allocations. For the purpose of the modelling however, the SRTM has assigned the demand from each Local Plan allocation to the respective model zone(s) detailed in Figure 16 and assumed Local Plan development traffic to connect to the modelled network from the same connection(s) from these zones as established for the baseline.

4.5. 2036 Do-Something Model

4.5.1. The Do-Something (DS) scenario builds on the DM scenario with the addition of identified mitigation measures following the assessment of significant impacts from the proposed Local Plan allocations. The highway network includes modifications at ten junction locations but no changes to the Public Transport network, as there were no committed PT schemes identified at the time of the assessments, including BRT (Section 6.4). Details of the proposed mitigations are provided in Section 6 of this TA.

4.6. Assessment Methodology for Havant LP

4.6.1. As detailed previously, a comparative assessment of the results between the Baseline and DM scenarios has been undertaken to isolate, as far as is possible, the impact of the proposed Local Plan allocations within the DS scenario. In this case it provides an overview of the residual impacts of the Local Plan allocations following the introduction of mitigation measures.

4.6.2. In the first instance, a comparison of the differences between the Baseline and DM scenarios was used to determine a list of junctions and corridors within the Borough where future highway schemes may be required to support the proposed Havant Local Plan development on the local highway network. The key SRTM outputs assessed are:

- Changes in Highway Link Flows between the Baseline and DM scenarios
- Changes in Vehicle Delays and Journey Times between the Baseline and DM scenarios
- Capacity Hotspots (expressed as the ratio of flow to capacity V/C with links identified where the V/C is more than 80% in either the AM or PM peak hour for the Baseline or DM scenarios

4.6.3. The list of junctions affected is included in Table 6-2 of the SRTM Modelling Report, but a more detailed review of the list was then undertaken to provide a reduced list of junctions affected by the Local Plan developments. Details of the methodology used to refine the list of affected locations are presented in Section 5.8 of this TA.

4.6.4. Once the nature of the capacity constraints at each location was identified from the SRTM Baseline and DM scenarios, mitigation measures were considered to increase highway capacity on the network including the SRN. OS-map-based

concept designs have been prepared for the necessary mitigation works at the affected junctions and links, to a level that enabled junction capacity modelling (i.e. correct lane widths, flare lengths, radii, etc.), and identify any particularly costly infrastructure elements (such as the need for retaining walls or bridges).

4.6.5. It should be noted that this exercise has been undertaken to demonstrate that the proposed development is capable of mitigation. The designs are indicative and should not be taken to represent a definitive 'solution' for the locality. The exact nature and design of any schemes in each of these locations can only be determined at the planning application stage and would be progressed through detailed Transport Assessments submitted in support of that.

4.6.6. An initial capacity assessment of these mitigation measures was undertaken using standard junction modelling packages (LinSig and ARCADY) following a principle of achieving the greatest level of congestion relief within existing constraints such as highway boundaries, while avoiding any structural work at bridges and viaducts. Consideration was also given to the affordability and deliverability of all measures proposed. The measures explored include common improvements such as lane widening and junction signalisation.

4.6.7. Once mitigation measures were identified and local junction models run, these measures were introduced in the SRTM to provide the model results for the DS scenario.

4.6.8. The following sections of the TA summarises the results of the SRTM model runs and presents the proposed mitigation measures necessary to support the proposed allocations.

5. Initial Modelling Results and Analysis – Baseline vs Do Minimum (DM)

5.1. Impact on demand matrices

5.1.1. The SRTM Modelling Report provides details of the impact of the proposed Local Plan allocations on the total person trips and percentage mode share to and from the Borough for a 24-hour period. There are approximately 88,500 additional person trips to / from Havant across a 24-hour period in the Do Minimum compared to the Baseline, although this will include an element of double counting for trips that both start and end within Havant Borough. This represents an increase of 17.5%.

5.1.2. The model also forecasts a small shift (<1%) away from Highway to Passenger Transport and active modes. These outputs are indicative of a network subject to increasing delay.

5.1.3. Moreover, Havant Borough Council aims to increase walking and cycling in line with Hampshire County Council's strategies (Section 2.3.9). To achieve this, Havant Borough Council is looking to complete a Local Cycling and Walking Infrastructure Plan (LCWIP) which will use evidence and relevant modelling tools to identify future improvement schemes. Future developers of the proposed site allocations will be expected to consider these schemes as part of their transport assessment work and make appropriate contributions.

5.2. Highway Network Performance

5.2.1. Table 7 summarises the key network statistics over a 24-hour period for the full SRTM core study area and for the Havant Borough in isolation for the 2036 Baseline and DM. As would be expected, the impact across the wider Core model area is diluted.

5.2.2. Within Havant, Vehicle Hours increase by approximately 10% and Vehicle Kilometres by 5% between the Baseline and DM scenarios within Havant. Increases in these outputs are consistent with the additional traffic generation from the Local Plan forecast growth. The greater percentage increase in vehicle hours compared to vehicle kilometres is indicative of a network under increasing pressure and higher delays. The average speed (kmph) in the Borough decreases by 4.5% in the DM scenario compared to the Baseline which is again consistent with the forecast additional traffic volumes and increased delay.

Table 7 Havant Borough Baseline 2036 VS Do Minimum 2036 - 24hr Period Highway model network statistics

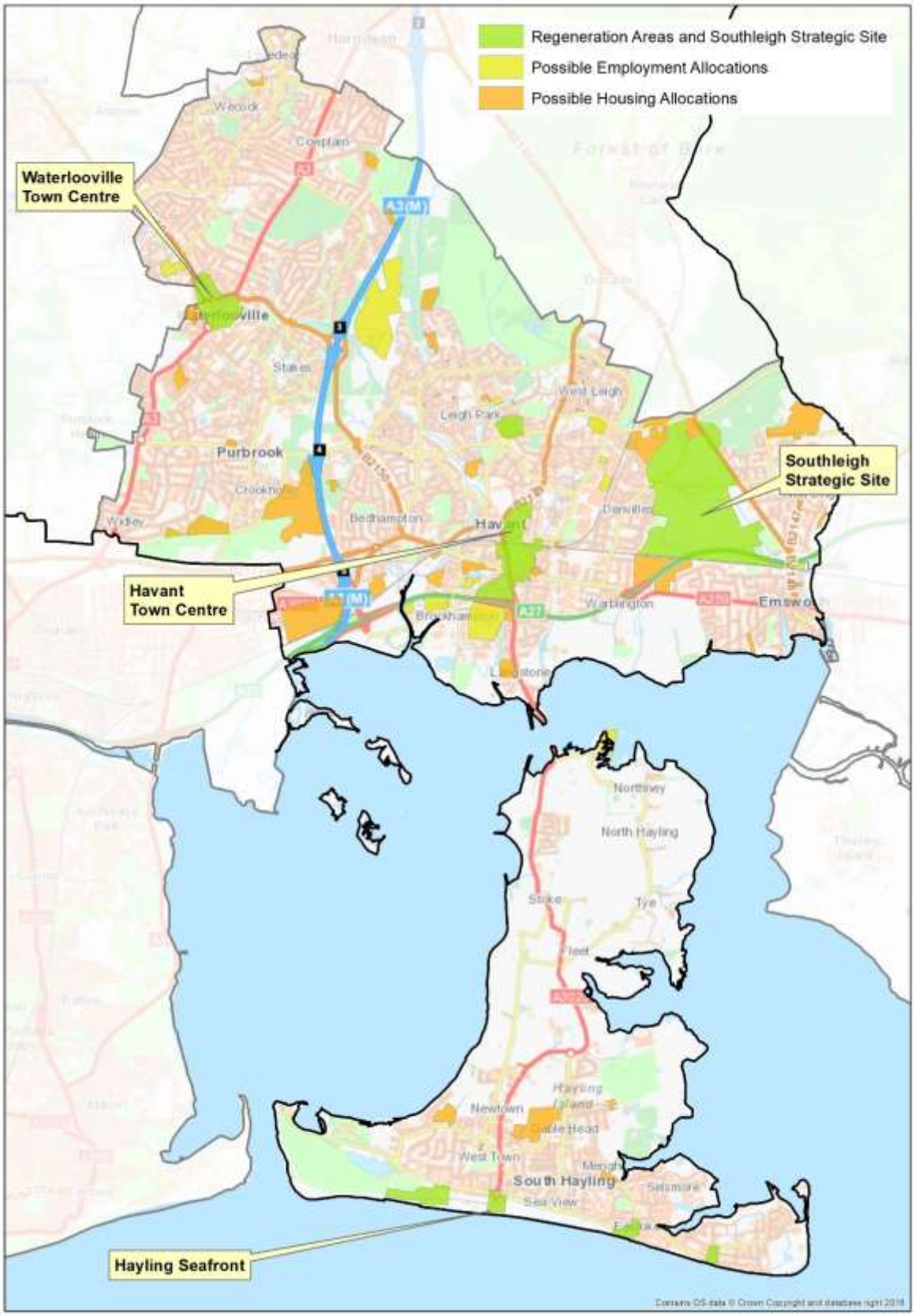
Parameter	Baseline 2036	Do Min 2036	*Diff*	*% Diff*
Vehicle Hours	52,803	58,091	*+5,288*	*+10.0%*
Vehicle Kms	2,657,959	2,793,512	*+135,553*	*+5.1%*
Average Speed (kmph)	50.3	48.1	*-2.2*	*-4.5%*

5.3. Change in Traffic Flows – Local Network

5.3.1. The model identifies the change in traffic flows in the AM and PM peak hours between the DM and Baseline scenarios in 2036. In addition to the new traffic directly associated with the Local Plan land use, it highlights any re-routing of traffic that may result from localised congestion or redistribution of existing trips.

5.3.2. When comparing the DM to the Baseline, there is a general increase in traffic within the Borough as would be expected with the inclusion of Local Plan development. The location of the greatest traffic increases is consistent with the larger development allocations tested through this TA (shown in Figure 18) and can be summarised as follows for each peak hour.

Figure 18 Larger proposed development allocations (sites as considered likely allocations by HBC at September 2017)



5.3.3. In the AM peak:

- There are projected increases on Southleigh Road, Bartons Road, Horndean Road, Emsworth Common Road, and Woodberry Lane that correspond with the Southleigh Strategic Development Site.
- The Dunsbury Hill Farm site is a contributor to the increases in traffic on Purbrook Way and the Asda roundabout.
- The Campdown development is the main contributor to the increases on Portsdown Hill Road, Crookhorn Lane and a contributor to Stakes Road/ Purbrook Way.
- Development in Waterlooville Town Centre is a significant contributor to forecast increases on London Road and a contributor to increases on Stakes Road/ Purbrook Way.
- The combined effect of development on Hayling Island creates the forecast increase on Langstone Road towards the mainland.

5.3.4. In the PM peak hour, similarly to the AM, the greatest traffic growth is in the vicinity to the main development areas and at similar volumes, albeit the flows are predominantly in the opposite direction to the AM (inbound for residential development and outbound for employment).

5.3.5. A noticeable reduction is forecast on Hulbert Road in both directions to the north of the Asda roundabout. This reduction is the result of forecast delay increases on the approach to the Asda roundabout and at the A3M junction that are producing a reassignment to avoid the increased delay.

5.4. Projected Changes in Traffic Flows – Strategic Road Network

5.4.1. In the AM peak hour, the model identifies effects on the A27 Junctions as set out below.

- 230 additional PCUs[40] joining westbound at the Warblington / Emsworth junction (additional eastbound joiners minimal)
- 40 additional PCUs joining westbound at the Langstone Road junction (additional eastbound joiners minimal)

[40] Impacts are measures in terms of PCUs. A PCU is a Passenger Car Unit which is a measure of the effect that each type of vehicle has on capacity. It is derived from the average distance between vehicles of the same type. For example, a car has a PCU value 1. A Heavy Commercial Vehicle has a PCU value of 1.75 as typically there is a greater distance between these types of vehicles than cars

- 100 additional eastbound PCUs exiting the A27 at the Langstone Road junction.
- 100 additional PCUs joining westbound at the Teardrop junction (additional eastbound joiners minimal)
- AM peak hour forecast flow changes on A3M are relatively modest in both directions

5.4.2. There is a noticeable reduction in trips westbound on the A27 (compared to the Baseline) to the east of the Warblington / Emsworth junction. This is the result of the A27 being forecast to be at/over- capacity in both Baseline and the Do Minimum on the section of carriageway between the Langstone Road and Teardrop junctions. The actual traffic volume of that section of carriageway does not change significantly between the two scenarios but in the Baseline, there is a higher component of trips originating from Chichester (and the areas further east).

5.4.3. The SRTM Modelling Report notes that in the Do Minimum scenario there is a lower component of trips from the Chichester area but a larger component from the Havant area and joining the A27 at the Emsworth Road and Langstone Road junctions. In modelling terms, this displays as a flow reduction between the two scenarios on the section of carriageway east of Emsworth. Because the distribution of trips between Origin-Destination pairs is not fixed between the two scenarios, this output is not just replicating trips assigned to alternate routes to avoid congestion (away from A27) but also differences in destination between the scenarios (for example, accessing a job in a different location in the different scenarios).

5.4.4. In the PM Peak Hour:

- On the A27 the model forecasts a reduction between the Baseline and Do Minimum) to the eastern side of the Borough, but in the PM this is more evident in the eastbound direction towards Chichester and beyond.
- Similarly to the AM, the section of A27 between the Teardrop and Langstone Road junctions is forecast to be over capacity in the PM in both scenarios. This effectively limits the volume of traffic using this carriageway; in the Do Minimum there are more PCUs using the A27 and then exiting at the Warblington/Emsworth junction towards the Southleigh development, and fewer continuing on the A27 towards Chichester area (this ties in with the fewer 'outbound' trips in the westbound direction in the AM from Chichester area).
- On the western side of the Borough, the A27 eastbound has forecast increases from the areas to the west (Portsmouth, Fareham etc.).

- The A3M is showing increases in both directions on the section between A27 and the Hulbert Road junction (Junction 3 of the A3 (M). To the north of that junction, the forecast A3M flow changes are minimal.

5.5. Highway Delays

5.5.1. The forecast delay changes between the 2036 DM and Baseline scenarios predominantly correspond with those locations where the flow changes are also most pronounced.

5.5.2. In the AM peak the model forecasts notable delay increases (of over 30 seconds) as follows:

- 42 seconds on A27 westbound between the Langstone Road and Teardrop junctions. This change will be one of the drivers behind the forecast decrease in flow on the upstream westbound sections of carriageway highlighted above.
- 76 seconds on the Langstone Road northbound approach to the A27 Junction
- 109 seconds on the Emsworth Road eastbound approach to the respective A27 junctions.
- The B2149 Petersfield Road southbound (276 seconds) has a substantial increase at the junction with Stockheath Road,
- West Lane has a 49 second increase at the junction with A3023.

5.5.3. In the PM peak the model forecasts notable delay increases (of over 30 seconds) as follows:

- On the A27 between the Langstone Road and Teardrop junctions - 37 seconds westbound and 27 seconds eastbound
- On Harts Farm Way approaching the Teardrop junction (66 seconds)
- On Elm Lane approaching the junction with Park Road (192 seconds)
- On Hulbert Road southbound approaching the Asda roundabout (76 seconds)
- On Manor Lodge Road southbound approaching Redhill Road (33 seconds).

5.6. Capacity Hotspots

5.6.1. In order to identify locations with capacity issues as a result of possible Local Plan allocations, the operational capacity on all links on the approaches to junctions within Havant Borough, and in the immediate vicinity of, Havant Borough boundaries have been assessed. Junction approaches have been reviewed based on the ratio of flow (or volume) to capacity (V/C) on each approach. A value of 90% is normally taken as the practical capacity value for design purposes. Junctions with a V/C of less than 90% on their approaches are said to be operating 'within capacity', with no or limited queues and delays. If the V/C is near, or in excess of 90%, then the junction will be subject to queuing and delays and is said to be operating 'at capacity'. A value of >100% means that the junction is 'over capacity' and significant queues and delay could occur. A high V/C is defined as 80% or over for the purposes of this assessment. The change in V/C between the Baseline and the Do Minimum scenarios has been calculated to identify locations where the V/C worsens as a direct result of the Local Plan development, to show where capacity issues might arise.

