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HAVANT BOROUGH LOCAL PLAN – SRTM MODELLING

SOLENT TRANSPORT EVIDENCE BASE

HAVANT BOROUGH LOCAL PLAN – SRTM MODELLING

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1. INTRODUCTION

1.1 Study Background

1.1.1 Systra has been commissioned by Havant Borough Council (HBC) to apply Solent Transport's Sub-Regional Transport Model (SRTM) to help inform and evidence the update to Havant's Local Plan. The SRTM has been used to model the proposed land allocations and identify key transport implications resulting from the scale and location of the allocations. The SRTM outputs form inputs to a Transport Assessment undertaken by Hampshire Services and reported in a separate document

1.1.2 This application of the SRTM was originally commissioned by HBC in April 2017.

1.2 Havant Local Plan SRTM Scenarios

1.2.1 To best assess the transport impacts of the Local Plan, three SRTM model scenarios have been developed:

- Scenario 1 – 2036 Baseline, No Havant Local Plan development
- Scenario 2 – 2036 Do Minimum, With Havant Local Plan development, no mitigation measures
- Scenario 3 – 2036 Do Something, With Havant Local Plan development and mitigation measures

Scenario 1 – 2036 Baseline - *No Havant Local Plan Development*

1.2.2 The Baseline forms the basis against which the proposed Local Plan development quantum scenarios are assessed.

1.2.3 In this study, the Baseline represents a scenario that includes all known current (at time of commissioning) completed development and infrastructure within Havant, in addition to all committed development and infrastructure through to 2036. In the Baseline, no allowance is made for Local Plan allocations in Havant.

1.2.4 Outside of Havant development growth is assumed to continue as 'normal' and in accordance with the adopted Local Plan's (or equivalent) for the respective Borough's, and in accordance with TEMPRO v7.2 growth projections.

1.2.5 It should be noted that the 2036 Baseline scenario serves a purpose to help isolate and appraise the impact of 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 only and one that is very unlikely to develop in reality.

Scenario 2 – 2036 Do Minimum Scenario - *With Havant Local Plan Development, No Transport Mitigation Measures*

1.2.6 Scenario 2 includes the Havant Local Plan housing and employment allocations but assumes the same transport network as the Baseline. By comparing the outputs of the Do Minimum scenario to the Baseline, the transport impact resulting from the Local Plan scenario is identified. Development growth outside Havant is identical to the Baseline.

1.2.7 The outputs from the first two Scenarios of this SRTM commission form inputs to the Transport Assessment (TA) for the Local Plan. The TA has been prepared by Hampshire Services.

Scenario 3 – 2036 Do Something Scenario - *With Development and Mitigation Measures*

1.2.8 Scenario 3 has incorporated the highway mitigation measures developed as part of the TA for the Local Plan. Scenario 3 captures the impact of these interventions in the wider context of the full Borough and surrounding areas and identifies any further locations where mitigation could be considered.

2. SOLENT TRANSPORT – SUB REGIONAL TRANSPORT MODEL (SRTM) BACKGROUND

2.1 SRTM Model Development

2.1.1 SYSTRA was commissioned, as part of a wider team, to support Solent Transport with the development and application of the SRTM. An update to the original 2010 model was completed in early 2017 that updated and re-validated the model to a 2015 base year.

2.1.2 The SRTM has been developed to support a wide-ranging set of interventions across the Solent Transport sub-region, and is specifically required to be capable of:

- Forecasting 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);
- Testing the impacts of land-use and transport policies and strategies within a relatively short model run time; and
- Testing the impacts of individual transport interventions in the increased detail necessary for preparing submissions for inclusion in funding programmes.

2.2 Sub Regional Transport Model Context and Scope

2.2.1 The SRTM is a suite of linked models comprising the following components as shown in Figure 2-1:

- The Main Demand Model (MDM) which predicts when (time of day), where (destination choice) and how (choice of mode) journeys are made;
- the Gateway Demand Model (GDM) which predicts demand for travel from ports and airports;
- the Road Traffic Model (RTM) which determines the routes taken by vehicles through the road network and journey times, accounting for congestion;
- the Public Transport Model (PTM) which determines routes and services chosen by public transport passengers; and
- a Local Economic Impact Model (LEIM) which uses inputs including transport costs to forecast the quantum and location of households, populations and jobs.

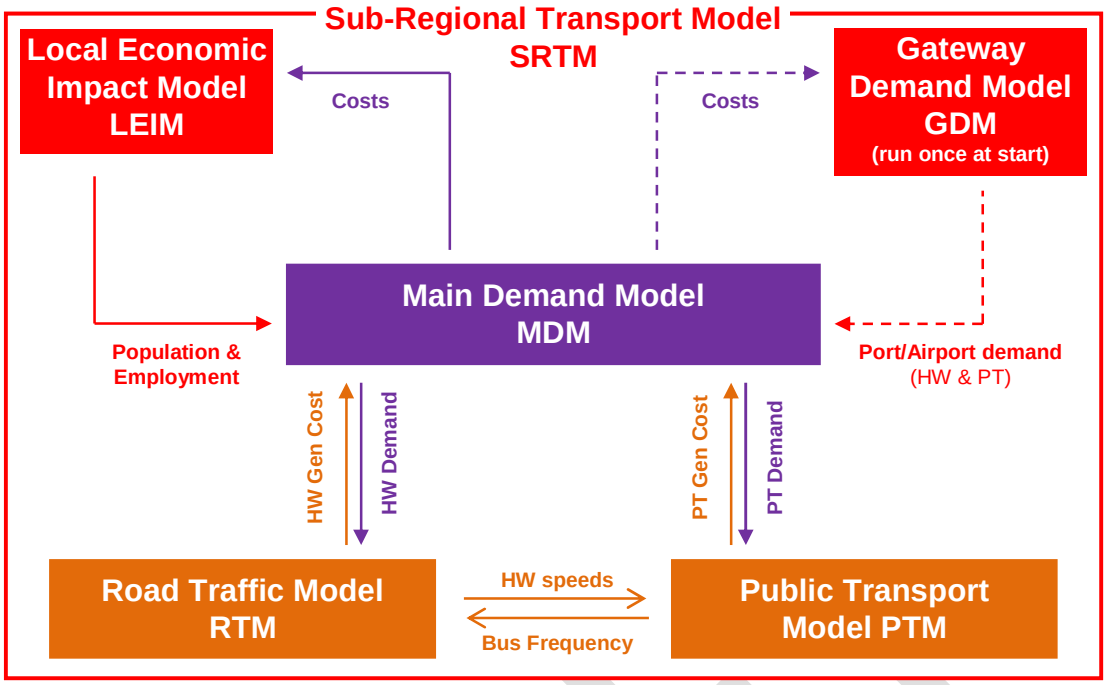


Figure 2-1 Solent Transport Sub-Regional Transport Model

2.2.2 The modelled area of the SRTM is divided into four regions, shown in Figure 2-2, which differ by zone size and modelling detail. 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 2-3. Zone boundaries were developed in Accordance with Census output areas and boundaries.

2.2.3 In accordance with guidance three weekday periods are modelled in the SRTM:

- AM peak: busiest hour between 07:00 and 10:00, (defined as 40.5% of the three hours for Highway and 40% for Public Transport);
- Inter peak: average of 10:00 to 16:00 (i.e. 16.7% of the six hours for both modes); and
- PM peak: busiest hour between 16:00 and 19:00, (defined as 36.8% of the three hours for Highway and 40% for Public Transport).

2.2.4 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.