5.6.2. In peak hours for 2036 forecast year conditions, it is to be expected that a relatively high number of junctions have V/C in excess of 80%. The analysis of all modelled links within the Havant Borough produces an initial list of 66 junctions that are forecast to have at least one approach arm which has a V/C greater than 80%, either in the AM or the PM peak. These are listed in Appendix G of the SRTM Modelling Report and shown in Figure 19.

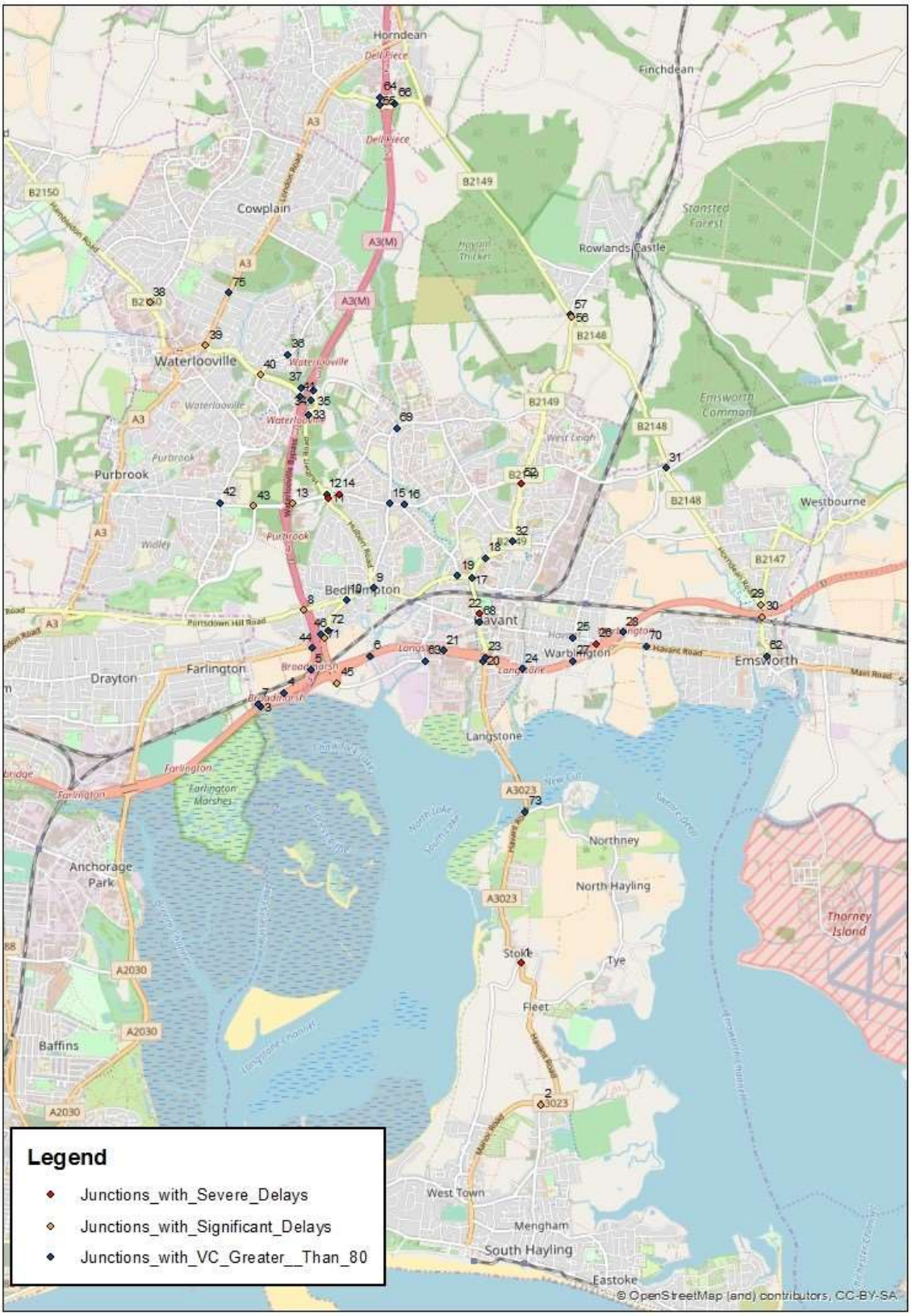
5.6.3. The list of 66 junctions was subsequently refined to quantify the magnitude of change in capacity as a result of the Local Plan Allocations (and thereafter of the effect of potential mitigation), using the following classifications:

- A junction is classified as experiencing a 'significant' impact where the V/C on any approach is greater than 85% and has increased in the DM by more than 5% compared to the Baseline
- A junction is classified as experiencing a 'severe' impact where the V/C on any approach is greater than 95% and has increased in the DM by more than 10% compared to the Baseline.

5.6.4. In addition to identifying Significant and Severe impacts, a review was undertaken to establish whether any of the long list of junctions experienced a "notable" increase in V/C due to the Local Plan, bringing a junction close to capacity, even if not quite enough to flag it as significant or severe. The criterion used was V/C of 80% or more combined with a change of 15% or more in the DM compared to the Baseline. This is to reflect the fact that the purpose of the TA is to test, and propose mitigation, for development planned through the Local Plan.

5.6.5. A total of twelve junctions fell into the 'significant' change criteria and a further six were classified as 'severe'. A further two locations were identified as experiencing a 'notable' change in V/C.

Figure 19 Junctions forecast to meet the criteria of V/C over 80%



5.6.6. Of the twenty junctions, two are located on Hayling Island; A3023 / West Lane (SRTM Junction ID1) and A3032/ Church Road (SRTM Junction ID2). Havant Borough Council will review the identified impacts at these junctions as part of the separate Hayling Island Paramics model. As detailed in Section 1.2, Hayling Island has an island geography with only one road bridge connecting it to the rest of the Borough, therefore, a separate, Paramics microsimulation model has been built and used to consider impacts on Hayling Island. Further investigation of these two junctions has been discounted for the purpose of this TA, which focuses on the rest of the Borough.

5.6.7. Table 8 summarises the modelled performance of the selected eighteen junctions in both peak hours in 2036.

5.6.8. Figure 20 highlights the location of these junctions. Due to their proximity to each other junctions 11 and 12 are grouped and considered together throughout this TA.

5.6.9. Observations have been given to outline the reasons why they have been selected for mitigation investigations. It should be noted that observations presented in Table 8 are based on an analysis of the initial modelling results from the SRTM. The sole purpose of this exercise is to identify the requirement for further assessment, with the impact of the Local Plan development on the mitigated junctions presented in Section 5.8 of this TA.

5.6.10. The eighteen junctions in Table 8 have also been grouped by corridors (colour coded) in recognition of the fact that capacity constraints on approaches may also be the result of link capacity along a specific corridor. This is particularly critical when considering potential measures to improve sustainable modes of transport such as bus services or cycle lanes.

Table 8 Junctions for Potential Mitigation Assessment List

ID	Junction	Impact (1)	Type (2)	Observations
38	B2150 Hambledon Road / Milton Road	s	R	Flag due to minor increase in RFC[41] (from 91% to 96%) in AM on Hambledon Road approach but all approaches at capacity in both peaks and scenarios
39	A3 London Road / B2150 Hulbert Road	s	R	Flag due to minor increase in RFC (from 89% to 94%) in PM on A3 London Road approach but same approach operating over capacity in AM in both scenarios. Remaining approaches below capacity
40	B2150 Hulbert Road / Tempest Avenue	s	R	Flag due to minor increase in RFC (from 85% to 91%) in PM on Tempest Avenue approach but same approach operating over capacity in AM in both scenarios along with Hulbert Road (both directions) in PM
43	Purbrook Way / College Road	s	S	The SRTM modelling accounts for the scheme to convert the junction from priority control to a signal junction. The increase in traffic on College Road has resulted in this approach being flagged 'significant' V/C in the AM impact
13	Purbrook Way A3(M) J4 southbound on-slip (B&Q roundabout)	s	R	The westbound flow on the Purbrook Way approach increases by approximately 83PCUs in the AM peak hour and the operating V/C on the Purbrook Way westbound approach increases from 77% to 86% triggering the 'significant' flag. The eastbound approach is over capacity in both Baseline (101%) and Do Minimum (102%) but the increase does not trigger an impact flag
11/ 12	Purbrook Way westbound approach and Hulbert Road southbound approach to Asda roundabout	S	R	The Purbrook Way westbound signalised approach has a forecast V/C increase from 85% to 95% in the PM that triggers a 'severe' flag. The same approach is at capacity in the AM but the increase between Baseline and Do Minimum does not trigger an impact flag Hulbert Road southbound is over capacity in the PM in both Baseline (103%) and Do Minimum (106%) but the increase does not trigger an impact flag. The high V/C on the southbound approach is related to the increase of 182 PCUs vehicles travelling eastbound on Purbrook Way and reducing gaps to join the roundabout for Hulbert Road.
14	Purbrook Way / Park House Farm Way	S	P	Purbrook Way operates in excess of 100% V/C in the Do Minimum in the AM PM peak hour. The increase from the Baseline (75%) triggers a 'severe' flag. The mainline flows increase on Purbrook Way that reduce the opportunities and capacity for traffic exiting from Park House Farm Way
8	A3 northbound / on-slip from A27 junction	s	M	In the PM peak hour there is a forecast flow increase of approximately 76PCUs on the on-slip and 20 PCUs on the mainline. The on-slip V/C increases from 81% to 86% and triggers a 'significant' flag
9	B2150 / Bedhampton Road junction	N	S	Notable change in V/C from 61% to 84% on the Bedhampton Road westbound approach and from 71% to 81% on the Bedhampton Road eastbound approach in the PM peak but as below 85% does not trigger a significant flag

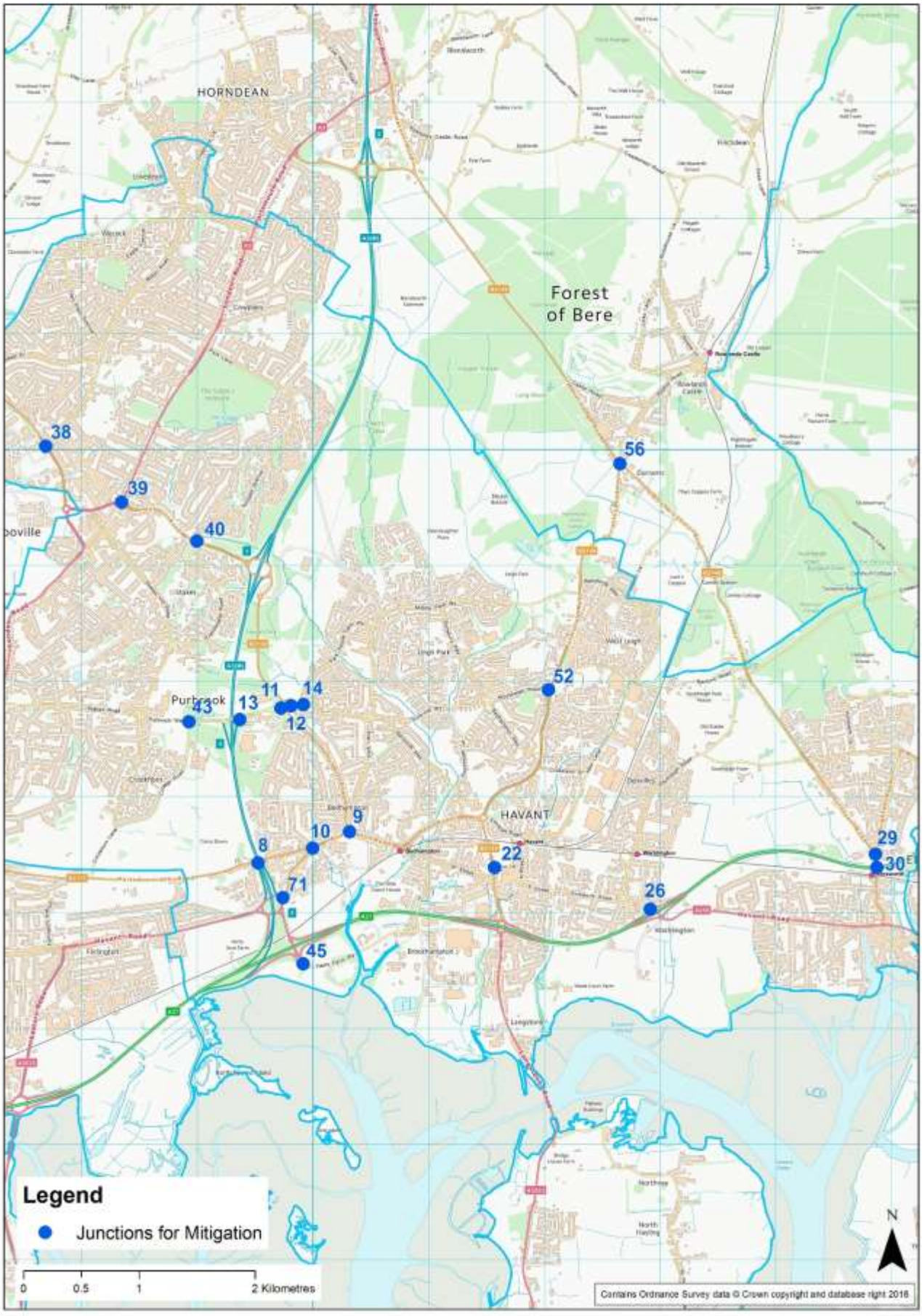
[41] Ratio of Flow over Capacity - term used for priority junction and roundabout modelling outputs whereby a ratio of less than 0.85 represents a junction performing below its theoretical capacity

10	B2177 / Bedhampton Road junction	N	R	Bedhampton Road approach at capacity in both peaks and scenarios but notable change in V/C on Portsdown Hill Rd eastbound approach in the PM peak from 64% to 80%. As below 85% does not trigger a significant flag.
71	A3(M) J5 / B2177 Bedhampton Hill (Rusty Cutter Roundabout)	s	R	The Bedhampton Hill southbound approach to the Rusty Cutter roundabout has a V/C increase in the PM from 83% in the Baseline to 91% in the Do Minimum that triggers a 'significant' impact flag. This is a result of an increase in the circulating flow of 225 PCUs in that period that reduces the opportunity for vehicles joining from the Bedhampton Hill approach.
45	Harts Farm Way approach to Teardrop junction	s	R	Traffic from Harts Farm Way joining the Teardrop junction experiences a 'significant' increase in operating V/C during the AM peak hour going from 71% in the Baseline to 86% in the Do Minimum. This is due to a flow increase of 140PCUs on this approach. The same approach is over capacity in both Baseline and do Minimum, but the relatively small V/C increase does not trigger an impact flag.
56	B2149 Durrants Road / B2148 Whichers Gate Road	s	R	The Durrants Road approach to the three-arm mini-roundabout has a V/C increase from 81% in the Baseline to 86% in the Do Minimum that triggers a 'significant' flag. The southbound Manor Lodge Road approach is over capacity in the PM both Baseline and Do Minimum but there is no change in V/C and so does not trigger an impact flag.
52	B2149 Petersfield Road / Stockheath Road	S	S	The southbound approach of Petersfield Road has a V/C increase from 79% to 112% in the AM peak associated to a 70PCU increase in flow. This triggers a 'severe' flag.
22	Park Road South / Elm Lane	S	S	The Elm Lane arm has the highest V/C at the junction and during the PM peak hour it operates at 100% in the Baseline and increases to 110% in the Do Minimum which triggers the 'severe' flag
26	Emsworth Road / A27 eastbound off-clip	S	R	The roundabout where Emsworth Road meets the A27 eastbound off-slip has a very large V/C increase in the AM from 72% in the Baseline to 105% in the Do Minimum that triggers a 'severe' impact flag That V/C increase is associated to a forecast flow increase of 270PCUs on Emsworth Rd that itself is largely the result of the Southleigh strategic site. In the PM, the A27 off-slip has a forecast V/C increase from 77% to 86% that triggers a 'significant' flag. That movement accommodates an increase of 153PCUs which is predominantly trips returning to the Southleigh strategic site.
29	B2148 Horndean Road / New Brighton Road	s	P	During the PM peak hour, the Horndean Road N/B approach to the junction has a 'significant increase in operating V/C from 67% in the Baseline to 85% in the Do Minimum. The V/C increase is the result of a flow increase of 134 PCUs on Horndean Road N/B in the PM with a high proportion making the opposed right turn to New Brighton Road.
30	B2148 Horndean Road / Interbridges Emsworth	s	T	The signalised T-junction on the B2148 is a new scheme. The increase in traffic on Horndean has resulted in the Horndean Road S/B being flagged 'significant' V/C impact but it appears this could be resolved through further signal optimisation.

S- Severe; s – significant; N – notable change

P – Priority junction; S – Signalised junction; R – Roundabout; M- Merge

Figure 20 Corridors and Junctions Identified for Potential Mitigation – Long List



5.7. Analysis of casualty impact

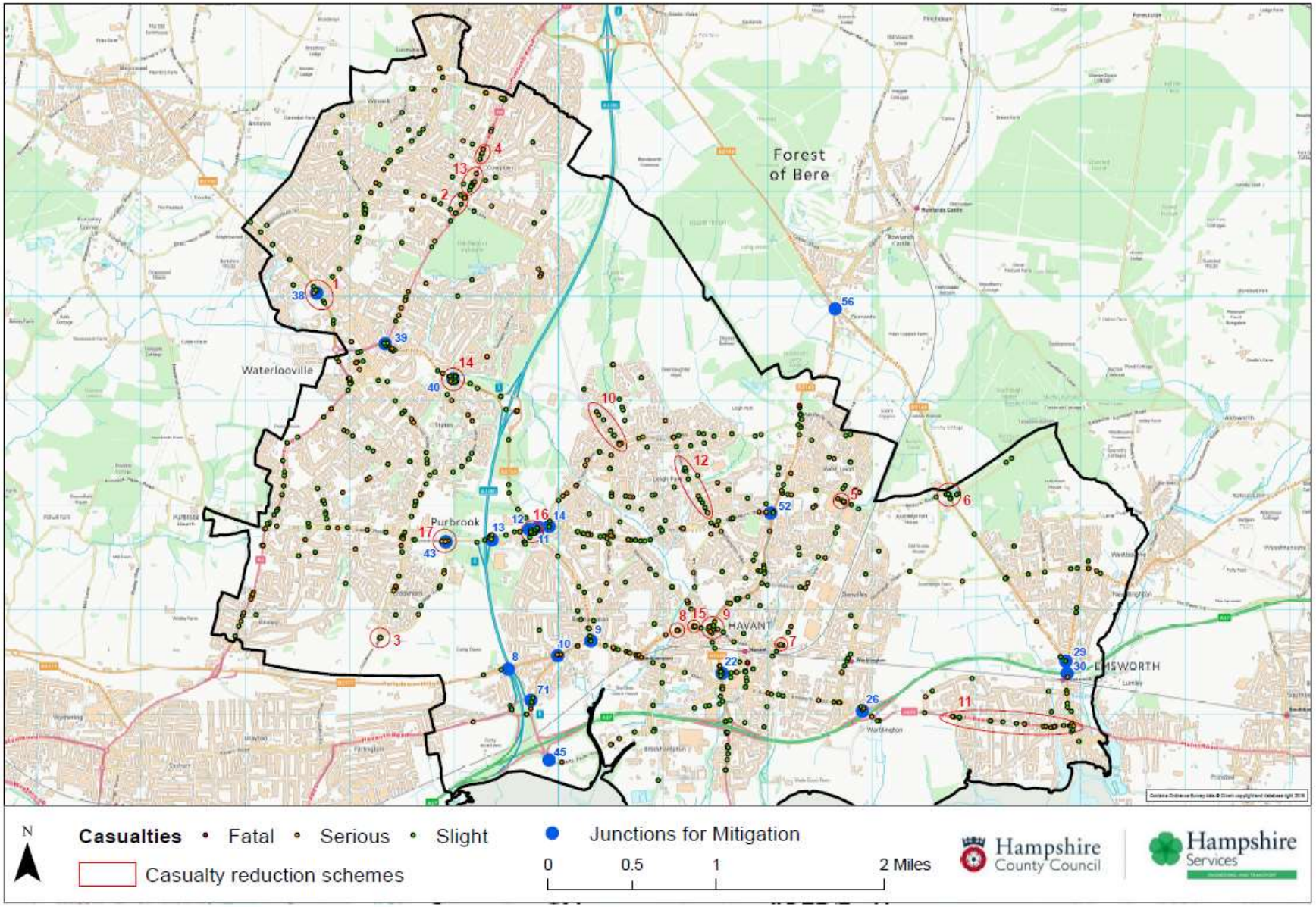
5.7.1. Figure 21 shows the locations of the proposed allocations alongside the casualty hotspots discussed in Section 3.9.

5.7.2. As discussed elsewhere in this section the proposed allocations are predicted to increase traffic flows at a number of locations. These increased flows could potentially have an adverse impact on road safety at these locations. However, Figure 21 shows that a number of these are also the locations of recently delivered; or planned, road safety interventions to address existing issues. These locations are as follows:

- Junction 38 (Table 5 scheme ref 1, planned for delivery in 2019/20)
- Junction 40 (Table 5 scheme ref 14, delivery date to be confirmed)
- Junction 43 (Table 5 scheme ref 17, planned for delivery in 2018/19)
- Junctions 11/12 (Table 5 scheme ref 16, delivered in 2016/17)

5.7.3. In addition, future planning applications for each of the proposed allocations would be required to undertake a transport assessment to consider the most recent casualty data available and mitigate impacts of their scheme. These transport assessments will be expected to consider both the capacity impacts of their development the relevant junctions highlighted in this TA and impacts on road safety.

Figure 21 Road safety schemes and junctions for assessment



5.8. Corridors and Junctions for Assessment

5.8.1. This section reviews the modelling data outputs from the long list of 18 junctions (see Table 8) in the Borough (excluding Hayling Island) expected to experience 'significant' or 'severe' impact, with an additional two experiencing a notable change due to the Local Plan proposal. The section identifies the potential interventions that may be required to address the impacts resulting from the proposed site allocations.

5.8.2. The list of junctions was presented by Hampshire Services at a workshop with Havant Borough Council, Hampshire County Council (as the Highway Authority) and the lead SRTM modeller present. The workshop drew together a localised understanding of the functioning of these junctions, as well as in depth knowledge of traffic schemes previously investigated, planned and/or delivered in the Borough. Through the workshop and a review of the impact on journey delay to road users (rather than highway capacity) eight junctions were subsequently excluded from further detailed mitigation assessment. Table 9 summarises those locations and provides the reasons why they have been excluded.

Table 9 Junctions Excluded from Detailed Mitigation Assessment

ID	Junction	Impact (1)	Type (2)	Reason for exclusion
38	B2150 Hambledon Road / Milton Road	s	R	Difference in journey time along the route through ID38, 39 and 40 is +18s (AM) and +3s (PM) for eastbound traffic and +3s (AM) and +8s (PM) for westbound traffic. This is not considered a significant increase and therefore no mitigation should be required particularly as improvements considered for the future would be towards accessibility for vulnerable users rather than highway capacity. Similarly, increases in journey time on Hulbert Rd approach is max. 7s (PM) and on Tempest Ave is 7s (AM), which are not considered detrimental to road users.
39	A3 London Road / B2150 Hulbert Road	s	R	
40	B2150 Hulbert Road / Tempest Avenue	s	R	
43	Purbrook Way / College Road	s	S	The SRTM coding results in right turning manoeuvres and thus in the V/C results being over-estimated. Detailed review of traffic movements from Waterlooville and Campdown MDAs support this observation and with junction models for proposed signals at this location based on greater levels of traffic movement than those from the SRTM, it is concluded that no additional mitigation to the proposed MDAs signalisation will be necessary..
8	A3 northbound / on-slip from A27 junction	s	M	Difference in journey times for on-slip traffic joining A3(M) is negligible (max +3s)
9	B2150 / Bedhampton Road junction	N	S	Despite a significant increase in V/C between the baseline and DM scenarios, the junction will continue to perform within theoretical capacity in the DM scenario for both peaks and therefore does not require any mitigation
29	B2148 Horndean Road / New Brighton Road	s	P	The observed high proportion of right turn into New Brighton Rd is as a result of misallocation of traffic from Southleigh directly onto New Brighton Rd instead of Horndean Rd. Regardless, the forecast difference in delays is only minor (+3s max in AM).
30	B2148 Horndean Road / Interbridges Emsworth	s	T	The 'significant' flag is due to increase of traffic along Horndean Road but the difference in delays to through traffic is only minor with max. difference of 7s in AM.

S- Severe; s – significant; N – notable change

P – Priority junction; S – Signalised junction; R – Roundabout; M- Merge

5.8.3. Table 9 shows that although ID9: B2150/Bedhampton Road shows a significant increase, it will continue to operate within capacity in the DM scenario for both peaks and does not warrant mitigation at this stage.

5.8.4. Table 9 also dismisses the need for additional mitigation at ID43: Purbrook Way/College Road. This priority junction together with the Crookhorn Lane/Purbrook Way roundabout to the west will both be converted to traffic signals as part of both the Waterlooville MDA and Campdown MDA. As a result of these schemes being 'committed', the SRTM already includes the modification to signalisation. Nevertheless, the DM model run found that this junction would exceed capacity mainly as a result of the high levels of right turning traffic from College Road. However, in the SRTM, the zones (646 and 643) that include the developments served by Crookhorn Lane and College Road can load on to either of these roads. In practise, the model results in the right turn volume out of College

Road and the left turn volume out of Crookhorn Lane being overestimated while the left turn out of College Road and right turn out of Crookhorn Lane being underestimated.

5.8.5. A review of turning movements at both junctions against those estimated in the respective Transport Assessment reports for Waterlooville and Campdown MDAs established that the Campdown MDA flows used in the modelling of the proposed signalised junctions are overall much greater than those estimated in the SRTM in both peak hours (up to 56% in AM peak). Whilst the modelling of the proposed signalisation is ongoing for this development, the forecast Performance Ratio of Capacity (PRC) for the worst-case AM scenario has been estimated as +1.8% and suggests that the signalisation proposals will be sufficient to accommodate the estimated level of traffic that will have been assumed in the SRTM. As a result, given that the proposed signalisation of the Purbrook Way/College Road junction is already included as a committed scheme and will be capable of accommodating greater levels of traffic than estimated in the SRTM DM scenario, it is concluded that no further mitigation is required for this junction.

5.8.6. Whilst the other six junctions have been identified by the model as experiencing a 'significant' or 'severe' impact on highway capacity, the resulting delays to journey times along the corridor are considered to be negligible and therefore do not warrant mitigation at this stage.

6. Do Something Model Results

6.1. Details of Potential Mitigations

6.1.1. Mitigation measures have been identified for each of the remaining 10 junctions and these were then included in the SRTM for the Do-Something scenario. Full details of the results of the DS scenario are presented in Chapter 7 of the SRTM Modelling Report with details of the measures and residual impacts at each of the 10 locations presented in the following sections.

6.1.2. The 10 junction locations considered are:

- ID13 Purbrook Way junction with junction 4 A3(M) on slip
- ID11/12 Asda roundabout (Purbrook Way/ Hulbert Rd)
- ID14 Purbrook Way / Parkhouse Farm Way Junction
- ID10 Bedhampton Road / Bedhampton Hill Roundabout
- ID71 Rusty Cutter Roundabout
- ID45 Harts Farm Way approach to Tear Drop
- ID56 B2149 Durrants Road / B2148 Whichers Gate Road roundabout
- ID52 Petersfield Road / Stockheath Road Junction
- ID22 Park Road / Elm Way Junction
- ID26 Emsworth Road / A27 Slips

6.1.3. The junctions considered in this Transport Assessment are those considered to be critical to the success of the Local Plan developments and most likely to require works at the strategic level to accommodate the Local Plan development. It should be noted that the list of junctions that may require mitigation is not exhaustive and other junctions and links within the modelled area may also require improvements in further studies as the Local Plan is taken forward. It is also important to note that the mitigation presented is to demonstrate that the level of development proposed is capable of mitigation – it is not intended to present a preferred package of works or to advocate specific junction designs. The final design solutions would be developed as and when the individual proposals come forward to take account of any changes in traffic patterns and other infrastructure schemes coming forward in intervening years; and to ensure that inclusion of infrastructure for sustainable modes is considered.

6.1.4. This section also offers an indication of costs for each of the potential mitigations proposed.

ID13 - Purbrook Way A3(M) J4 southbound on-slip (B&Q roundabout)

6.1.5. As detailed in Table 8, the westbound flow on the Purbrook Way approach increases by approximately 83PCUs in the AM peak hour and the operating V/C on the Purbrook Way westbound approach increases from 77% to 86% triggering the 'significant' impact flag as defined in para 5.6.3. The eastbound approach is over capacity in both Baseline (101%) and Do Minimum (102%) but the increase does not trigger an impact flag.

Figure 22 Aerial View of Junction 13 - Purbrook Way A3(M) J4 southbound onslip (B&Q roundabout)

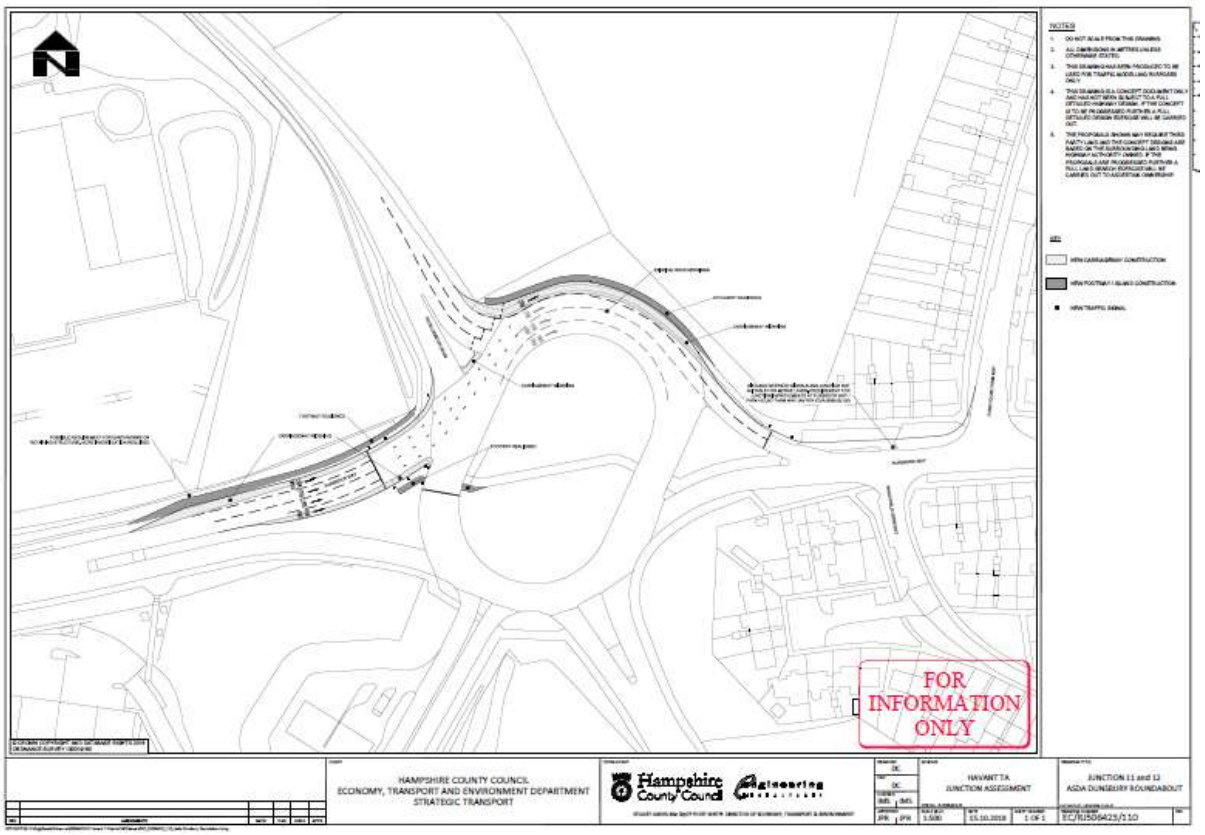
6.1.6. As a result, a 'jet lane' has been modelled on the westbound approach, as shown on Drawing EC/RJ506429/103 attached in Appendix N of the SRTM Modelling Report. This arrangement will enable traffic wishing to access the A3(M) southbound to do so without requiring it to give way to circulatory traffic at the roundabout. The proposals also include some minor widening of the eastbound approach and reduction of the central island to facilitate manoeuvring around the junction and ensure this addresses issues of poor lane management.