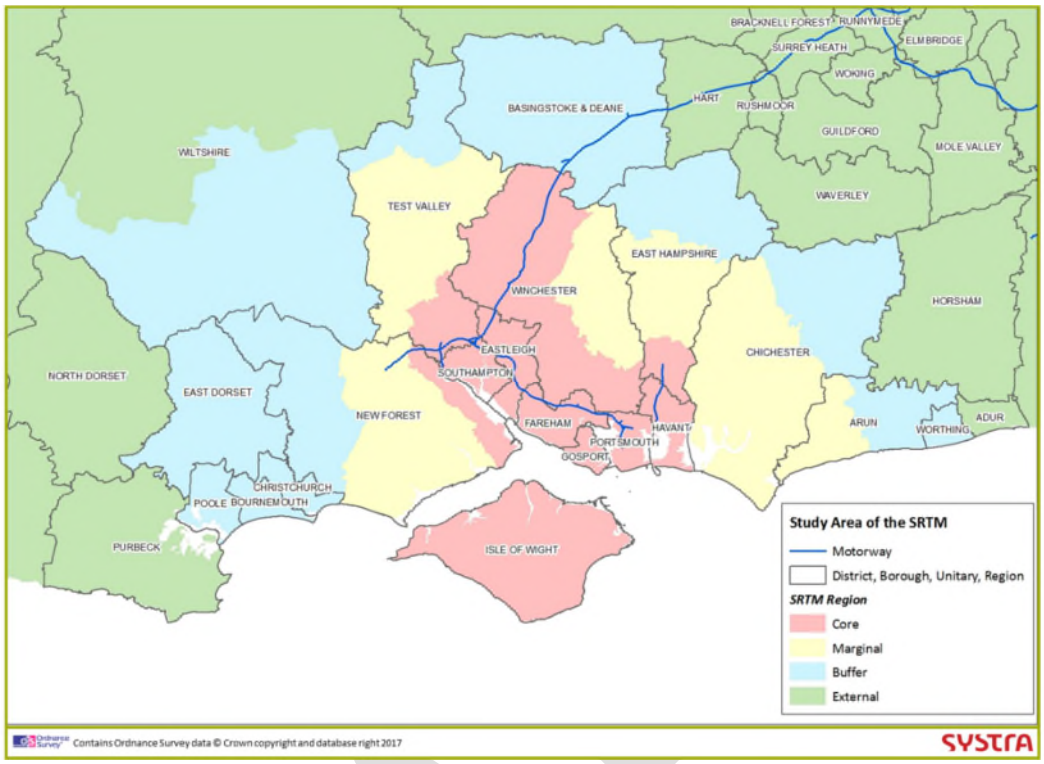


Figure 2-2 SRTM Study Area

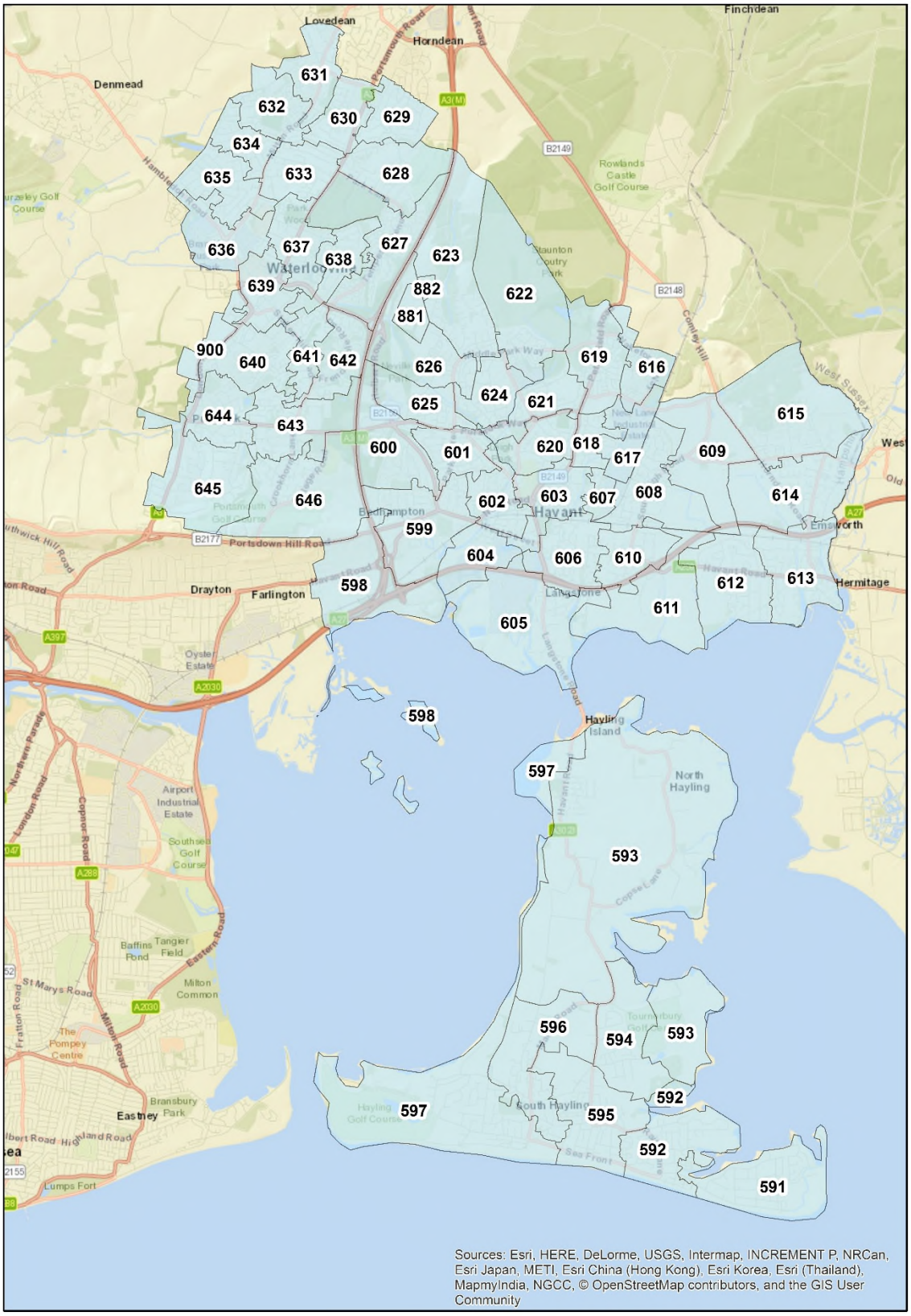


Figure 2-3 SRTM Havant Zone Structure

3. HAVANT LOCAL PLAN MODELLING ASSUMPTIONS

3.1 Introduction

3.1.1 This chapter summarises the development of the model scenarios applied in this commission, and their land use, highway and public transport (PT) inputs.

3.1.2 The sections below provide a breakdown of the key modelling processes, inputs and outputs. The landuse quantum reported in the document for the Havant Borough Local Plan development allocations were provided by HBC Officers in September 2017 and supersede the version provided earlier in 2017.

3.2 Scenario 1 – 2036 Baseline

Highway and PT network

3.2.1 The Baseline scenario uses standard SRTM reference case networks for all modelled years. The SRTM has a base year of 2015 and represents forecast conditions up to the year 2041. Known developments and committed highway schemes are included within the models' reference case scenarios (2019, 2026, 2031, 2036, and 2041) to provide the most accurate representation of future year conditions. A list of the committed (funded) highway schemes included in the Reference Cases is provided as Appendix A. The list of schemes to be included in the standard reference case was developed in consultation with Solent Transport Officers.

Non-Havant Borough Land Use Assumptions

3.2.2 In this study the SRTM Reference Case inputs populate the Baseline scenario for all model areas except Havant Borough where the Reference Case inputs have been revised as detailed in Section 3.2.5 below.

3.2.3 The Reference Case incorporates land use identified as either 'committed' or 'permissible'. Committed sites are those that have received planning permission and for modelling purposes are considered certain to be built-out. 'Permissible' sites refer to those locations identified as suitable for future development (i.e. allocated sites) but that have not yet been subject to planning approval. The locations and maximum land use quantum of the permissible sites are based on Local Authority inputs as at April 2016 in accordance with adopted Local Plans at that time. The take-up of permissible developments is determined by processes within the model and is based on the local conditions (the relative 'attractiveness' of the development compared to other sites e.g. accessibility of the site).

3.2.4 The level of overall development growth within the model is controlled in accordance with TEMPRO (v7.2) employment and population trajectories for the sub-region which conforms with WebTAG guidelines as provided by DfT. This is equivalent to allowing for background traffic growth within the modelling process.

Havant Borough Completions and Committed Development Land Use Assumptions

3.2.5 The starting point in the Baseline for all model data specific to Havant Borough is to remove all the standard reference case inputs after 2015 (the SRTM Base year). In place of these, the actual site completions post-2015 have been added plus committed (with planning permission) future developments. The total completions and committed development totals

for Havant Borough through to 2036 are summarised in Table 3-1 below, and a tabulated breakdown by SRTM model zone provided Appendix B. In addition, Figure 1 shows the Baseline residential growth by zone.

Table 3-1 Baseline: Havant Land Use Assumptions 2015 - 2036

	RESIDENTIAL (DWELLINGS)
SCENARIO 1 Baseline (2015-36 Completions and Committed)	2493

	EMPLOYMENT (SQM)					
	RETAIL	OFFICE	INDUSTRIAL	WARE-HOUSING	HOTEL & OTHER ACCOMO-DATION (bedroom)	LEISURE
SCENARIO 1 Baseline (2015-36 Completions and Committed)	10,447	1,296	1,599	-14,536	96	1,071

SRTM Ref: DGU

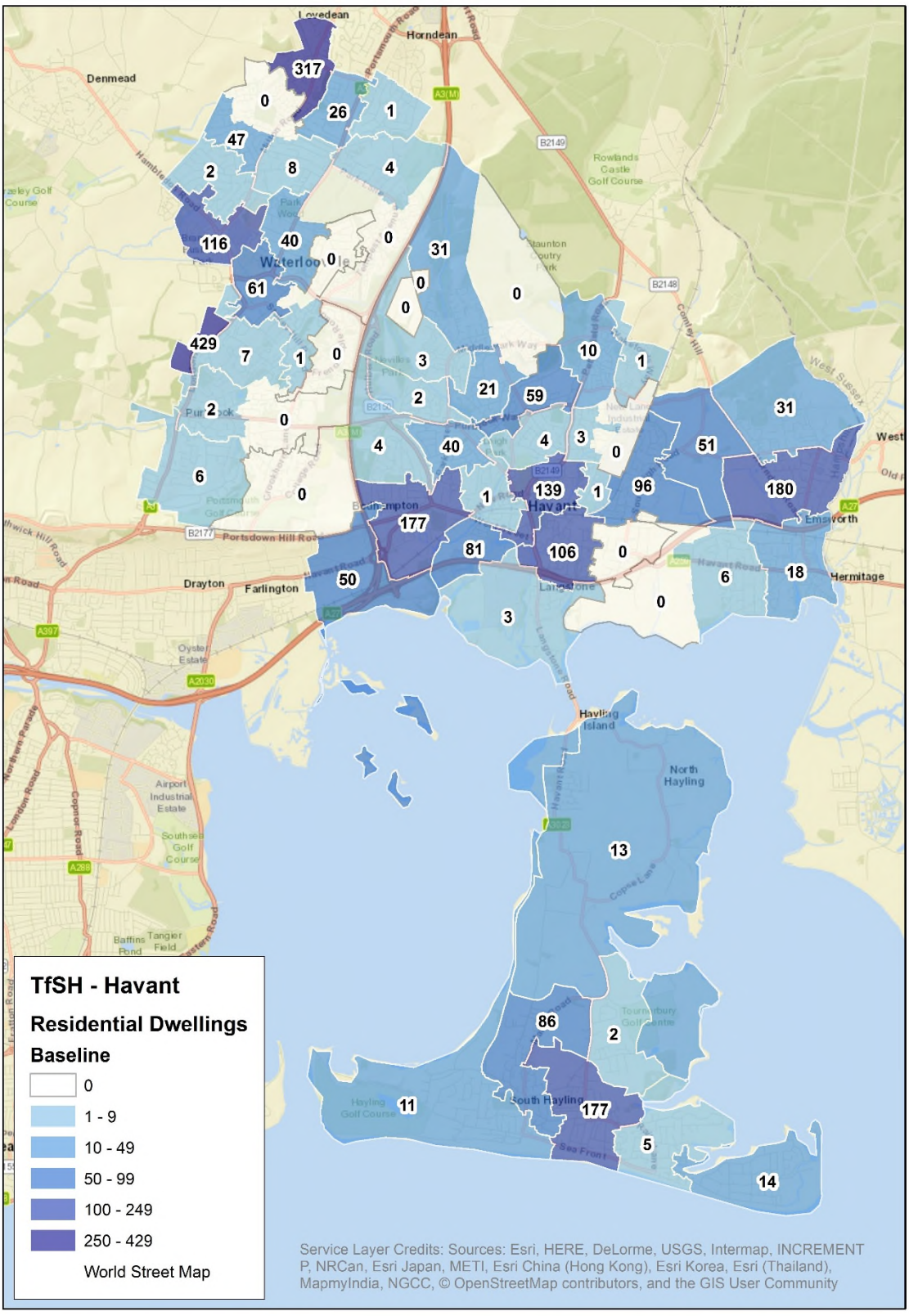


Figure 1. 2036 Havant Baseline Residential Growth (dwellings)