ID11/12 – 'Asda' Roundabout

6.1.7. The main impact of the Local Plan allocation at this junction is on the Purbrook Way westbound signalised approach which has a forecast V/C increase from 85% to 95% in the PM that triggers a 'severe' impact flag as defined in para 5.6.3. The same approach is at capacity in the AM but the increase between Baseline and Do Minimum does not trigger an impact flag.

6.1.8. Hulbert Road southbound approach is also over capacity in the PM in both Baseline (103%) and Do Minimum (106%) but the increase does not trigger an impact flag. The high V/C on the southbound approach is related to the increase of 182 PCUs vehicles travelling eastbound on Purbrook Way and reducing gaps to join the roundabout for Hulbert Road.

Figure 23 Junction 11/12 - 'Asda' Roundabout



42

6.1.9. Drawing EC-/RJ506423/110 attached in Appendix N of the SRTM Modelling Report shows the potential mitigation. To address the above capacity issues, improvements to the Purbrook Way eastbound approach have been considered to allow four lanes at the stop line to this already signalised approach. Consequently, the circulatory width past the Hulbert Road approach has also been widened to four lanes. Due to the proximity of the junction with Park House Farm Way in the east,

[42] Recent aerial photography not available at this location.

which prevents a suitable merge lane, it has also been necessary to signalise the exit lanes onto Purbrook Way.

6.1.10. In this potential mitigation design, minor modifications to the footways through the junction have also been made as a result of widening of the various approaches.

ID14 Purbrook Way / Park House Farm Way Junction

6.1.11. Purbrook Way operates in excess of 100% V/C in the Do Minimum in the AM PM peak hour. The increase from the Baseline (75%) triggers a 'severe' impact flag as defined in para 5.6.3. This is a result of the increase in mainline flows along Purbrook Way which reduces the opportunities and capacity for traffic exiting from Park House Farm Way, particularly right turning manoeuvres.

Figure 24 Aerial View of Junction 14 - Purbrook Way / Park House Farm Way Junction

6.1.12. It should be noted that the high level of delays for traffic exiting Park House Farm Way results in the SRTM routing left turning traffic onto Purbrook Way (eastbound) at the junction with Linkenholt Way, approximately 380m to the east. As a result, the junction modelling of the mitigation measures has taken this into account by manually re-assigning traffic onto the correct junction to ensure the effect of the mitigation is fully understood.

6.1.13. Drawing EC/RJ506423/105 attached in Appendix N of the SRTM Modelling Report provides details of the potential mitigation, which is to fully signalise the existing priority junction to enable traffic to exit from Park House Farm Way,

particularly right turning manoeuvres towards the Asda roundabout. Widening of the Purbrook Way eastbound approach to two lanes has been modelled to tie in with the mitigation at the Asda roundabout. Timings of the signals would also be linked with those suggested for the exit lanes to Purbrook Way at the Asda roundabout to ensure effective use of the network but also for safety reasons.

ID10 - B2177 / Bedhampton Road Roundabout

6.1.14. Junction 10 was considered a "notable" junction as defined in para 5.6.4 in that it does not show a significant or severe impact as a result of the proposed Local Plan developments. Therefore, it was originally discounted from the short list. Notwithstanding, the review of impacts at the downstream B2177 Bedhampton Hill/ Rusty Cutter Roundabout (Junction ID71) showed a moderate difference in total journey delay to vehicles between the two junctions in the northbound direction, suggesting capacity issues at the approach to the Portsdown Hill / Bedhampton Hill junction affect Junction ID71. Therefore, mitigation at junction ID10 has been reconsidered as part of addressing the wider impacts at Junction ID71.

Figure 25 Aerial View of Junction 10 - B2177 / Bedhampton Road Roundabout

6.1.15. Drawing EC/RJ506423/104 attached in Appendix N of the SRTM Modelling Report shows that mitigation at Junction ID10 primarily involves converting the mini-roundabout junction to a fully signalised junction, with local kerb realignment and widening on the Bedhampton Hill and Maylands Road approach. This also enables improvements to the pedestrian infrastructure by introducing a full signalised

crossing on the Bedhampton Road westbound approach, where the carriageway is at its widest with four lanes and a central reserve.

ID71 - Rusty Cutter Roundabout

6.1.16. At the Rusty Cutter roundabout, the impact of the Local Plan allocation showed an increase in V/C at the Bedhampton Hill southbound approach in the PM from 83% in the Baseline to 91% in the Do Minimum that triggers a 'significant' impact flag as defined in para 5.6.3. This is a result of an increase in the circulating flow of 225 PCUs in that period that reduces the opportunity for vehicles joining from the Bedhampton Hill approach.

Figure 26 Aerial View of Junction 71 - Rusty Cutter Roundabout

6.1.17. To facilitate traffic from Bedhampton Hill joining the A27 in the PM, an express lane ('jet lane') has been modelled alongside the existing shared pedestrian/cycle lane. This would also require modifications to the lane markings along the circulatory lanes past the approach as shown on Drawings EC/RJ506423/101 and EC/RJ506423/102 attached in Appendix N of the SRTM Modelling Report. Removal of traffic between Bedhampton Hill and the A27 from the junction will in turn improve capacity at both the A3(M) and A27 on-slip approaches. The final future design at this location will be required to maintain safe pedestrian and cycle movements.

ID45 - Harts Farm Way approach to Teardrop junction

6.1.18. Traffic from Harts Farm Way joining the Teardrop junction experiences a 'significant' increase in operating V/C during the AM peak hour going from 71% in the Baseline to 86% in the Do Minimum. This is due to a flow increase of 140PCUs on this approach. The same approach is over capacity in the PM peak in both Baseline and Do Minimum, but the relatively small V/C increase does not trigger an impact flag.

Figure 27 Aerial View of Junction 45 - Harts Farm Way approach to Teardrop junction

6.1.19. Both currently, and in the future scenario, whilst the circulatory lane and the A27 off-slip are signalised and allow creation of gaps in the 'platoons' of traffic past Harts Farm Way, these are not sufficient to create adequate capacity for traffic exiting Harts Farm Way, which consequently queues back, especially in the PM peak.

6.1.20. As with Junction ID71 above, to facilitate traffic exiting Harts Farm Way from being 'blocked' by circulatory traffic, an express lane ('jet lane') has been modelled alongside the existing shared cycle route as shown on Drawing EC/RJ506423/114 attached in Appendix N of the SRTM Modelling Report. This would in effect bypass the circulatory traffic and provide a 'free-flowing' lane for this approach. This arrangement will also help deal with the increase in circulatory traffic from the Rusty Cutter roundabout wishing to join the A27 (eastbound) following mitigation at that location.

ID56 - B2149 Durrants Road / B2148 Whichers Gate Road Roundabout

6.1.21. Junction ID56 combines with Junction ID57 in the SRTM to provide the double mini-roundabout arrangement linking the B2146 with the B2149 north of Havant. Whilst this junction is outside of the Borough Council's administrative boundary, it provides an important link between the town and areas in East Hampshire. It is also an alternative route between the A3(M) and the A27 west. As such, consideration for mitigation as part of the Havant Local Plan allocations has been included in this TA.

6.1.22. The Durrants Road approach to the three-arm mini-roundabout has a V/C increase from 81% in the Baseline to 86% in the Do Minimum that triggers a 'significant' impact flag as defined in para 5.6.3. The southbound Manor Lodge Road approach is over capacity in the PM both Baseline and Do Minimum but there is no change in V/C and so does not trigger an impact flag.

Figure 28 Aerial View of Junction 56 - B2149 Durrants Road / B2148 Whichers Gate Road Roundabout

6.1.23. The forecast heavy flows carried by the current double mini-roundabout arrangement along the main Manor Lodge Road/B2149 corridor constrain the ability of traffic exiting from the side approaches. As a result, a modification from the current arrangement to a full signalised junction has been modelled. This is shown on Drawing EC/RJ506423/113 attached in Appendix N of the SRTM Modelling Report. This would also require some local widening of the Redhill Road and Whichers Gate Road approaches.

ID52 – B2149 Petersfield Road / Stockheath Road Junction

6.1.24. The southbound approach of Petersfield Road has a V/C increase from 79% to 112% in the AM peak associated to a 70PCU increase in flow. This triggers a 'severe' impact flag as defined in para 5.6.3.

Figure 29 Aerial View of Junction 52 - B2149 Petersfield Road / Stockheath Road Junction

6.1.25. A detailed review of the SRTM outputs indicates that the increase in right turning manoeuvres is as a direct consequence of the way the Southleigh Local Plan allocation has been modelled, with demand from this development spread over three separate zones of which two link directly onto Southleigh Road. With no new direct access onto the A27 proposed at this stage, this traffic appears to route west along Bartons Road to access the B2149 Petersfield Road, which then either travels south to access the A27 or west along Stockheath Road, becoming Purbrook Way to the west to link to the A3(M).

6.1.26. In this instance, no physical mitigation measures have been modelled but the existing signal timings have been reviewed and updated to reflect changes in the traffic volumes forecast on each approach at the junction.

ID22 – Park Road South / Elm Lane Junction

6.1.27. The junction as a whole operates at capacity in the baseline with the Elm Lane approach experiencing the greatest V/C. During the PM peak hour this was forecast to operate at 100% in the Baseline and to increase to 110% in the Do Minimum, triggering the 'severe' impact flag as defined in para 5.6.3.

Figure 30 Aerial View of Junction 22 - Park Road South / Elm Lane Junction

6.1.28. This key junction in the town centre area of Havant provides the main access to the rail and bus stations. The public park known as Havant Park and specifically the location of a protected tree at the north-east corner of the signalised junction is a key constraint for improvement of this junction. The heavy traffic volumes along the B2149 (Park Road North and South) corridor, which provides the main link between the A27 and the town centre, requires the majority of green time which restricts the capacity of the Elm Lane approach.

6.1.29. As a result, a number of options have been considered to increase the 'stop line capacity' at the Park Road southbound approach, which would allow greater flexibility for signal timings at this location. Two options were developed at this stage and whilst both would be modelled in similar ways in the SRTM, Option 2 as shown on Drawing EC/RJ506423/112 attached in Appendix N of the SRTM Modelling Report is presented in this Transport Assessment. These options, in effect, remove the left turning manoeuvres from Park Road North onto Elm Lane from the junction and allow the resulting released capacity to be allocated to the other approaches at the junction. It should be noted however that this option has a

significant impact on the park and more detailed work will be needed to establish whether this is a suitable option when taking into account wider factors other than traffic capacity alone.

ID26 – A27/ Emsworth Road Roundabout

6.1.30. The A27/Emsworth Road roundabout junction is identified in the SRTM as Junction ID26, which has been highlighted as requiring mitigation in the short list of junctions. The roundabout where Emsworth Road meets the A27 eastbound off-slip will experience a significant decrease in junction performance (expressed as V/C) in the AM from 72% in the Baseline to 105% in the Do Minimum. This triggers a 'severe' impact flag as defined in para 5.6.3. That increase in V/C is associated with a forecast flow increase of 270 PCUs on Emsworth Rd that itself is largely the result of the Southleigh strategic site. In the PM, the A27 off-slip has a forecast V/C increase from 77% to 86% that triggers a 'significant' impact flag. That movement accommodates an increase of 153 PCUs which is predominantly trips returning to the Southleigh strategic site.

Figure 31 Aerial View of Junction 26 - A27/ Emsworth Road Roundabout

6.1.31. The proposals modelled in the DS scenario as initial mitigation are illustrated on Drawings EC/RJ506423/107 to 109 attached in Appendix N of the SRTM Modelling Report and include the following:

- Widening of the A27 eastbound off-slip to three lanes

- Modification of the northern dumbbell roundabout to a signalised junction including local widening of the A27 on- and off-slips and of the Emsworth Road approach

- Widening of the A259 exit lane carriageway at the southern dumbbell roundabout to allow effective use of two exit lanes

6.1.32. As with all proposals in this TA, it should be remembered that whilst the designs illustrate that the Local Plan impact can be mitigated, they are not considered to be final detailed designs. The final design solutions would be developed as and when the individual proposals come forward.

6.2. Do-Something Highway Network Performance

6.2.1. The above mitigation measures have been included in the SRTM to provide the 2036 Do-Something (DS) scenario with full details of the results of the modelling and residual impacts of the mitigation measures presented in Chapter 7 of the SRTM Modelling Report. This detailed analysis of the DS results is summarised below.

6.2.2. Vehicle Hours increase by approximately 9% and Vehicle Kilometres by 5% between the Baseline and Do Something scenarios within Havant. These increases are smaller than those in comparison with the DM (10% and 5% respectively) and thus reflect the positive impact of the potential mitigations. The average speed (48.6kmph) in the Borough decreases by 3% in the Do Something scenario compared to the Baseline. That represents a smaller reduction than in the Do Minimum (4.5%) where the average forecast speed dropped to 48.1kmph.

6.2.3. The model also analyses the forecast change in network flows and delays between the 2036 Do-Minimum (DM) and 2036 Do-Something (DS) scenarios to provide an indication of the residual impacts of the proposed Local Plan allocations following mitigation.

6.2.4. The nature of the SRTM means that where additional capacity is introduced on a modelled network that is operating under unconstrained demand, re-routing of traffic occurs and released capacity often attracts traffic demand from other routes This can, in turn, can dampen or fully absorb the mitigation scheme benefits in terms of junction performance. The observed forecast traffic flow increases at the locations where mitigation measures have been implemented to alleviate capacity issues are due to this phenomenon. This can also result in congestion points elsewhere on the network that are not forecast in earlier DM scenarios. This re-assignment of traffic is representative of actual changes in driver behaviour when deciding on a route to avoid congested areas and whilst, in reality, a number of factors other than driver delay can affect route choice, traffic re-assignment within the network is an expected knock-on effect of the model. Details of knock-on effects resulting from the potential mitigation measures elsewhere on the network are explored later in this section.

6.2.5. In most locations, the forecast flow changes as a result of the mitigation measures are more pronounced in the PM peak reflecting the greater congestion at this time of day and are noticeable along the following corridors:

- Asda Roundabout and Park House Farm Way
- Park Road/ Elm Lane and Emsworth Road/A27
- Harts Farm Way/Teardrop Junction, Rusty Cutter and Bedhampton Hill/Bedhampton Road junctions
- Whichers Gate Road/Redhill Road junction

6.2.6. Paras 7.3.7 to 7.3.15 of the SRTM Modelling Report provide a detailed commentary on the forecast larger flow changes at individual mitigated junctions, including the interaction with adjacent junctions. Para 7.3.32 of the SRTM Modelling Report concludes that there is no meaningful change in performance in the Do Something at those junctions from the long list where mitigation has not been modelled as shown in Table 10. The review of the significance of those impacts at this location for the DM scenario and the conclusion that no mitigation is required at these locations therefore remain valid for the DS scenario.

Table 10 Junction Performance Summary 2036 Do-Minimum & Do-Something Comparison – Sites with No Potential Mitigation Modelled

ID	Junction	DM	DS
38	B2150 Hambledon Road / Milton Road		
39	A3 London Road / B2150 Hulbert Road		
40	B2150 Hulbert Road / Tempest Avenue		
43	Purbrook Way / College Road		
8	A3 northbound / on-slip from A27 junction		
9	B2150 / Bedhampton Road junction		
29	B2148 Horndean Road / New Brighton Road		
30	B2148 Horndean Road / Interbridges Emsworth		

Key:
Green – junction operating within theoretical capacity;
Orange: junction operation representative of a 'significant' impact;
Red: junction operation representative of a 'severe' impact

6.2.7. The changes in junction performance for the sites with potential mitigation are summarised in Table 11. The table demonstrates that of the five junctions that would otherwise experience a 'severe' impact in the DM scenario, four of these will experience a considerable reduction in the magnitude of impact from 'severe' to 'operating within theoretical capacity'. The remaining 'severe' junction will also experience a reduction in impact magnitude albeit more moderate from 'severe' to 'significant'. A further two junctions will experience a more moderate reduction in magnitude of impacts from 'significant' to 'operating within theoretical capacity'.

Overall, all but three (ID13, 26 and 56) of the ten mitigated junctions are forecast to no longer experience a 'significant' or 'severe' impact and these are discussed further below.

Table 11 Junction Performance Summary 2036 Do-Minimum & Do-Something Comparison – Sites with Potential Mitigation Modelled

ID	Junction	DM	DS
13	Purbrook Way A3(M) J4 southbound on-slip (B&Q roundabout)		
11/ 12	Purbrook Way westbound approach and Hulbert Road southbound approach to Asda roundabout		
14	Purbrook Way / Parkhouse Farm Way		
10	B2177 / Bedhampton Road junction		
71	A3(M) J5 / B2177 Bedhampton Hill (Rusty Cutter Roundabout)		
45	Harts Farm Way approach to Teardrop junction		
56	B2149 Durrants Road / B2148 Whichers Gate Road		
52	B2149 Petersfield Road / Stockheath Road		
22	Park Road South / Elm Lane		
26	Emsworth Road / A27 eastbound off-clip		

Key:
Green – junction operating within theoretical capacity;
Orange: junction operation representative of a 'significant' impact;
Red: junction operation representative of a 'severe' impact

6.2.8. For Junction ID13 (Purbrook Way junction with A3(M) SB on-slip known as the B&Q Roundabout), the westbound approach nearside lane is converted to a left turn jet lane at the roundabout meaning traffic joining the A3(M) on-slip do not need to give way at the roundabout. This improvement scheme addresses the AM peak capacity issues on Purbrook Way westbound but result in an increased V/C in the PM peak due to the reduced capacity of the east to west ahead movement (reduced from 2 lanes to 1 as a result of the jet lane). The increase in V/C is from 80% in the DM to 90% in the DS; however this is combined with a reduction in V/C on the Purbrook Way eastbound approach in the same period (from 83% to 80%). Overall, the junction will remain working within capacity in the PM peak and the slight forecast increase in V/C is not considered to be material.

6.2.9. At Junction ID26 (Emsworth Road junction with A27 EB off-slip), the existing roundabout is converted to a signalised junction with dedicated left turn lanes from Emsworth Road to the A27 eastbound on-slip and for A27 eastbound off slip onto Emsworth Road. These dedicated lanes mean that traffic making these movements does not need to wait at the new traffic signals. The potential improvements address the forecast capacity issues on Emsworth Road eastbound and the A27 off-slip, however traffic travelling westbound on Emsworth Road has increased in V/C to

91% in the PM peak that is classified as significant. However, overall, the V/C on all three approaches modelled in the AM peak will remain below 78%, with that for the PM peak below 91%. This is a significant improvement to the DM scenario, which forecast V/C on the Emsworth Road approach of 105% and 104% in the AM and PM respectively. This is reflected in the forecast delays for traffic travelling eastbound on Emsworth Road to the A27 junction which will benefit from a delay reduction of more than one minute in both the AM and PM peak periods following the junction being changed from a roundabout to signals. Overall, it is therefore concluded that the potential mitigation will benefit the junction as a whole in future.

6.2.10. At Junction ID56 (B2149 Durrants Road/ B2148 Whichers Gate Road), the existing two mini roundabouts at Manor Lodge Road / Whichers Gate Road with Durrants Road and Redhill Road have been modelled as a single signal operated junction. The forecast results of this scheme are mixed. Manor Lodge Road sees a reduction in V/C in both peaks, but Whichers Gate Road has an increase in both with V/C between 85-90% while Durrants Road has an increase in V/C in the AM peak and a reduction in the PM peak. Overall, however, the maximum V/C forecast at the junction in the AM peak will remain the same in both DM and DS scenario and will reduce from 103% to 99% in the PM peak. Given that the performance of a double mini-roundabout arrangement is complex and thus will not be accurately modelled by the strategic model, more detailed junction modelling work would need to be undertaken in future and the mitigation (which may be different to that modelled for the DS scenario) reviewed accordingly. As the junction is outside of HBC's administrative boundary, it is recommended that the impact at this location is reviewed as part of East Hampshire Borough Council's own Transport Assessment in consultation with Hampshire County Council as the Highway Authority.

6.2.11. The Do Something scenario has also resulted in three further junctions that now fulfil the 'severe' impact criteria:

- ID3 Merge from teardrop with A3(M)
- ID25 Emsworth Road/Southleigh Road junction
- ID33 Hulbert Road/Dunsbury Farm junction

6.2.12. The impacts at these three junctions are the "knock-on" effects of the mitigation measures modelled at junctions upstream. As explained in paragraph 6.2.4, where additional capacity is added to junctions on the network, these junctions can become more attractive and traffic re-assigned from elsewhere on the network. Therefore, although it would be difficult to attribute these impacts as a direct result of the Local Plan allocations, it is recognised that these locations are likely to require further consideration. It should also be noted that, whilst the SRTM includes a number of committed infrastructure schemes, the capacity constraints observed at the above three locations reflect issues that will be arising as a result of mitigating the above junctions in the absence of addressing congestion at other

locations on the network. As shown in the Baseline model, there is a large number of junctions expected to exceed capacity over the Local Plan period as a result of growth in background traffic and already committed developments. It is therefore expected that the Highway Authority will bring forward junction improvements, where required, to alleviate congestion on the network prior to the end of the Local Plan period. It is therefore expected that the detailed design of the potential mitigation measures detailed above will consider in greater detail any knock-on effects at nearby locations along the network and any additional infrastructure improvement to that modelled that may arise in the intervening period.

6.2.13. It is suggested that these more detailed considerations could include the following measures and assessment methods:

- ID3 – this is a complex 4-lane merge arrangement where a significant level of weaving between all lanes occurs at this location due to the proximity of the downstream Eastern Road interchange. It is therefore recommended that a detailed review of merge capacity in line with DMRB principles is undertaken to establish the requirement for additional mitigation, particularly as this would only be required once the works identified at the Teardrop junction are completed.

- ID25 – a review of signal timings at this location to reflect the new balance of flows at this junction may resolve the issue. Alternatively minor alterations to the junction layout may be required. As with the above junction ID3, this would only be required once the works identified at the A27/Emsworth Road junction (ID26) are completed.

- ID33 – This junction is also modelled as a node connector to the zone representing Dunsbury Park and in this instance, a detailed assessment using ARCADY software and updated survey flows would be advisable now the works at the Asda roundabout are complete to establish whether additional mitigation is required

6.3. Southleigh Local Plan Allocation

6.3.1. Whilst the TA has assessed the impact of the proposed Local Plan allocations as a whole on the Borough's network, it is acknowledged that the proposed development known as Southleigh will be a major contributor in terms of delivering the planned housing needs and associated traffic generation for both the locality and the Borough.

Background

6.3.2. The Southleigh Local Plan allocation is a strategic residential site between Denvilles and Emsworth that was first identified in the Local Plan Housing Statement in 2016.

6.3.3. It was anticipated at the time that a new junction with the A27 would be needed to allow this large-scale development to take place. This would be connected to a link road running north-south through the site, serving not only the development, but also potentially relieving the highway network in the surrounding area, including Southleigh Road and Havant Town Centre.

6.3.4. A high-level appraisal showed that the likely costs of this, based on high level design options, did not make the site unviable. On that basis, the site, together with a statement that a new junction on the A27 and associated link road north would be needed, were included in the Local Plan Housing Statement. This draft policy document was consulted on and subsequently adopted as an interim policy position in 2016, before forming the basis of the first full draft Local Plan.

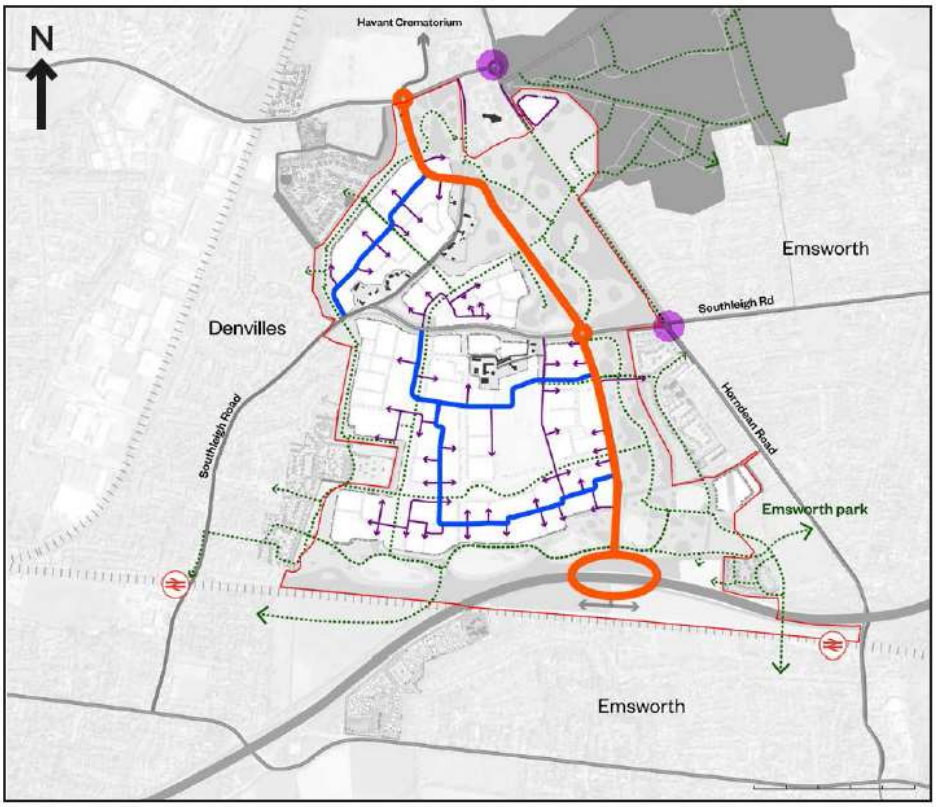
6.3.5. The original intention had been to complete a full borough wide TA before a formal draft local Plan with site allocations was consulted on. However, due to factors beyond the Borough Council's control, it was not possible to complete the TA at that time.

6.3.6. Design workshops were held with local residents and other key stakeholders in March 2017 and shaped a draft masterplan published in December 2017[43]. This showed that the site is capable of delivering up to 2,100 new homes, a new primary school, community centre, nursery, small parade of shops and new parks and open spaces. The masterplan took forward the assumed need for the junction and planned it into a draft high-level layout for the site, as illustrated on the extract of the draft masterplan in Figure 32.

6.3.7. A number of draft options for a new or reconfigured junction access onto the Strategic Network (A27) have been prepared by the Borough Council in a parallel exercise. At a meeting with Highways England in June 2018 to discuss the opportunities for a new direct access onto the A27, it was confirmed that assessment of options that made use of the existing junction at Warblington, rather than a new junction, would be favoured in the first instance. This position was reaffirmed by Hampshire Services, who, on examining the results of the DM runs and considering possible mitigation options, advised that it would be possible to design mitigation measures to deal with the impact of the proposed Local Plan development in a way that required smaller scale intervention.

[43] Havant Borough Council, Levitt Bernstein, *Denvilles-Emsworth Masterplan Document* (December 2017)

Figure 32 Proposed Denvilles-Emsworth Masterplan Movement Plan (Extract)[44]



6.3.8. For the purpose of this TA, traffic from Southleigh will thus continue to route via the existing network. In the absence of a new direct link to the A27, the DM scenario represents the worst-case impact of this allocation site onto Havant's roads. This approach will, however, need to be revisited at the planning stage., and when the strategic context is firmer e.g. demands from adjoining authority areas. It may also need to account for the outcome of additional assessments of any of the preferred options detailed in the "Southleigh – A27 Junction Report". Should it be established in the future that a new direct A27 link with the A27 is needed, the impact of this on the network will need to be re-assessed, either as a stand-alone feasibility study or as part of the associated Transport Assessment for the development.

Modelling of Southleigh in SRTM

6.3.9. The strategic Southleigh site has thus been modelled in the SRTM based on the 2,100 homes spread across three model zones shown on Figure 16 and defined as follows:

- Zone 608 – accommodating 1,700 dwellings
- Zone 609 – accommodating 200 dwellings
- Zone 614 – accommodating 200 dwellings

[44] [44] Havant Borough Council, Levitt Bernstein, *Denvilles-Emsworth Masterplan Document* (December 2017)

6.3.10. In the SRTM, traffic from both zones 608 and 609 is 'loaded' onto the link representing Southleigh Road while zone 614 connects to the link representing New Brighton Road. In practice, the Southleigh development would not be accessed directly from this corridor and whilst this has no bearing on the validity of the SRTM assignment across the network as a whole, it does have implications at local level, particularly to the performance of the New Brighton Road/ Horndean Road junction, where a proportion of residents returning home in the PM will be forecast as right turning traffic at the junction when in practice these movements would travel unobstructed northbound along Horndean Road.

6.3.11. One of the stated benefits of the draft masterplan for Southleigh is that the new A27 junction and spine road would "*remove traffic from surrounding roads, and in particular, relieve traffic from Havant town centre*". Concerns from local residents have also been raised as to the impact of such a large-scale development on Southleigh Road, in particular given the presence of the Warblington level crossing (see Section 6.3.17).

6.3.12. Whilst the comparison between the Baseline and DM scenarios isolates the impacts of the Local Plan allocations as a whole, the way the SRTM can re-assign background and development traffic to avoid congested areas can make it difficult to accurately isolate the impact of specific development sites. However, it is likely that proximity of the Southleigh development to Havant town centre, the A27/Emsworth Road junction and the Warblington level crossing will directly contribute to the forecast changes at these locations. This is explored further below.

Impacts of Southleigh on Havant Town Centre

6.3.13. The plots showing the difference in flows between the Baseline and the DM scenario, as shown below (and Appendix C of the Modelling Report), provide an indication of the likely impact on Havant town centre.