3.3 Scenario 2 – 2036 Do Minimum

3.3.1 The term 'Do Minimum' solely refers to the transport network included in this scenario. Aside from previously committed infrastructure, no specific infrastructure schemes are included to mitigate against the traffic (highway or PT passengers) associated to the Havant Local plan. Such measures will be included where identified as appropriate in the 'Do Something' model run.

Highway and PT network

3.3.2 As alluded to above, the highway and PT network remain unchanged between the Baseline and Do Minimum. This allows the impacts of the Havant Local Plan development on the transport network to be isolated.

Non-Havant Borough Land Use Assumptions

3.3.3 In the Do Minimum, the landuse outside of Havant is the same as in Scenario 1 - Baseline. By assessing the Local Plan in this way, there are no changes to the number of households, jobs or population outside of Havant and the impacts of the Havant Local Plan development can be isolated.

Havant Borough Local Plan Land Use Assumptions

3.3.4 Within Havant Borough, the Local Plan allocation sites are included in addition to the completed and committed sites from the Baseline to create the Do Minimum scenario landuse inputs. It is assumed that all Local Plan sites will be built-out in full by 2036. The Havant Local Plan development totals are shown in Table 3-2 and the resulting Do Minimum totals in Table 3-3 with a tabulated breakdown by SRTM model zone is provided in Appendix B. In addition, Figure 2 shows the Local Plan residential growth by zone and Figure 3 the resulting Do Minimum (Baseline + Local Plan).

Table 3-2 Local Plan: Havant Land Use Assumptions 2015 - 2036

	RESIDENTIAL (DWELLINGS)
Local Plan Developments in Havant	9,415

	EMPLOYMENT (SQM)					
	RETAIL	OFFICE	INDUSTRIAL	WARE-HOUSING	HOTEL & OTHER ACCOMO-DATION (bedroom)	LEISURE
Local Plan Developments in Havant	12,530	49,033	29,556	18,879	0	8,170

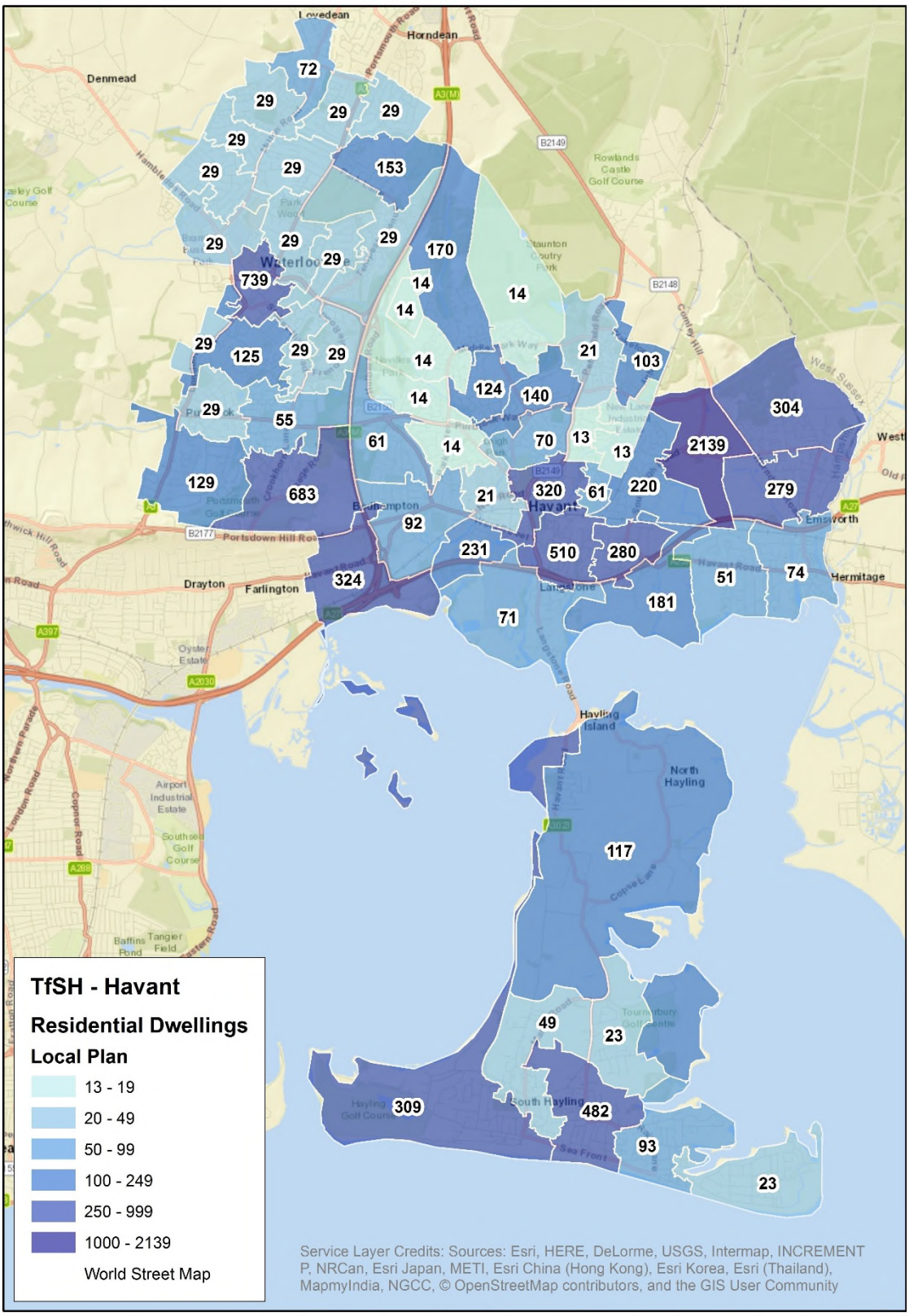


Figure 2. 2036 Havant Local Plan Allocations (dwellings)

Table 3-3 Do Minimum: Havant Land Use Assumptions 2015 - 2036

	RESIDENTIAL (DWELLINGS)
Local Plan Developments in Havant	11,908

	EMPLOYMENT (SQM)					
	RETAIL	OFFICE	INDUSTRIAL	WARE-HOUSING	HOTEL & OTHER ACCOMO-DATION (bedroom)	LEISURE
Local Plan Developments in Havant	22,977	50,329	31,155	4,343	96	9,241

SRTM Ref: DHT

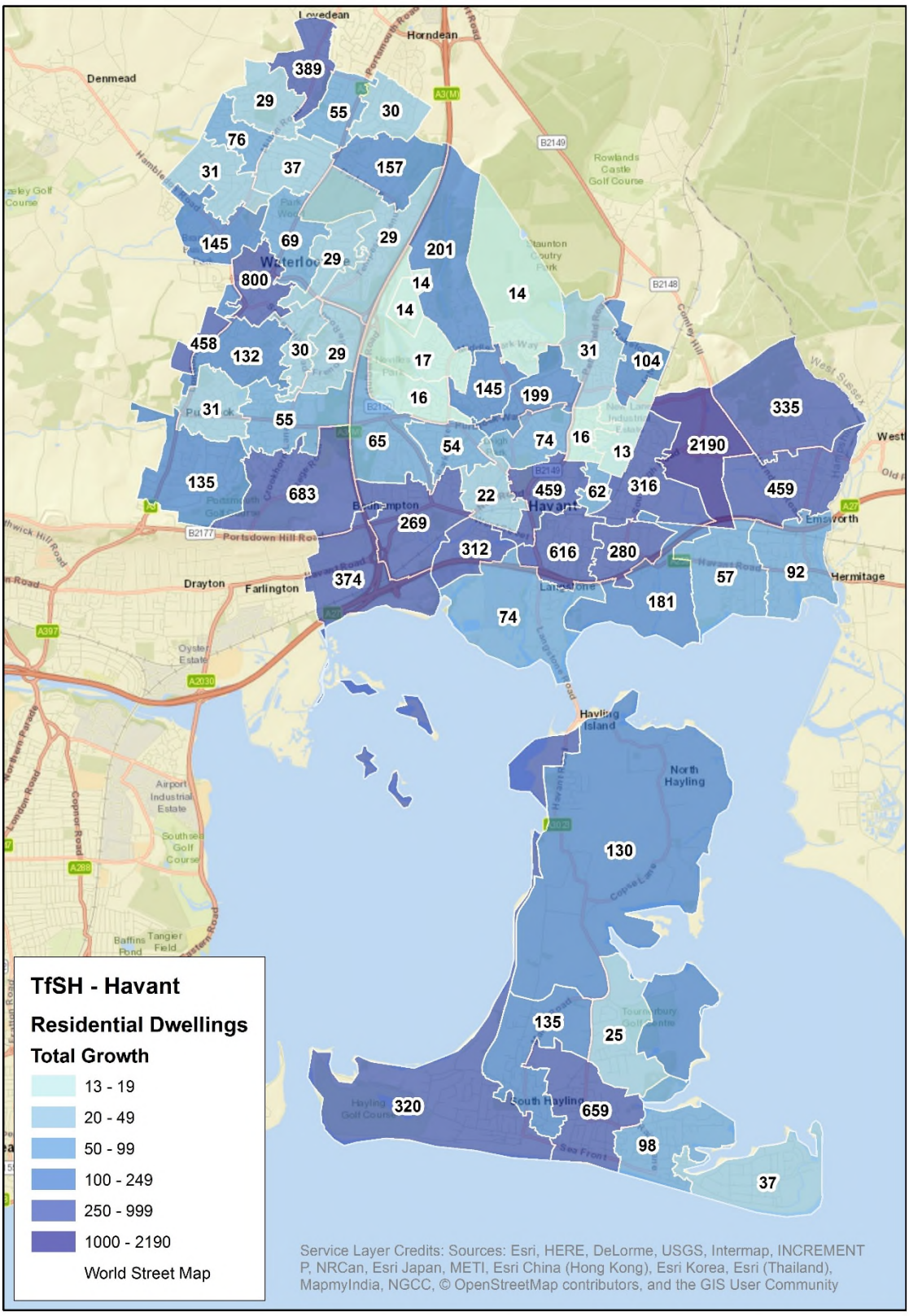


Figure 3. 2036 Havant Do Minimum Residential Growth (dwellings)

3.4 Scenario 3 – 2036 Do Something

3.4.1 The' Do Something' scenario includes the infrastructure measures identified to help mitigate the transport impacts associated to the Havant Local Plan. The measures were identified in the TA for the Local Plan prepared by Hampshire Services and that incorporated outputs from SRTM Scenario 2 - Do Minimum.

Highway Mitigation schemes and PT network

3.4.2 The Highway network for the Do Something scenario includes changes at 10 junctions in order to try and mitigate against the impacts of the Havant Local Plan. The locations of the junctions that have been changed are listed below:

- Bedhampton Hill / Rusty Cutter Roundabout
- Purbrook Way junction with junction 4 A3(M) on slip
- Bedhampton Road / Bedhampton Hill Roundabout
- Purbrook Way / Parkhouse Farm Way
- Emsworth Road / A27 Slips
- Asda roundabout
- Park Road / Elm Way
- Manor Lodge Road / Redhill Road / Whichers Gate Road / Durrants Road
- Harts Farm Way approach to Tear Drop
- Petersfield Road / Stockheath Road

3.4.3 Further details of the development of the mitigation measures are included in the TA. Appendix N includes the conceptual layout drawings for each scheme.

3.4.4 The TA did not identify any changes to the Public Transport network and there are no PT changes included in the SRTM modelling.

Land Use Assumptions

3.4.5 The land use inputs for the Do Something are identical to those in the Do Minimum and represent the Local Plan proposed allocations. This allows the impact of the transport mitigation measures to be isolated.

4. LAND USE MODEL RESULTS

4.1.1 This section summarises the outputs of the land use model (LEIM) within SRTM for the Baseline and Do Minimum/ Do Something scenarios. As noted in Section 3.4.5, the Do Something land use is identical to the Do Minimum land use.

4.2 Population, Dwellings, Jobs (LEIM Module outputs)

4.2.1 Table 4-1 summarises the forecasts, produced by the SRTM, for the population, number of dwellings, and number of jobs within Havant Borough. The comparison show the change between the 2036 Baseline (no local plan development) and the 2036 Do Minimum and Do Something (with local plan development) scenarios.

4.2.2 Havant Borough is forecast to see an increase in population of approximately 21,405 and an increase in dwellings of approximately 9,415 between 2015-36. In the same period the number of jobs increases by approximately 4,295.

Table 4-1 Havant Borough Local Plan change in population, dwellings and jobs, 2036

	WITHOUT LOCAL PLAN 2036	WITH LOCAL PLAN 2036	DIFFERENCE	% DIFFERENCE
Population	117,317	138,723	21,406	18%
Dwellings	54,986	64,401	9,415	17.5%
Jobs	51,005	55,298	4,293	8.5%

SRTM Ref: DHTvDGU

5. DEMAND MODEL RESULTS

5.1 Introduction

5.1.1 This section summarises the forecasts produced by the Demand module (MDM) of the SRTM for the 2036 Baseline (without Local Plan) and Do Minimum/ Do Something (with Local Plan), in addition to the difference between the forecasts in order to isolate the impacts of the Local Plan development.

5.2 Demand Model Results

5.2.1 Table 5-1 summarises the total person trips, and percentage mode share to, and from, Havant Borough for a 24 hour period. The table presents data for 2036 for both the With and Without the Local Plan scenarios.

5.2.2 There are approximately 88,500 additional person trips to / from Havant across a 24 hour period in the 'With Local Plan compared to the 'Without' (this will include an element of double counting for trips that both start and end within Havant). This represents an increase of 17.5%. There is a small shift to PT and Active mode shares at the expense of Highway.

Table 5-1 Person trips (24hr) to / from Havant

	SCENARIO	HAVANT AS DESTINATION			HAVANT AS ORIGIN		
		CAR	PT	ACTIVE	CAR	PT	ACTIVE
ABSOLUTE	**Without Local Plan**	158,058	25,795	68,295	157,141	26,424	68,338
	With Local Plan	183,244	31,372	81,682	182,442	32,032	81,721
	Difference	*25,186*	*5,576*	*13,387*	*25,301*	*5,608*	*13,383*
MODE SHARE (%)	**Without Local Plan**	62.7%	10.2%	27.1%	62.4%	10.5%	27.1%
	With Local Plan	61.8%	10.6%	27.6%	61.6%	10.8%	27.6%
	Difference	*-0.8%*	*0.4%*	*0.5%*	*-0.8%*	*0.3%*	*0.5%*

SRTM Ref: DHTvDGU

6. HIGHWAY MODEL RESULTS DO MINIMUM

6.1 Introduction

6.1.1 This section summarises the highway outputs across Havant Borough as a whole. The outputs relate to a forecast year of 2036.

6.2 Highway Network Performance

6.2.1 Table 6-1 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 Do Minimum. As would be expected, the impact across the whole Core model area is diluted and we have therefore focussed on the changes within Havant Borough itself.

6.2.2 Vehicle Hours increase by approximately 10% and Vehicle Kilometres by 5% between the Baseline and Do Minimum 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 (kph) in the Borough decreases by 4.5% in the Do Minimum scenario compared to the Baseline which is again consistent with the forecast additional traffic volumes and increased delay.

Table 6-1 24hr Period Highway model network statistics, DM 2036 vs Baseline 2036

PARAMETER		BASELINE 2036	DO MIN 2036	*DIFF*	*% DIFF*
Vehicle Hrs	Core Model Area	710,980	721,438	*10,458*	*1.5%*
	Havant Borough	52,803	58,091	*5,288*	*10.0%*
Vehicle Kms	Core Model Area	33,773,876	34,024,774	*250,898*	*0.7%*
	Havant Borough	2,657,959	2,793,512	*135,553*	*5.1%*
Average Speed (kph)	Core Model Area	47.5	47.2	*-0.3*	*-0.7%*
	Havant Borough	50.3	48.1	*-2.2*	*-4.5%*

SRTM Ref: DHT v DGU

6.3 Highway Link Flows, Delays and Capacity Hotspots

6.3.1 The following, summarises the outputs of the Road Traffic Model. For clarity, the outputs shown are for those which exceed a given threshold which is specified in the appropriate paragraphs below. The plots included in the main section of the Report, are an overview of the Havant Borough – with more localised plots for areas within the Borough being provided in Appendices C to F.

6.3.2 When considering these highway outputs it is useful to bear in mind the following:

- The purpose of the Do Minimum vs Baseline comparison is to isolate the impact of Local Plan development traffic to help identify where the net change to traffic flow and network operation is most pronounced. This is to assist determining if/where mitigation is required in order to deliver the LP growth.
- The comparison is between the two scenarios for a 2036 forecast year and not a comparison back to existing conditions (i.e. an increase or decrease in flow between the two 2036 scenarios does not necessarily relate to an increase or decrease compared to existing conditions).
- The two scenarios represent two different 2036 end-states for that specific year either with, or without, the Havant Local Plan growth and do not represent a progression from one scenario to the other that transport users would 'experience' (i.e in the 2036 Do Minimum, the 2036 Baseline conditions never existed and vice-versa).

Change in Traffic Flow

6.3.3 Figure 6-1 to Figure 6-4 identify the change in traffic flow in the AM and PM peak hours between the Do Minimum and Baseline scenarios in 2036, at an overall Borough level (more detailed plots are contained within Appendix C). In addition to the new traffic directly associated with the Local Plan land use, these plots highlight any re-routing of traffic that may result from localised congestion or redistribution of existing trips.

6.3.4 For the flow difference plots the absolute difference in passenger car units (PCUs) is identified adjacent to the appropriate link. Blue lines identify a reduction compared to the 2036 Baseline and pink/red lines an increase. In addition, the scale of the change is represented graphically with the coloured lines of varying bandwidth. Only flow differences of 50 PCUs or greater and are displayed in the plots.

6.3.5 When comparing the Do Minimum to the Baseline, there is a general increase in traffic within the Borough as would be expected with the inclusion of Local Plan development. In the AM, the location of the greatest traffic increases are consistent with the larger development allocations. In particular, there are large increases on Southleigh Road, Barton's Road, Horndean Road, Emsworth Common Road, and Woodberry Lane that correspond with the large Denvilles strategic development site. Dunsbury Hill Farm is a contributor to the increases 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 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 development on Hayling Island creates the forecast increase on Langstone Road towards the mainland.