Figure 33 Changes in Flows – Baseline vs Do-Minimum (AM Peak)

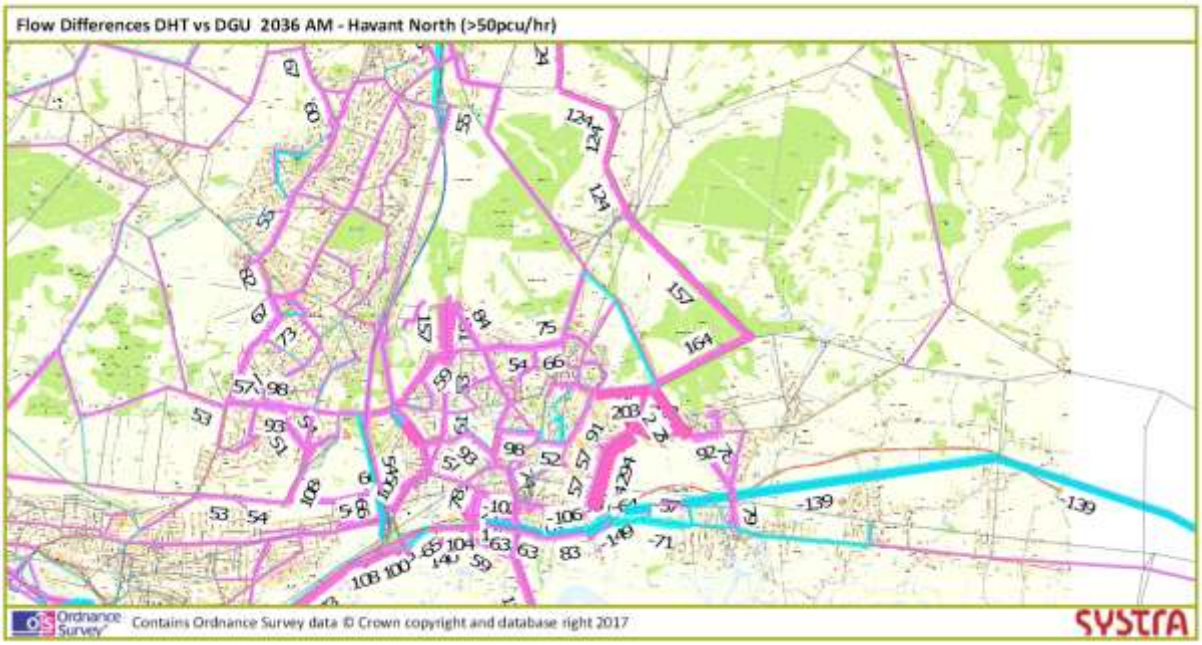
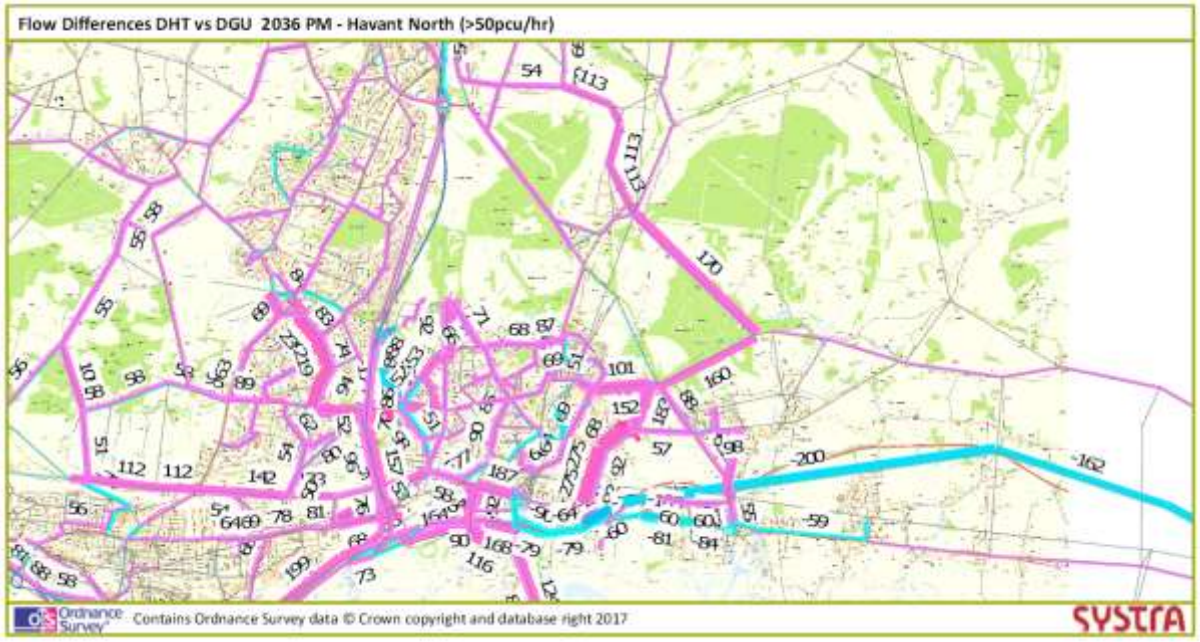


Figure 34 Changes in Flows – Baseline vs Do-Minimum (PM Peak)



6.3.14. They show that there are large increases on Southleigh Road (as would be expected), Barton's Road, Horndean Road, Emsworth Common Road, and Woodberry Lane that correspond with the large Southleigh strategic development site. It also shows increases in the town centre, but these would be a combination of the Local Plan allocations and re-assigned traffic as a whole. On the other hand, there is a reduction of forecast flows on the A27 corridor to the eastern side of the Borough. In the Do Minimum there are more trips using the A27 and then exiting at the Emsworth junction towards the Southleigh development and fewer continuing on the A27 towards Chichester area (this ties in with the fewer 'outbound' trips in the westbound direction in the AM from Chichester area). This would suggest that

despite having modelled no direct new access onto the A27, the majority of Southleigh traffic would be able to access the strategic network in the peak hours and thus limit the impact on Havant town centre roads.

6.3.15. Notwithstanding these overall flow increases, the extracts of figures from the Modelling Report (6.5 and 6.7 of that document) reproduced below as Figures 35 and 36) clearly show that the Local Plan allocation (as a whole) will have limited impact on the town centre with maximum increases in delay of 19 seconds in the PM peak and no noticeable change in the AM peak.

Figure 35 Changes in Vehicle Delays – Baseline vs Do-Minimum (AM Peak)

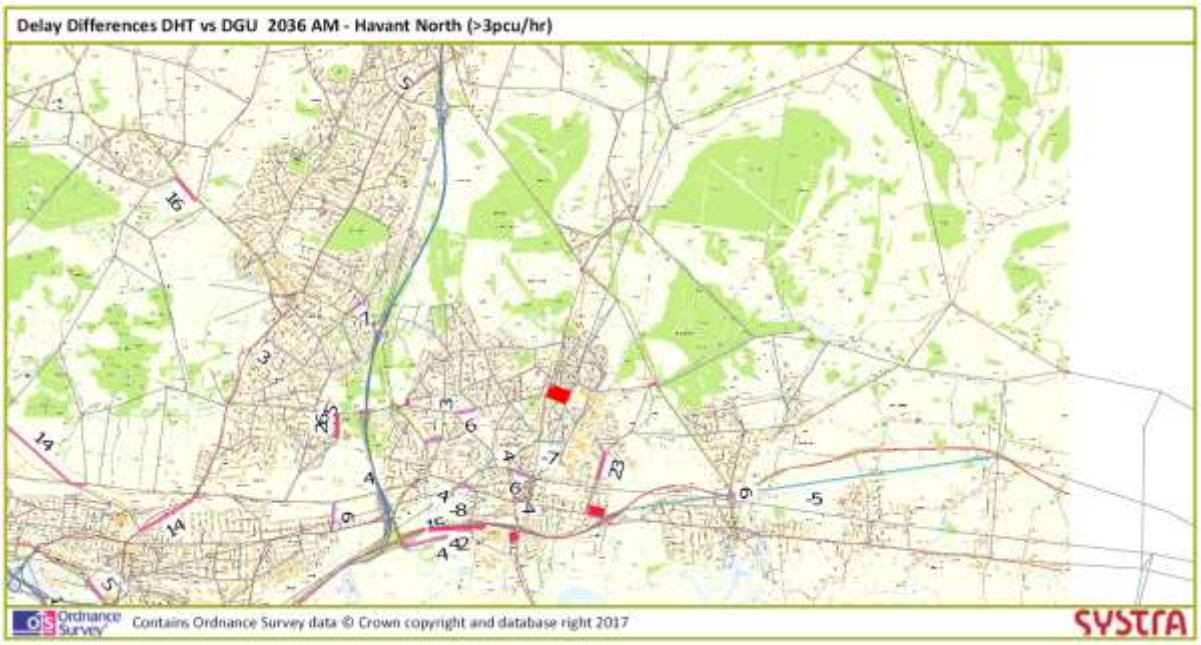
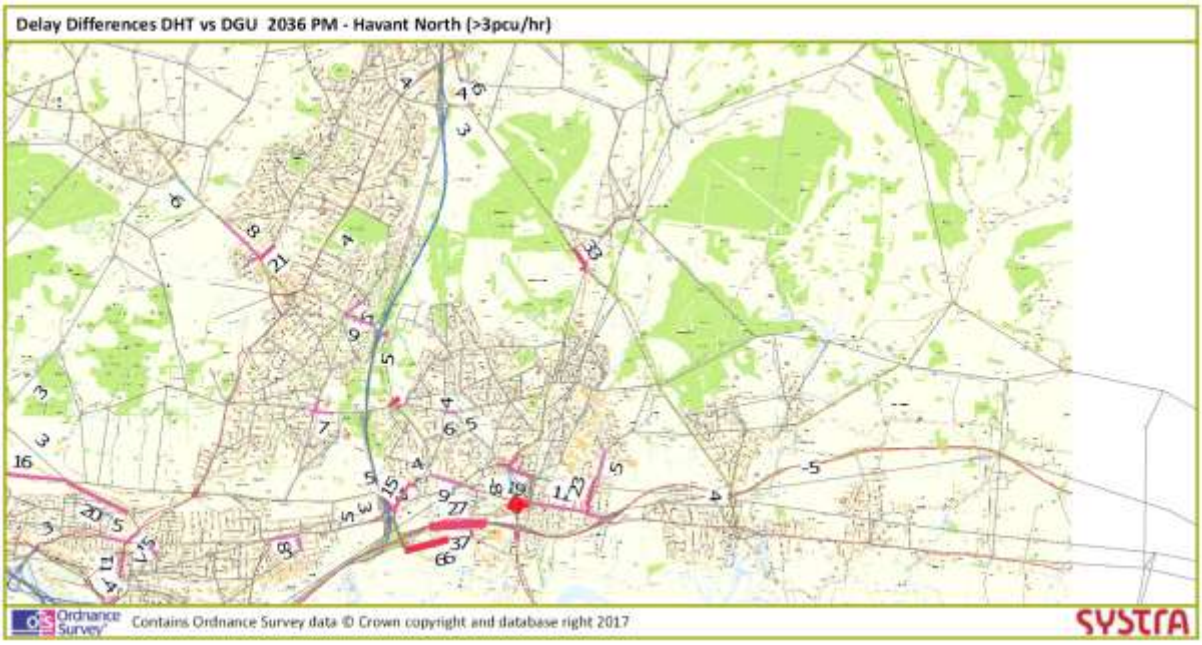


Figure 36 Changes in Vehicle Delays – Baseline vs Do-Minimum (PM Peak)



6.3.16. Overall, whilst a more detailed assessment of the impacts of Southleigh development will be required at a level more local to the Site, the strategic modelling of the Local Plan does not suggest any material increases or impacts on Havant Town Centre as a consequence of this allocation.

Southleigh Road and Warblington Level Crossing

6.3.17. The Southleigh forecast traffic has been assigned by the model to route along two primary corridors; Southleigh Road and Horndean Road. Both these corridors require crossing of the railway line; at Emsworth, the railway runs on a bridge over the B2148/ North Street but at Warblington this requires traffic to route through a level crossing, as shown on Figure 37 below.

Figure 37 Location of Warblington level crossing

6.3.18. With the majority of traffic from Southleigh modelled to access Southleigh Road (90%), one of the key traffic impacts of any increase in flows will thus affect the Warblington level crossing. Table 12 below provides the delay per pcu (seconds) and queue lengths (total average queue in pcus) for the three scenarios modelled at the Warblington level crossing.

Table 12 Delays and queue lengths at Warblington Level Crossing

	AM		PM	
	Queue (veh)	Delay (s)	Queue (veh)	Delay (s)
Baseline				
Southbound	7	91	4	84
Northbound	3	83	8	94
Do Min				
Southbound	17	114	6	89
Northbound	4	86	19	117
Do Something				
Southbound	19	119	7	92
Northbound	4	85	13	104

6.3.19. The above shows that whilst there will be an impact on queue length at the level crossing in the southbound carriageway in the morning (and vice versa in the northbound carriageway in the PM peak), the difference in delay to each vehicle will be a maximum of 23s (91s in the baseline to 114s in the DM scenario in the AM peak and 94s in the baseline to 117s in the DM scenario for the PM peak). The impact of the mitigation, which is to allow greater capacity of traffic accessing and exiting the A27 corridor, however, will have a limited effect at the level crossing (DS vs DM).

6.3.20. The results represent a sensitivity test of this level crossing which is assumed to be closed to traffic for 50% of the time. This assessment is considered to be robust, as there are no committed timescales for additional services on this route at present. In reality, the impact of additional traffic from Southleigh is likely to be lower than that modelled above given that the crossing will closed for shorter overall time than modelled.

6.3.21. It is suggested that the impact of Southleigh development at the level crossing is further considered as part of the detailed analysis, including the Transport Assessment supporting any planning application.

Summary

6.3.22. In summary, whilst the DS scenario shows that the mitigation measure tested in this TA for the A27/Emsworth Road junction will address capacity issues associated with the Local Plan allocations as a whole, the full impact of the Southleigh strategic site requires additional assessment, particularly in respect of its impacts on the town centre, Southleigh Road, and the surrounding local road network. This may require a revised junction arrangement allowing a direct link from the Southleigh site onto the A27 to be considered further; the Borough Council should consider safeguarding land that could deliver junction options as set out in the "Southleigh – A27 Junction Report" that will be published separately to this Transport Assessment.

6.4. Residual Impacts and Consideration of Potential Further Mitigation

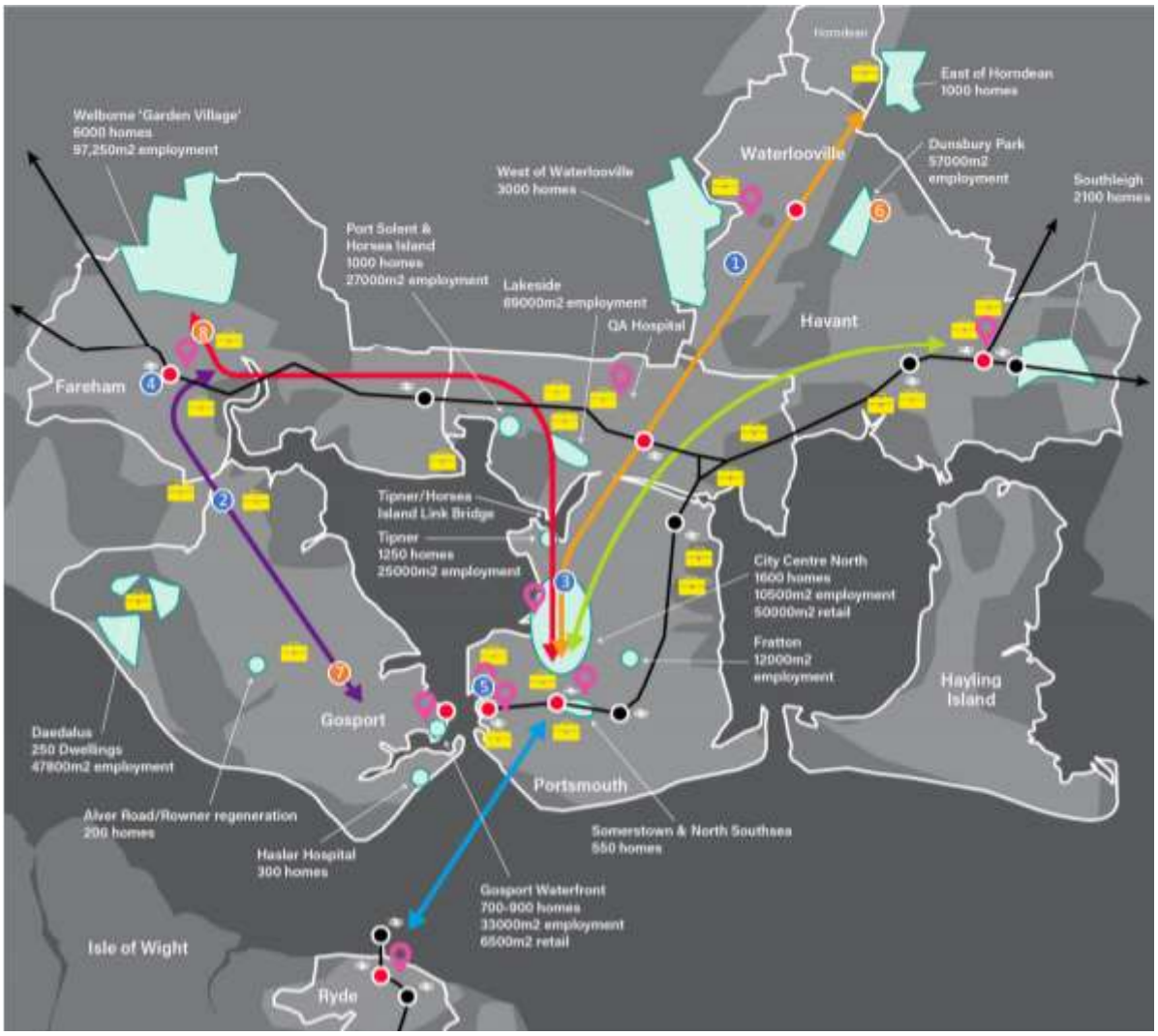
6.4.1. Whilst the mitigation detailed in this TA has been shown to satisfactorily accommodate the additional travel demand from the Local Plan allocation, there may be additional opportunities for reducing the impact of the Local Plan across the road network within the Borough. Although the demand forecasts in the SRTM are unconstrained it is likely that, in practice, other factors (principally new schemes delivered outside the scope of the Local Plan mitigation) could affect the overall demand for and routeing of travel on the network. In addition, the SRTM has not fully explored the impact that changes in mode choice, distribution and/or increased costs of travel may have on overall demand.

South East Hampshire Rapid Transit

6.4.2. There is strong support for a Bus Rapid Transit proposition in the strategic positions of Solent Transport, Solent Local Enterprise Partnership, Partnership for Urban South Hampshire, the four key planning authorities and the bus operators. Both Hampshire County Council and PCC, acting as the "South East Hants Rapid Transit (SEHRT) Board" are currently jointly progressing an Outline Business Case for Rapid Transit in South East Hampshire to submit to the DfT's Transforming Cities Fund. This work follows the successful delivery of the BRT corridor between Fareham and Gosport, supporting the high-quality Eclipse-branded service.

6.4.3. In Spring 2018, DfT selected 12 Expressions of Interest to this Transforming Cities Fund, including one from SEHRT to proceed with the development stage, which has already commenced. The governance of the project includes a wider BRT steering group which includes representation from Havant Borough Council and the two key local bus operators (First and Stagecoach). As a result, the BRT proposals include a variety of individual interventions on the network in Havant / Waterlooville and on routes between Havant/Waterlooville and Portsmouth. The corridors covered by this project are shown in Figure 38 below.

Figure 38 Transforming Cities project – key corridors for investment and development



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6.4.4. The 2017 Atkins study *South East Hampshire Transport Network Enhancement* identified the proposals at Southleigh as one of key development sites across the four planning authorities associated with BRT. As the proposal is developed further, there may be opportunities to link the BRT network to the Southleigh Local Plan allocation.

6.4.5. While the work supporting a BRT proposition is ongoing, it is not possible to quantify the expected level of impact and thus to model the potential impact on mode share in the DS scenario, but it is expected that a BRT proposition would significantly change bus modal shift and help to reduce the reliance on the private car. This would go towards alleviating the residual impacts of the Local Plan, particularly in relation to the local areas near the proposed Southleigh site if the BRT scheme is extended to serve the development in future.

[45] https://www.hants.gov.uk/transport/strategies/fundingbids

Propensity to Cycle Tool

6.4.6. The Propensity to Cycle Tool (PCT), developed with support from the Department for Transport, enables evidence-based planning for cycling. It can be used to explore cycling potential at different geographical scales – from a county to a potential route corridor.

6.4.7. The PCT is currently being used by many local authorities in the production of Local Cycling and Walking Infrastructure Plans (LCWIPs). It is used to test different scenarios, and to help identify changes in demand between origins and destinations, and changes on key routes. This evidence will support decisions regarding where improvements to cycling infrastructure are needed, and to help identify which improvements would provide the best outcomes.

6.4.8. One of the scenarios available to test is called the 'Government Target' which is described as: *"a doubling of cycling nationally, corresponding to the proposed target in the English Department for Transport's draft Cycling Delivery Plan to double cycling in England between 2013 to 2025. … The result is that cycling overall doubles at the national level, but at the local level this growth is not uniform, in absolute or relative terms. Areas with many short, flat trips and a below-average current rate of cycling are projected to more than double. Conversely, areas with above-average levels of cycling and many long-distance hilly commuter routes will experience less than a doubling."*[46]

6.4.9. Figure 39 and Table 12 show the number of people cycling to work in the 2011 Census and changes in numbers of cyclists and drivers projected by the tool within each Middle Super Output Area (MSOA) in the Borough in the Government Target scenario. Although these figures are not to be taken as a prediction of the future, they do show how levels in cycling could shift, based on current patterns.

[46] http://pct.bike/

Figure 39 Havant MSOAs and projected change in cycle commuters (Government Target scenario)

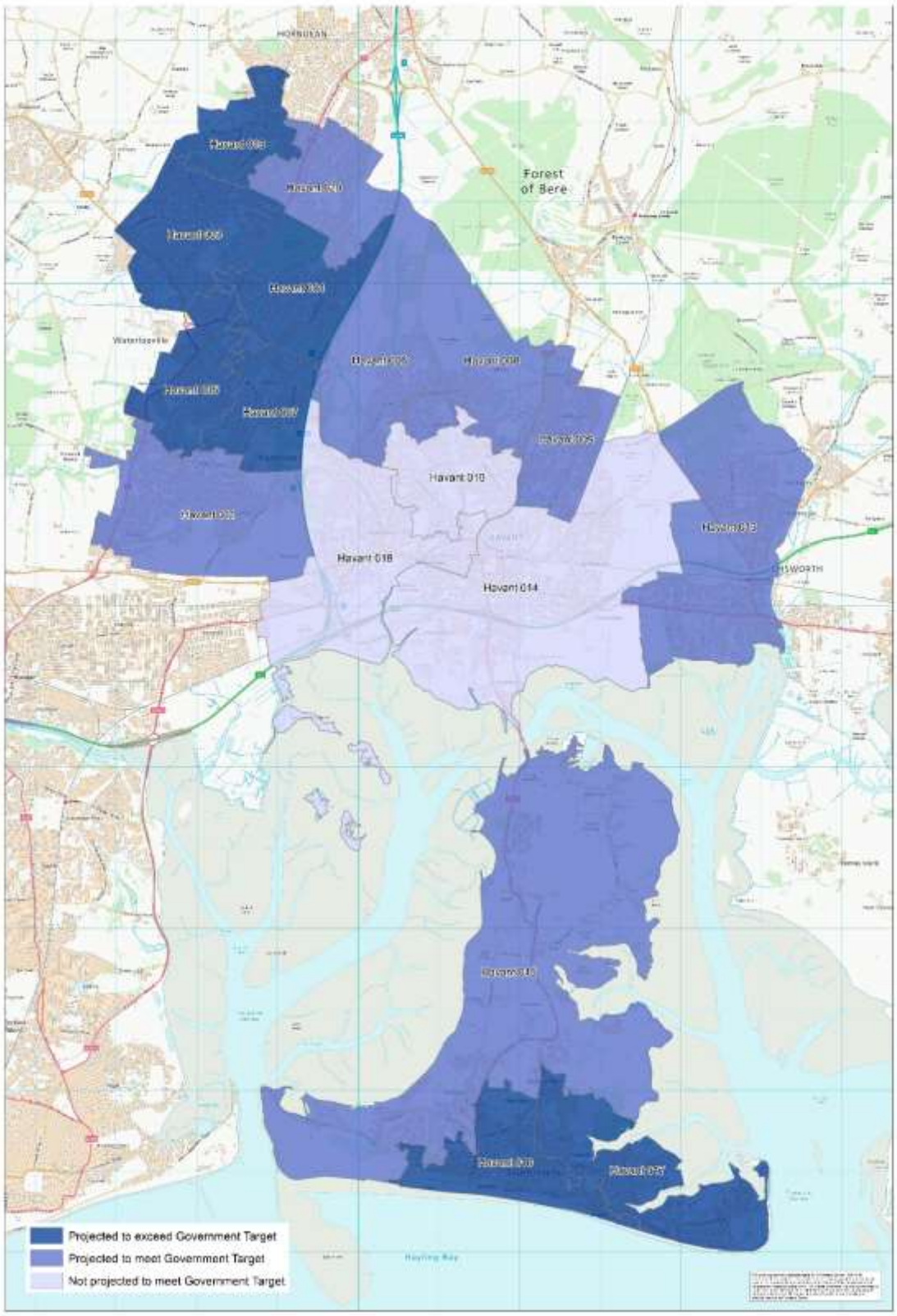

Table 13 2011 Census comparison with Government Target Scenario – Propensity to Cycle Tool output

MSOA	Total commuters 2011 baseline:	Cycle commuters 2011 baseline	Cycle commuters % of total commuters 2011	Cyclists (Gov target scenario) no.	Cyclists (Gov target scenario) %	Change in cycle commuters	Change in drivers:
Havant 003	3341	73	2%	172	5%	99	-73
Havant 004	3021	61	2%	145	5%	84	-68
Havant 005	2644	5	2%	132	5%	127	-50
Havant 006	2317	84	4%	175	8%	91	-58
Havant 007	2638	65	2%	142	5%	77	-54
Havant 008	2635	105	4%	208	8%	103	-61
Havant 009	2835	118	4%	221	8%	103	-59
Havant 010	3610	184	5%	332	9%	148	-85
Havant 011	4231	128	3%	253	6%	125	-94
Havant 013	3633	152	4%	277	8%	125	-91
Havant 014	3857	142	4%	275	7%	133	-88
Havant 015	2229	80	4%	170	8%	90	-72
Havant 016	1967	64	3%	147	7%	83	-57
Havant 017	2326	79	3%	171	7%	92	-68
Havant 018	3974	142	4%	294	7%	152	-103
Havant 019	2792	55	2%	138	5%	83	-56
Havant 020	2782	48	2%	121	4%	73	-59
	Totals	1585		3373		1788	-1196

6.4.10. The results in Table 13 show that almost all MSOAs are projected to meet or exceed the Government target to double cycling activity. It also highlights the potential to achieve a modal share of up to 9% and the potential to remove 1,196 car-based daily commutes from the network.

6.4.11. The forthcoming LCWIP will undertake a more in-depth assessment of both walking and cycling in the Borough and identify a prioritised list of schemes aimed at increasing use of these modes. Developers will be asked to consider these schemes through their own site specific transport assessments.

6.4.12. It should be noted that although the impact of meeting the Government Target has been assessed here, it has not been factored into modelling within this TA and therefore highlights the opportunity to further reduce traffic impacts in all three modelled scenarios.

Smarter Choices

6.4.13. In order to reduce the number of single occupancy vehicle journeys, smarter choices measures could also be considered. 'Smarter Choices' is an established approach which includes a range of measures such as:

- workplace and school travel plans,
- personalised travel planning,
- travel awareness campaigns, and public transport information and marketing
- car clubs and car sharing scheme
- teleworking, teleconferencing and home shopping

6.4.14. Research from the Department for Transport[47] suggests that these measures could achieve a modal shift in the region of 10% away from single occupancy vehicle trips.

6.4.15. Given that 65% of resident workers undertake single occupancy vehicle trips, as a broad estimate, implementation of smarter choices measures could look to reduce this by 10%. If implemented, this could reduce the 36,344 cars/vans identified in Figure 13 by 3,634 cars/vans.

6.4.16. Specifically, Hampshire's Travel Plan Guidance requires both residential and employment sites that meet set thresholds to develop and deliver travel plans. The travel plans must have a dedicated travel plan officer and sufficient identified funding to deliver the measures within each plan. These travel plans are monitored by the County Council and would be required of the larger allocation sites.

[47] https://www.gov.uk/government/publications/smarter-choices-main-report-about-changing-the-way-we-travel

7. Contributions and phasing

7.1. Cost Estimates of Mitigation

7.1.1. Costs of the mitigation discussed below have been estimated based on rudimentary detail to indicate the likely cost of delivering a project such as the feasibility scheme suggested. This estimate is built up using recent tendered rates from HCC's GEN-3 framework. Fees are estimated as a percentage based on HCC fees for similar sized projects, with £5m being the threshold for adopting the lower rates.

7.1.2. An optimism bias has also been applied to the costs at 44%. This is a mechanism to cover risks throughout design and delivery and is in line with HM Treasury 'Green Book' guidance for a standard Civil Engineering project. This figure may be reduced after a robust project risk analysis and reduction process, as detail and certainty are increased.

7.1.3. Table 14 provides an indication of costs (rounded up to nearest £100,000) to implement the mitigation detailed in Section 6.1.

Table 14 Indicative Costs of Mitigation

Ref	Description	**Estimates (£m)**
J10	Bedhampton Hill / Bedhampton Road	**1.9**
J11-12	Dunsbury (Asda) Roundabout	**3.3**
J13	Purbrook Way / B&Q Roundabout	**1.4**
J14	Purbrook Way / Park House Farm Way	**2**
J22	Park Road South / Elm Lane – Option 2	**7.5**
J26	A27 Slip road / Emsworth Road	**2.5**
J45	A27 Harts Farm Way	**2.2**
J52	Petersfield Road / Stockheath Road / Bartons Road	**N/A**
J56	Rowlands Castle – Double mini roundabout	**1.8**
J71	A3(M) Rusty Cutter Roundabout	**2.4**

7.1.4. The strategic nature of the modelling does not allow the identification of a link between the potential mitigation and specific Local plan allocation sites, as only the total impacts of the Local Plan developments and of the mitigation have been assessed at the end of the Plan period. Therefore, it is not possible at this stage to draw conclusions on possible development contributions towards the above mitigation, especially as these are also required to address issues arising from background growth and any contributions would need to be proportionate. It is expected that funding for the works identified in this Transport Assessment will be secured in parts via the Community Infrastructure Levy (CIL). As such, the above costs can be used to review the Preliminary Draft Charging Schedule of the CIL, but this does not negate the need for developers to identify and mitigate their site-

specific impacts via appropriate Section 106 planning obligations and the principles defined in the Borough Council's Developer Contributions Guide.

7.2. Phasing

7.2.1. The potential infrastructure improvements modelled in this TA are based on assessments of the junction performance in the 2036 Local Plan DS Scenario compared to the 2036 Baseline. However, in many cases all or part of the Local Plan developments are planned to come forward prior to 2036 and so mitigation may also be required prior to that date.

7.2.2. As the SRTM has not assessed the impact of the Local Plan allocation in other years than 2036 it does not reflect the potential delivery phasing of the allocation sites. The 2036 Do-Something model only assesses the impact of the mitigation as a single package of works, and it is not possible to specifically identify with any accuracy phasing of the mitigation or links to specific developments.

7.2.3. However, professional judgment has been applied to provide an indication of the relative importance of the successful implementation of the Local Plan as detailed in Table 15 below. This is based on junction performance with and without the Local Plan development (i.e. between DM and DS scenarios) and their location on the network. Junctions on strategic links have been prioritised since, if traffic is delayed by congestion at these locations, the predicted performance of junctions nearer the centre of Havant and Waterlooville will not materialise. Implementation of mitigation at central locations will therefore not be required until traffic can pass through strategic junctions without unnecessary delay.

7.2.4. It is also clear that some of the key Local Plan sites will have a greater impact at specific locations geographically close to the proposed developments. For example, the impacts identified at the A27/Emsworth Road junction and along the B2149 corridor can be attributed for the most part to the Southleigh allocation and mitigation at the relevant junctions on these corridors should be completed in parallel.