6.3.6 In the AM peak hour there are an approximate additional 230PCUs joining the A27 westbound at the Emsworth junction, approximately 40 PCUs additional westbound joiners at the Langstone Road junction, and 100 PCUs additional westbound joiners at the teardrop junction. The net impact of these additional joiners is dampened by a reduction in westbound traffic from the Chichester area as detailed below in Section 6.3.7. Additional eastbound joiners at the comparable locations are minimal but there is an approximate increase of 100 PCUs of eastbound vehicles exiting the A27 at the Langstone Road junction. AM peak hour forecast flow changes on A3M are relatively modest in both directions.

6.3.7 There is a noticeable reduction in trips westbound on the A27 (compared to the Baseline) to the east of the 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 Tear-drop junctions. The actual traffic volume of that section of carriageway does not change significantly between the two scenarios but in the Baseline on there is a higher component of trips originating from Chichester (and the areas further east). In the Do Minimum 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 (e.g accessing a job in a different location in the different scenarios).

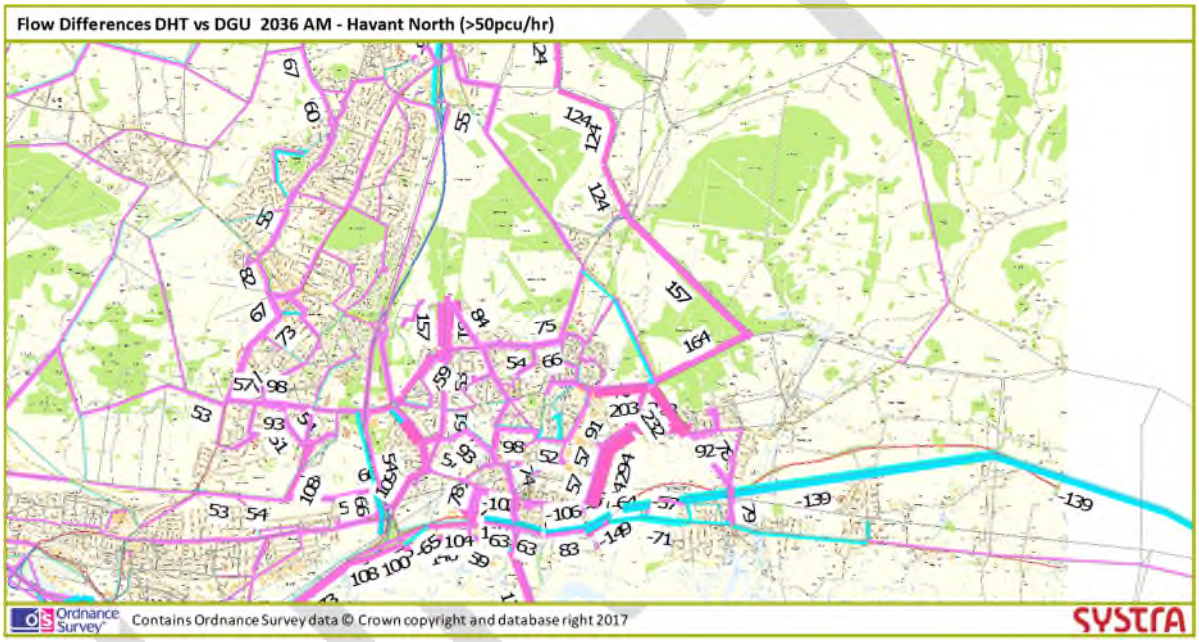


Figure 6-1 Flow Difference - Do Minimum vs. Baseline 2036 (AM)

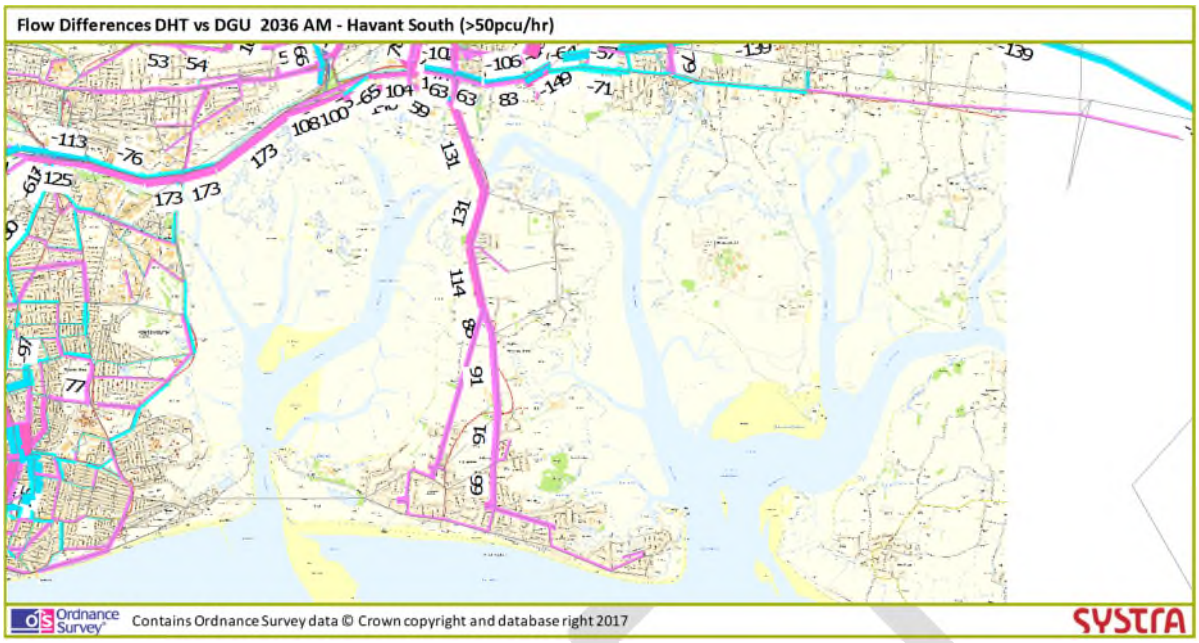


Figure 6-2 Flow Difference - Do Minimum vs. Baseline 2036 (AM)

6.3.8 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).

6.3.9 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.

6.3.10 On the A27 there is again a reduction forecast (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 trips using the A27 and then exiting at the Emsworth junction towards the Denvilles development and fewer continuing on the A27 towards Chichester area (this ties 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. To the north of that junction, the forecast A3M flow changes are minimal.

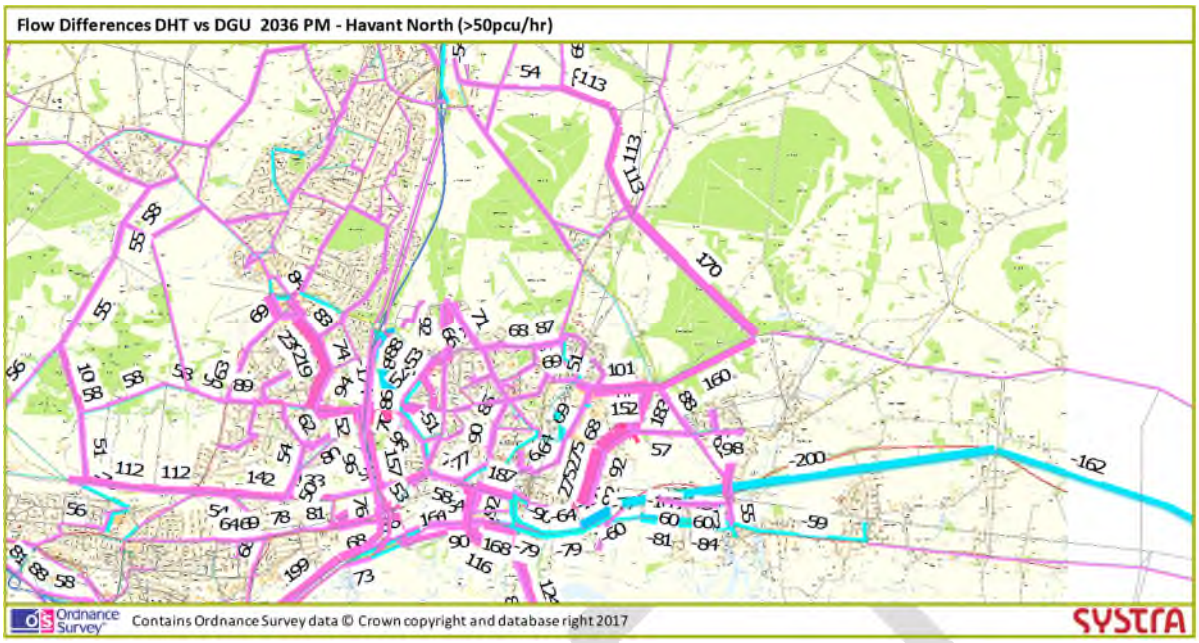


Figure 6-3 Flow Difference - Do Minimum vs. Baseline 2036 (PM)