7.2.5. The following table presents the mitigation works, in no particular ranked order in terms of delivery.

Table 15 Indicative Phasing of Mitigation Works

Potential Mitigation Sites	Phasing
ID26 – A27/Emsworth Road ID52 – Stockheath Road/Petersfield Road ID56 – Manor Lodge Rd/Whichers Gate Rd/B2149	Short-Medium term
ID13 – Purbrook Way/A3(M) ID11/12 – Asda Roundabout ID14 – Purbrook way	Short-Medium term
ID10 – Bedhampton Hill/Bedhampton Rd ID71 – Rusty Cutter ID45 – Harts Farm Way approach to Teardrop	Long term
ID22 – Elm Lane/Park Road	Long term

7.2.6. Whilst the use of the SRTM cannot isolate impacts of specific Local Plan developments on a particular junction requiring mitigation, it should be recognised that some key sites will have a greater impact at a local level and as such that their timescales will affect that of the mitigation. For example, the total impact of the Local Plan developments may not require mitigation at the A27/Emsworth Road junction until development of the Southleigh site is underway, which may be towards the end of the Local Plan period. However, the demand at the junction may exceed capacity earlier due to projected increases in traffic elsewhere on the network and/or once the Southleigh site reaches a certain completion rate. This also applies to the Elm Lane/Park Road junction where existing congestion is an issue without the Local Plan allocations. There may therefore be benefits in implementing some of the potential mitigation measures earlier in the Local Plan period, in order to improve the performance of the network within the Borough.

7.2.7. It should also be acknowledged that the above conclusions were drawn based on unconstrained traffic growth to reflect a worst-case scenario. In reality some of the forecasted demand may not materialise in the modelled time periods due to travellers avoiding congestion by altering their route, travelling at a different time of day ('peak-spreading') or choosing to travel to/from a different location. In addition, the assessment considers all travel demand (demand flows in traffic modelling terms) that intends to go through individual junctions and assumes all this travel demand can reach the specific junction during the modelled period of time. In reality, it is commonly recognised that some of the travel demand may not materialise in the modelled hours due to congestion elsewhere in the network, which leads to lower actual flows that arrive during a given period of time. In addition, the impact of new technology and its impact on travel demand is also unknown.

7.2.8. It is important that all of the above considerations are taken into account and kept under review when assessing the requirements for mitigation and its phasing. In reality some junctions may require mitigation at an earlier stage than the end of the Local Plan period or the severity of mitigation that is required could be reduced.

7.2.9. The mitigation suggested in this TA will therefore require further refinement or investigation in close liaison with HCC when developments in the Local Plan come forward in the future. Whilst recommendations have been made in this TA, the final design and implementation of mitigation measures will be determined by Hampshire County Council as the Highway Authority and as part of any review of Transport Assessments to be submitted in support of planning applications.

8. Summary and Conclusions

8.1.1. This Transport Assessment for Havant Borough Council evaluates the potential traffic impacts from developments in the emerging Local Plan (HBLP2036) and explores potential mitigation measures to alleviate such impacts where identified as necessary. The assessment is based on background growth, committed and planned developments in the Borough and surrounding areas covering a period of time at 2036.

8.1.2. The Transport Assessment considers traffic within and immediately beyond Havant Borough's administrative boundary in future scenarios but does not report on impacts within Hayling Island, as this has been commissioned and assessed as a separate study. This reflects its geography as an island, with one road bridge connecting it to the rest of the Borough. Notwithstanding, traffic impacts on the rest of Havant Borough arising from proposed development in Hayling Island are included in the traffic modelling within this main Transport Assessment.

8.1.3. The Sub-Regional Transport Model (SRTM) has been used to model the impacts of the emerging Local Plan. The methodology, limitations and analyses of the modelling exercise are presented in a separate report, attached as Appendix 1 to this TA and referred to therein as the SRTM Modelling Report. Both documents should be read in conjunction with one another.

8.1.4. There were no Public Transport schemes committed within the Local Plan timeframe and therefore no changes to the PT sub-model and modal choice demand matrix have been included in these assessments. The SRTM used in this study allows for re-assignment of background and new development traffic and for unconstrained demand from model zones onto the modelled road network. The strategic nature of the SRTM results in the impact of the Local Plan development being either under- or over-estimated at local level depending on the size of the zones and how these have been 'loaded' onto the local highway network.

8.1.5. It is the function of this TA to assess the impact as a whole of the development proposed through the Local Plan. The TA demonstrates that the overall Local Plan development, if accompanied by the potential mitigation measures modelled, can be accommodated on the network without causing severe traffic impacts within the Borough. However, it is not designed to test or propose specific or detailed mitigation to deal with the effects of individual development sites. The local transport impacts of each of the Local Plan allocation sites will still have to be addressed in Transport Assessments accompanying planning applications in accordance with guidance in the National Planning Policy Framework (NPPF) 2018.

8.1.6. The SRTM has been developed to assess three weekday periods (AM, PM and Inter-peak), although the TA focusses on the AM and PM periods. For the Havant Local Plan assessment, scenarios were forecast to 2036 and three scenarios have been developed as follows:

- Scenario 1 – 2036 Baseline – Demand from existing land uses plus background growth – i.e. no Havant Local Plan development
- Scenario 2 – 2036 Do-Minimum (DM) – Includes Havant Local Plan development but no mitigation measures
- Scenario 3 – 2036 Do-Something (DS) – Includes Havant Local Plan development and mitigation measures

8.1.7. The SRTM Modelling Report provides details of the impact of the Local Plan allocations on the total person trips and percentage mode share to and from the Borough for a 24-hour period. There will be approximately 88,500 additional person trips to / from Havant across a 24-hour period in the Do Minimum compared to the Baseline, although this will include an element of double counting for trips that both start and end within Havant. This represents an increase of 17.5% compared with the Baseline scenario.

8.1.8. The above increase in person trips across the Borough translates to a 10% increase in Vehicle Hours and in a 5% increase in Vehicle Kilometres between the Baseline and DM scenarios. The greater percentage increase in vehicle hours compared to vehicle kilometres is indicative of a network under increasing pressure and higher delays. As a result, the model also forecasts a small shift (<1%) away from Highway to Passenger Transport and 'active' modes. The average speed (kph) in the Borough will decrease by 4.5% in the DM scenario compared to the Baseline which is again consistent with the forecast additional traffic volumes and increased delay.

8.1.9. Comparison of results between the Baseline and DM scenarios allows for the impacts of the Local Plan to be isolated and for congestion 'hotspots' to be identified. The location of the greatest traffic increases is consistent with the larger development allocations. The analysis of all modelled links within the Havant Borough produces an initial list of 66 junctions that are forecast to have at least one approach arm which has a V/C greater than 80%, either in the AM or the PM peak. This list was refined to identify locations with a ratio of flow over capacity (V/C) greater than 85% (85% being the theoretical threshold below which a junction operates well within capacity), to show junctions that worsen either significantly or severely.

8.1.10. A total of twelve junctions fell into the 'significant' change criteria and a further six were classified as 'severe'. A further two locations were identified as experiencing a 'notable' change in V/C. Of the twenty junctions identified, two were in Hayling Island and have not been considered further in this TA but in the separate study for the island. Table 8 on page 61 summarises those eighteen locations and associated impacts.

8.1.11. A workshop was held with Hampshire Services, Havant Borough Council, Hampshire County Council (as the Highway Authority) and the lead SRTM modeller present to further refine the above list and investigate opportunities for mitigation.

8.1.12. Detailed junction analysis was undertaken for the ten locations to explore suitable improvements to mitigate the impacts of the Local Plan development traffic at these locations and the resulting package of mitigation has been modelled in a Do-Something scenario (DS) and Table 16 provides an overview of the ten locations investigated, the form of junction improvements recommended and an indicative cost of the potential mitigation measures.

Table 16 Overview of Junction Mitigation Findings

ID	Junction	Proposed Mitigation	Indicative Costs (£m)
13	Purbrook Way A3(M) J4 southbound on-slip (B&Q roundabout)	'Jet lane' on the Purbrook Way westbound approach	1.4
11/ 12	Purbrook Way westbound approach and Hulbert Road southbound approach to Asda roundabout	Widening of Purbrook Way eastbound approach to 4-lane and associated widening of circulatory carriageway	3.3
14	Purbrook Way / Parkhouse Farm Way	Convert existing priority junction to fully signalised junction	2
10	B2177 / Bedhampton Road junction	Convert existing roundabout to fully signalised junction with additional pedestrian crossings	1.8
71	A3(M) J5 / B2177 Bedhampton Hill (Rusty Cutter Roundabout)	'Jet lane' on the Bedhampton Hill southbound approach and associated works to the shared cycle lane alongside	2.4
45	Harts Farm Way approach to Teardrop junction	'Jet lane' on the Harts Farm Way approach and associated works to the shared cycle lane alongside	2.2
56	B2149 Durrants Road / B2148 Whichers Gate Road	Convert existing double mini-roundabout to fully signalised junction	1.8
52	B2149 Petersfield Road / Stockheath Road	Change to signal timings	N/A
22	Park Road South / Elm Lane	Introduce new lane for left turning manoeuvres between Park Road (N) to Elm Lane	7.5
26	Emsworth Road / A27 eastbound off-clip	Widening of the A27 eastbound off-slip to three lanes and Modification of the northern dumbbell roundabout to a signalised junction including local widening of the A27 on- and off-slips and of the Emsworth Road approach and Widening of the A259 exit lane carriageway at the southern dumbbell roundabout to allow effective use of two exit lanes	2.5

8.1.13. The effectiveness of the mitigation is reflected in the results of the DS scenario, which highlights that of the five junctions that would experience a 'severe' impact in the DM scenario, four of these will experience a considerable reduction in the magnitude of impact from 'severe' to 'operating within theoretical capacity'. The remaining 'severe' junction will also experience a reduction in impact magnitude albeit more moderate from 'severe' to 'significant'. A further two junctions will experience a more moderate reduction in magnitude of impacts from 'significant' to 'operating within theoretical capacity'. Overall, all but three of the ten mitigated junctions are forecast to no longer experience a 'significant' or 'severe' impact.

8.1.14. The three junctions (ID13, 26 and 56) which remain identified as experiencing a 'significant' impact following mitigation would still operate within capacity with the impacts of the Local Plan allocation not requiring further mitigation.

8.1.15. Due to the strategic nature of the SRTM and its ability to re-assign traffic from congested corridors onto routes that have sufficient capacity or lesser delays, there is an inevitable knock-on effect of 'releasing' additional capacity on the network to address the Local Plan development impacts. Where additional capacity is introduced on a modelled network that is operating under unconstrained demand, re-routing of traffic occurs and can create congestion points elsewhere on the network that are not forecast in earlier DM scenarios. The forecast traffic flow increases at the locations where mitigation measures have been implemented to alleviate capacity issues are also due to this phenomenon. There were three additional locations identified as potentially likely to experience a 'severe' impact following the introduction of mitigation. These are:

- ID3 Merge from teardrop with A3(M)
- ID25 Emsworth Road/Southleigh Road junction
- ID33 Hulbert Road/Dunsbury Farm junction

8.1.16. Whilst the SRTM includes a number of committed infrastructure schemes, the capacity constraints observed at the above three locations reflect issues that will be arising as a result of mitigating the above ten junctions in the absence of addressing congestion at other locations on the network. Additional mitigation to address this residual impact has been identified in this TA but it is expected that the detailed design of the potential mitigation measures will consider in greater detail any emerging issues at nearby locations along the network and any additional infrastructure improvement that may arise in the meantime.

8.1.17. The strategic nature of the modelling does not allow the identification of a link between the potential mitigation and specific Local plan allocation sites, as only the total impacts of the Local Plan developments and of the mitigation have been assessed at the end of the Plan period. Therefore, it is not possible at this stage to draw conclusions on possible development contributions towards the above mitigation, especially as these are also required to address issues arising from

background growth and any contributions would need to be proportionate. Nevertheless, given its size, a review of the impact of the proposed strategic residential site in the Denvilles-Emsworth area (known as the 'Southleigh' site) has been undertaken.

8.1.18. For the purpose of this TA, access to Southleigh has been modelled in the SRTM on the basis of no new direct access onto the A27. This diverges from the current draft masterplan for the site which considers a spine road bypassing the Horndean Road corridor and linking directly to the A27. The approach in this report reflects recent advice from Highways England, that options which made use of the existing junction at Warblington, but with significant amendments, should be developed in the first instance. This position was reaffirmed by Hampshire Services, who, on examining the results of the DM runs and considering possible mitigation options, including options prepared by HBC to reconfigure the existing Warblington Junction, advised that it is possible to design mitigation measures to deal with the impact of the proposed Local Plan development in a way that required less intervention.

8.1.19. Whilst it is difficult to accurately isolate the impact of a specific development from the SRTM scenarios, it is likely that proximity of the Southleigh development to Havant town centre, the A27/Emsworth Road junction and the Warblington level crossing will directly contribute to the forecast changes at these locations.

8.1.20. The analysis of the potential mitigation modelled at the A27/Emsworth Road junction (above) has shown that the potential infrastructure improvements will result in the junction experiencing a reduction in impact from 'severe' to 'significant' (as defined in para 5.6.3), with the associated V/C results also showing that the junction will be operating within its practical capacity in the DS scenario. The access strategy modelled in the SRTM along with the mitigation has thus been shown to satisfactorily accommodate the Southleigh development traffic in future. Nevertheless, the SRTM also highlighted additional impacts of the Southleigh development within Havant town centre and at other local junctions in the vicinity of the site such as the Warblington level crossing and it is therefore recommended that the impact of Southleigh development is considered further as part of the detailed analyses supporting any planning application. This would also need to have regards to the forthcoming recommendations of the "Southleigh – A27 Junction Report" currently being prepared by HBC which includes a review of the need for a new junction with the A27.

8.1.21. Whilst the mitigation detailed in this TA has been shown to satisfactorily accommodate the additional travel demand from the Local Plan allocation, there may be additional opportunities for reducing the impact of the Local Plan across the road network within the Borough. Although the demand forecasts in the SRTM are unconstrained, it is likely that in practice, other factors could affect the overall demand for travel on the network. In particular, the SRTM has not explored fully the impact that changes in mode choice, distribution and/or increased costs of travel may have on overall demand. Specifically:

- The South East Hampshire Rapid Transit is also expected to realise significant modal shift within Havant in future. While the work supporting a BRT proposition is ongoing, it is not possible to quantify the expected level of impact and thus to model the potential impact on mode share in the DS scenario but it is expected that a BRT proposition would significantly change bus modal shift and help to reduce the reliance on the private car. This would go towards alleviating the residual impacts of the Local Plan, particularly in relation to the local areas near the proposed Southleigh site if the BRT scheme is extended to serve the development in future

- The Propensity to Cycle Tool (PCT) is being used by many local authorities in the production of Local Cycling and Walking Infrastructure Plans (LCWIPs) to test different scenarios, and to help identify changes in demand between origins and destinations, and on routes. This tool allows changes in numbers of cyclists and drivers to be projected within each area of the Borough, and initial calculations demonstrate the potential for all areas within Havant to meet or exceed the Government target to double cycling activity. It also highlights the potential to achieve a modal share of up to 9% and remove 1,196 car based commutes from the network.

- Finally, Government's research on Smarter Choices suggests that the implementation for soft measures such as workplace and school travel plans, car clubs, home working and shopping, etc. could achieve a modal shift in the region of 10% away from single occupancy vehicle trips

8.1.22. The junctions considered in this Transport Assessment are those considered to be critical to the success of the Local Plan developments and most likely to struggle to accommodate the Local Plan development. Successful mitigation of these junctions indicates that the Local Plan can be accommodated on the network without causing severe traffic impacts. It should be noted that the list of junctions that may require mitigation is not exhaustive and other junctions and links within the modelled area may also require improvements in further studies as the Local Plan is taken forward. It is also important to note that the mitigation presented is to demonstrate that the level of development proposed is capable of mitigation – it is not intended to present a preferred package of works or to advocate specific junction designs.

8.1.23. It is concluded that the impacts of the Local Plan development in 2036 can be mitigated by the suggested improvements to the highway infrastructure at the ten locations on the road network; nine within the Borough, and one (ID56) just outside of it. Residual impacts could be further mitigated through a combination of further road improvements and/or the implementation of a number of soft and hard measures seeking to achieve modal shift away from single occupancy vehicle travel in future.

8.1.24. Based on the assessment of this Transport Assessment, it is considered that the quantum and distribution of development proposed in the draft Local Plan is capable of mitigation at the strategic level, and that the plan is therefore sound from a transport perspective.