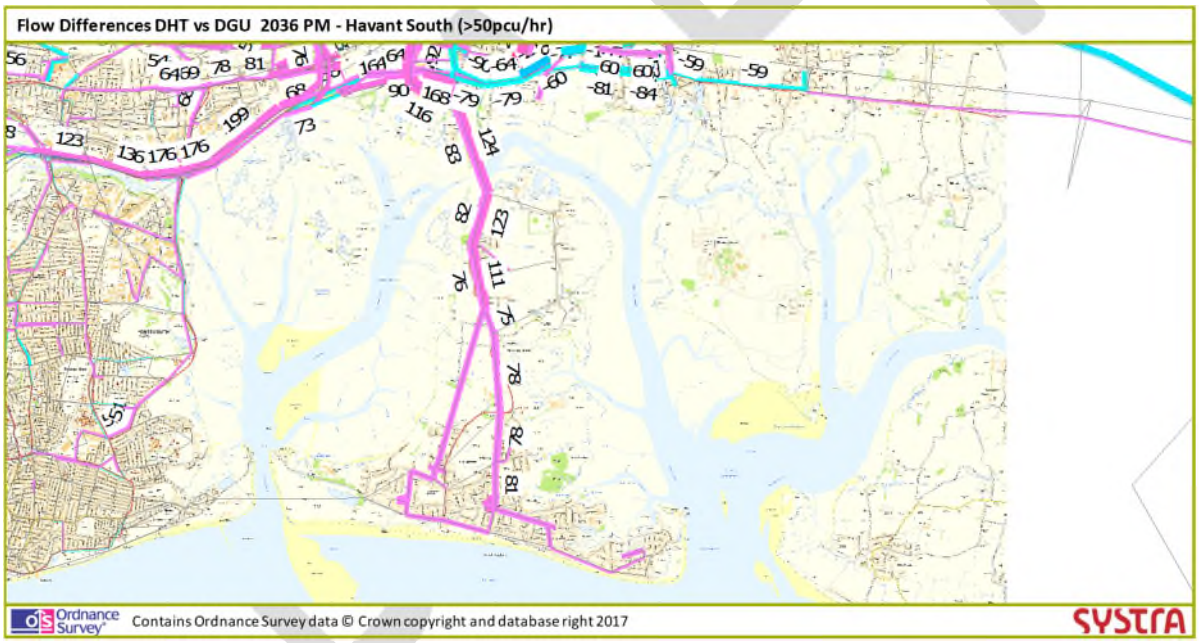


Figure 6-4 Flow Difference - Do Minimum vs. Baseline 2036 (PM)

Highway Delays

6.3.11 Figure 6-5 to Figure 6-8 display the forecast change in link delay, per PCU, for the AM and PM peak hours between the Do Minimum and Baseline scenarios in 2036. The absolute difference in delay in seconds is identified adjacent to the appropriate link. Blue lines identify a reduction compared to the 2036 Baseline scenario and pink/red lines an increase. In addition, the scale of the change is represented graphically with the coloured lines of varying bandwidth. All delay differences in excess of 3 seconds are displayed in the plots. More localised plots are provided in Appendix D.

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

6.3.13 In the AM peak there is a forecast additional 42 seconds of delay 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 (see 6.3.7).

6.3.14 Notable delay increases of over 30s are also forecast the on Langstone Road northbound (76s), and Emsworth Road eastbound (109s) approaches to the respective A27 junctions. The B2149 Petersfield Road southbound (276s) has a substantial increase at the junction with Stockheath Road, and West Lane has a 49s increase at the junction with A3023.

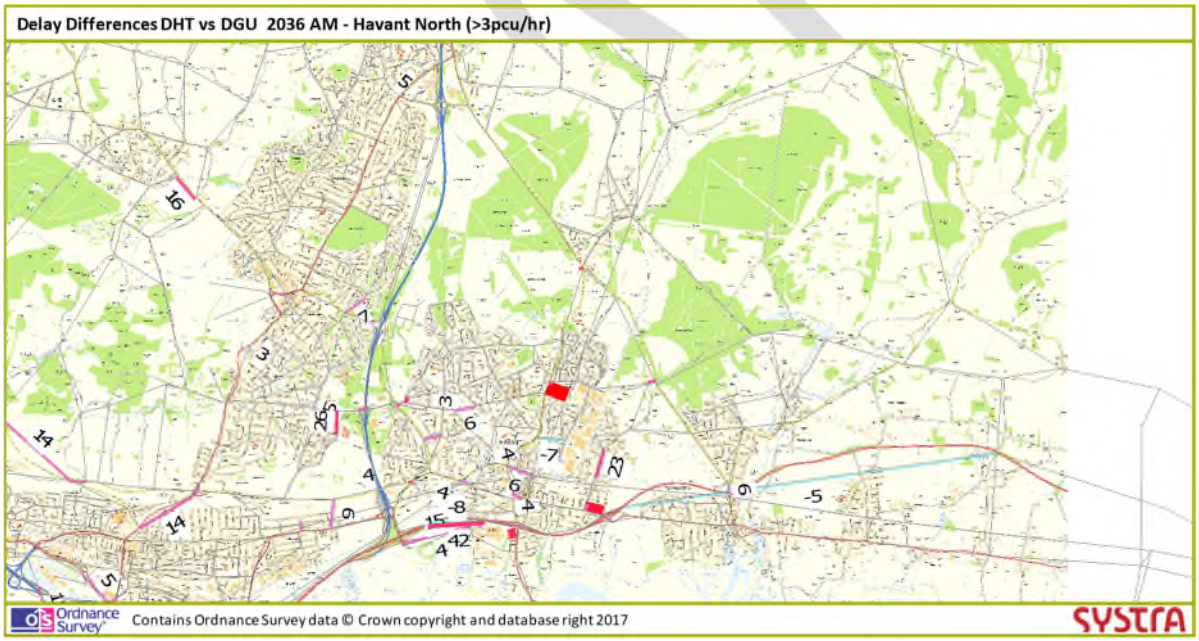


Figure 6-5 Delay Difference - Do Minimum vs. Baseline 2036 (AM)

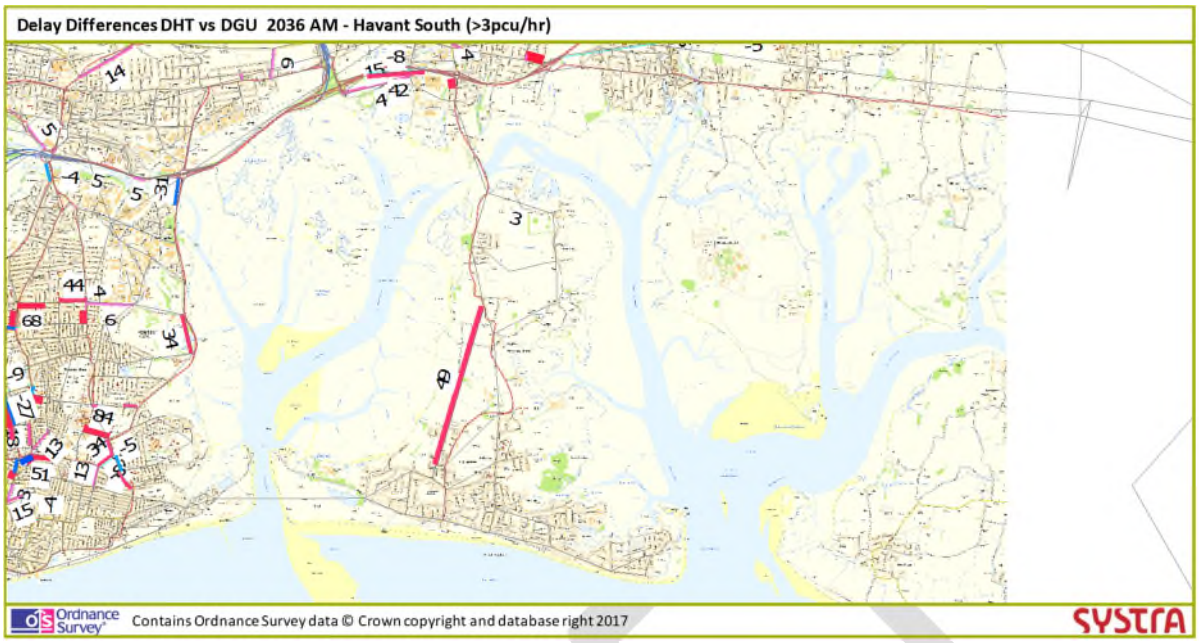


Figure 6-6 Delay Difference - Do Minimum vs. Baseline 2036 (AM)

6.3.15 In the PM peak there is a forecast additional 37 seconds of delay on A27 westbound between the Langstone Road and Teardrop junctions and an additional 27 seconds in the opposite direction. There is a forecast 66s increase on the Harts Farm Way approach to the Teardrop junction.

6.3.16 Notable delay increases of over 30s are also forecast the on Elm Lane approach (192s) to the junction with Park Road, the Hulbert Road southbound (66s) approach to the Asda roundabout (76s), and the Manor Lodge Road southbound (33s) approach at the junction with Redhill Road.

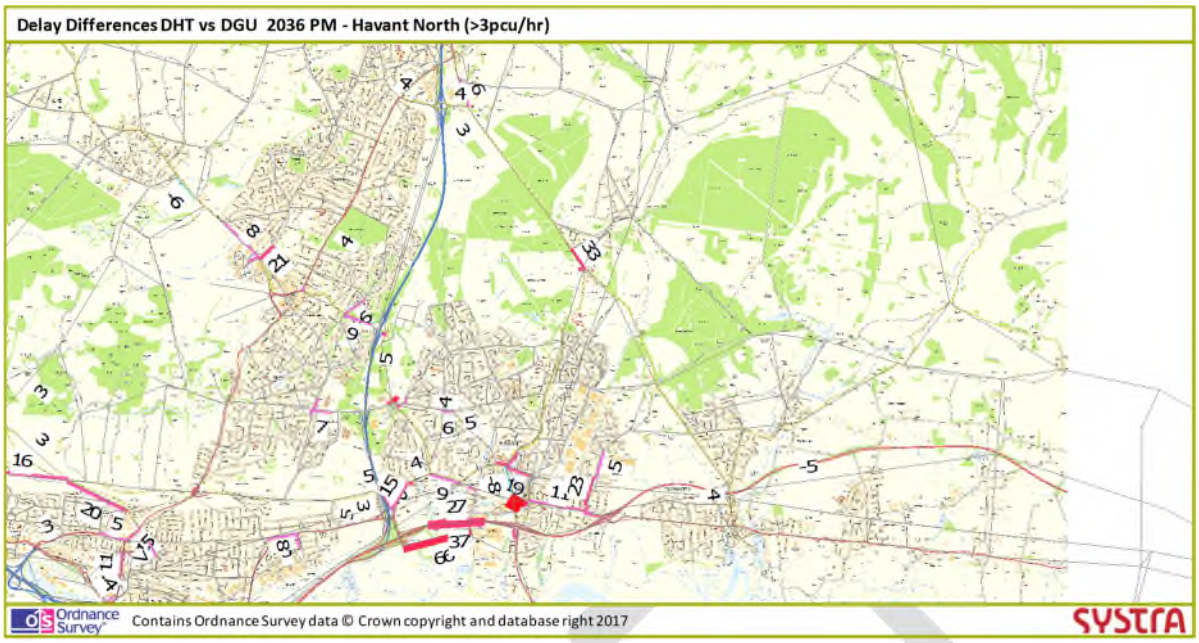


Figure 6-7 Delay Difference - Do Minimum vs. Baseline 2036 (PM)

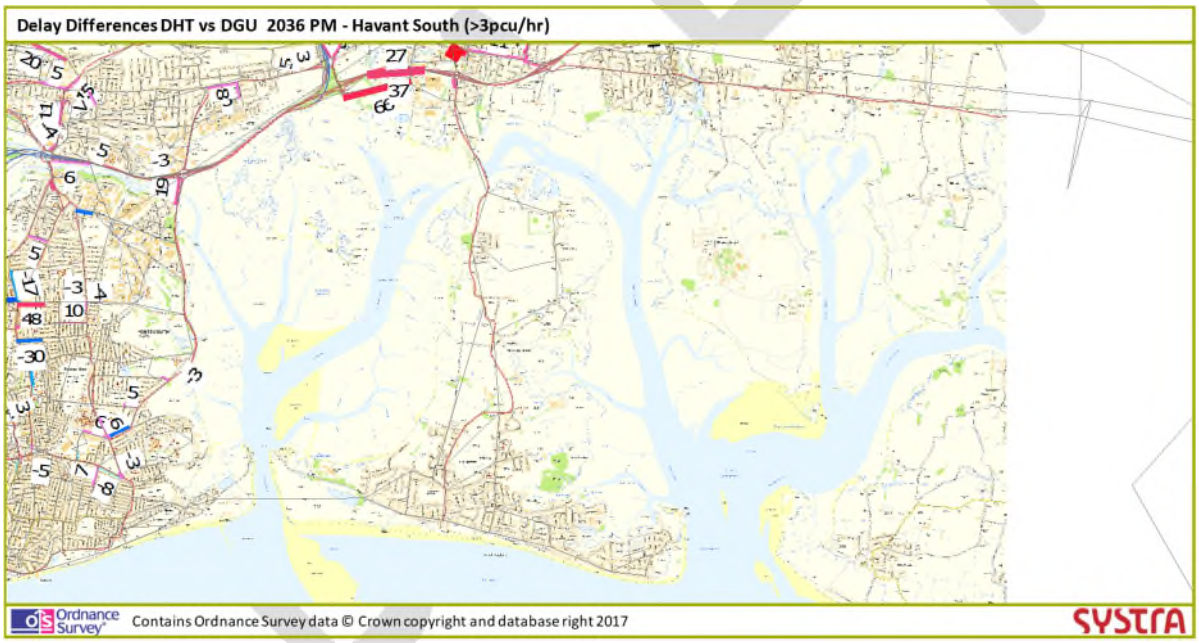


Figure 6-8 Delay Difference - Do Minimum vs. Baseline 2036 (PM)

Capacity Hotspots

6.3.17 In order to identify locations with capacity issues as a result of Local Plan allocations, the operational capacity on all links on the approaches to junctions within the Havant Borough have been assessed. Junction approaches have been reviewed based on the ratio of flow to capacity (V/C) on each approach – hence identifying links with a high V/C is a proxy for identifying junctions with capacity issues.

6.3.18 The following criteria has been used to identify a 'long-list' of junctions where future highway schemes may be required, for each scenario tested:

- Links where the V/C is more than 80% in either AM or PM peak hour for the Baseline or Do Minimum scenario.

6.3.19 Figure 6-9 to Figure 6-16 display the V/Cs for the AM and PM peak hours for the Baseline, and Do Minimum scenarios (more localised plots are provided for both Baseline and Do Minimum in Appendix E and Appendix F respectively).. For the V/C plots the performance of the link is identified through the colour of the link as follows:

- > 80% - Pink
- > 100% - Red

6.3.20 If the V/C is near, or in excess of 90%, then the junction will be subject to queuing and delays; a value of 90% is normally taken as the practical capacity value for design purposes. A value of >100% means that the junction is over capacity and significant queues and delay could occur.

6.3.21 The analysis of all modelled links within the Havant Borough produces a long-list of 66 junctions that are forecast to have at least one approach arm which meets the >80% V/C criteria. These are represented as dots in Figure 6-17 and tabulated in Appendix G. In peak hours for 2036 forecast year conditions, it is not unexpected that a relatively high number of junctions have V/C in excess of 80% so we have further refined the analysis to identify those sites impacted most by Local Plan Growth as detailed below.

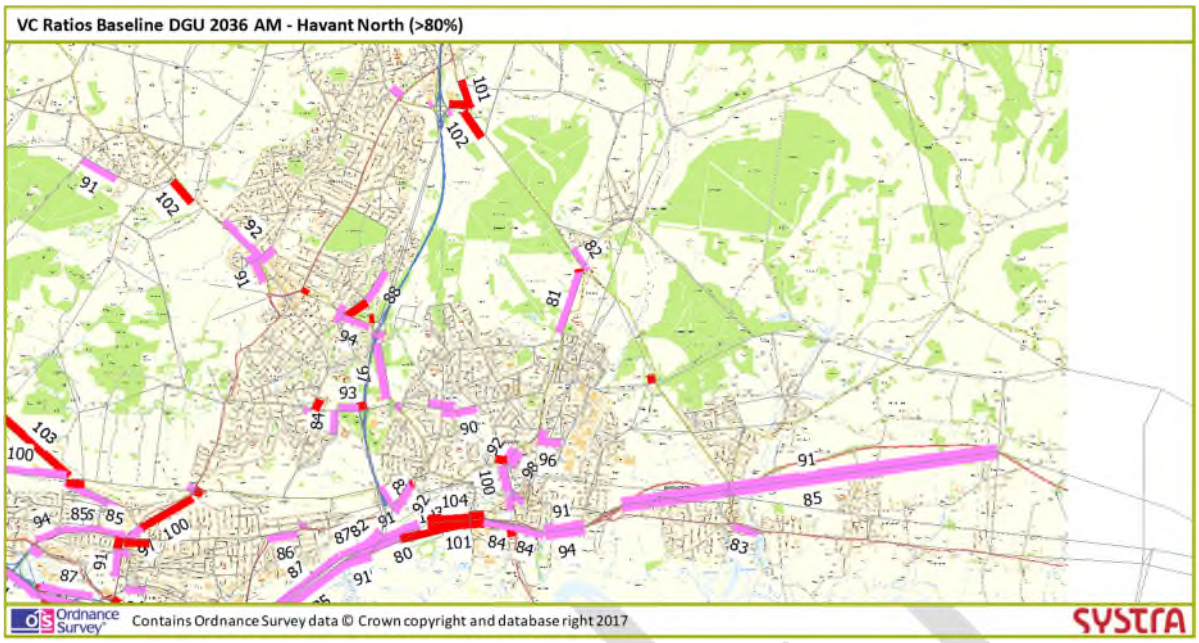


Figure 6-9 Volume Over Capacity - Baseline 2036 (AM)

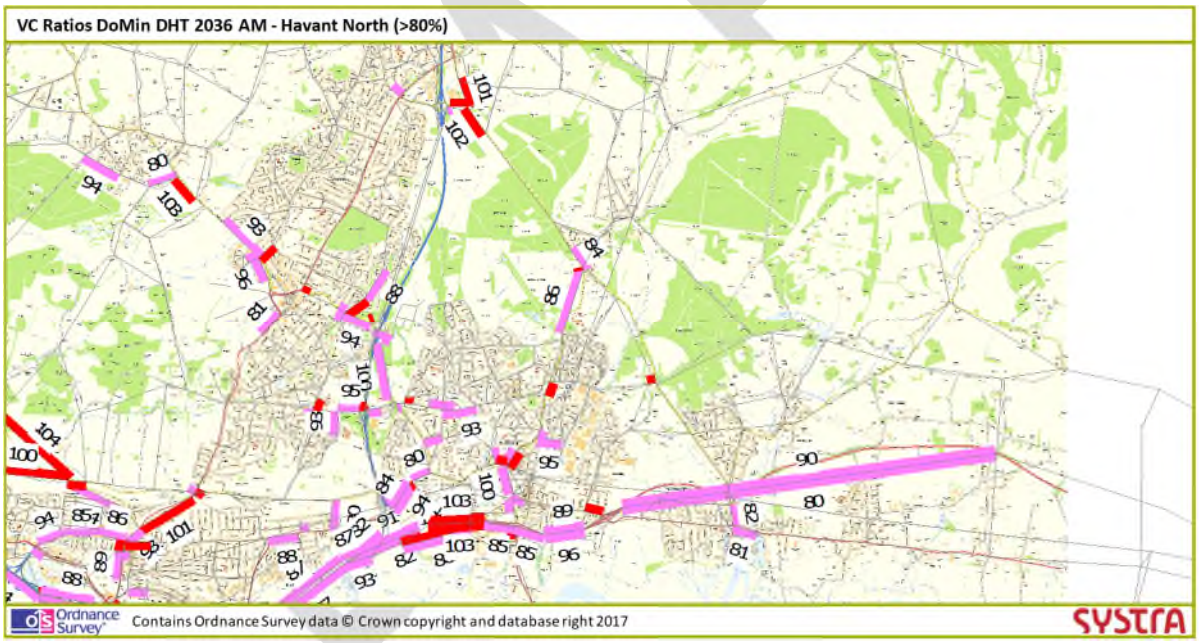


Figure 6-10 Volume Over Capacity – Do Minimum 2036 (AM)

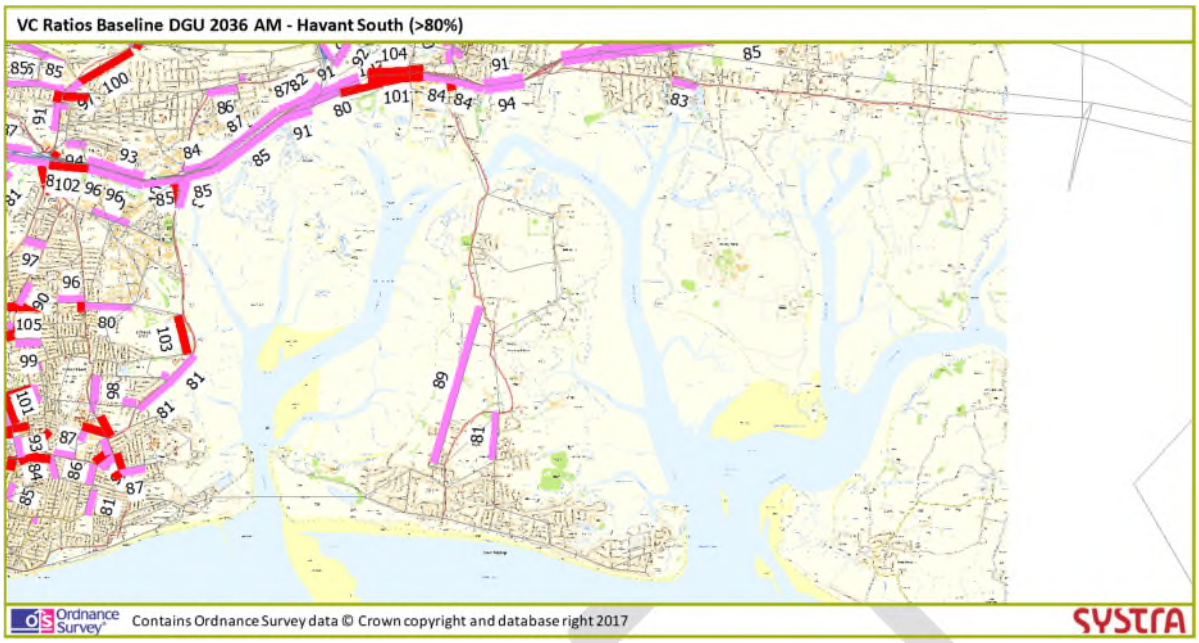


Figure 6-11 Volume Over Capacity - Baseline 2036 (AM)

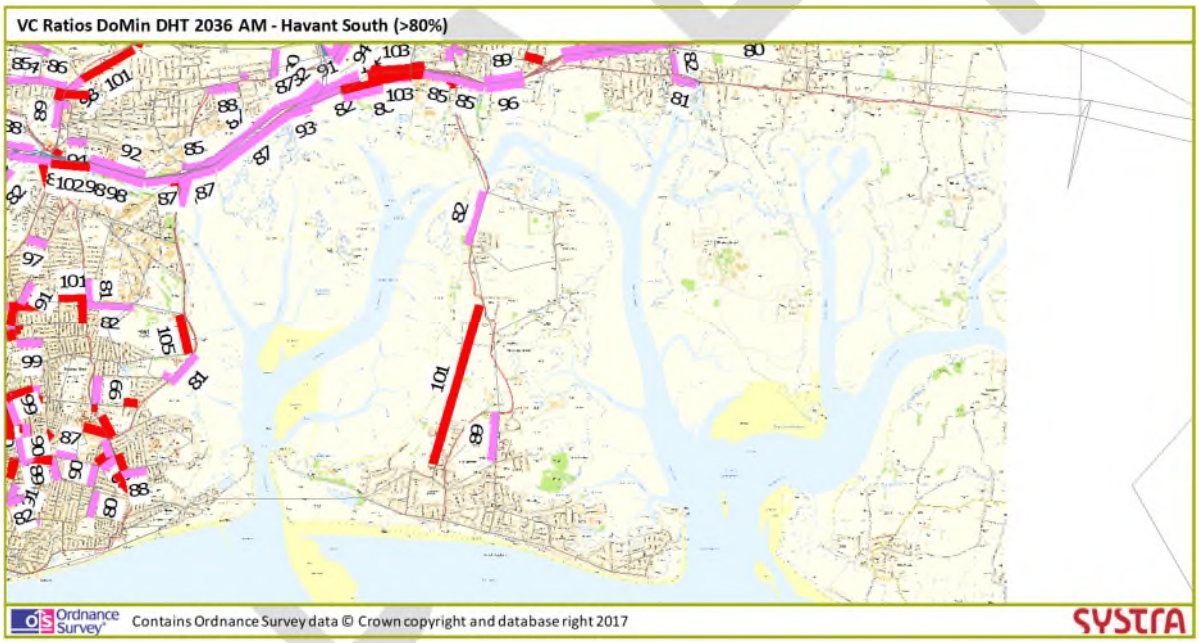


Figure 6-12 Volume Over Capacity – Do Minimum 2036 (AM)

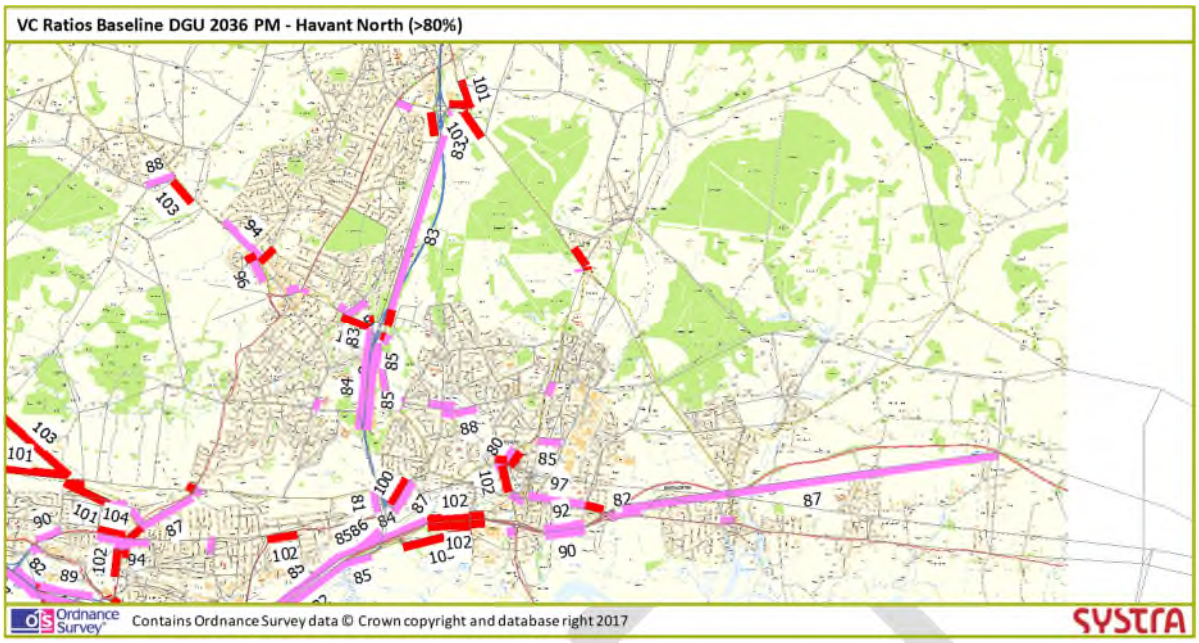


Figure 6-13 Volume Over Capacity - Baseline 2036 (PM)

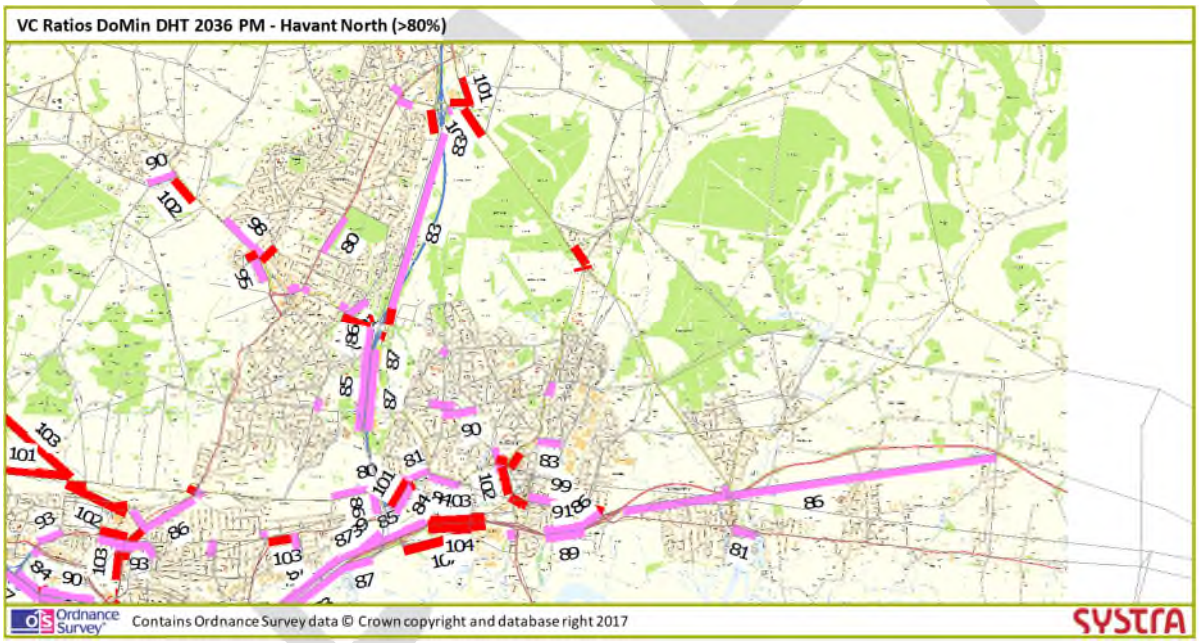


Figure 6-14 Volume Over Capacity – Do Minimum 2036 (PM)

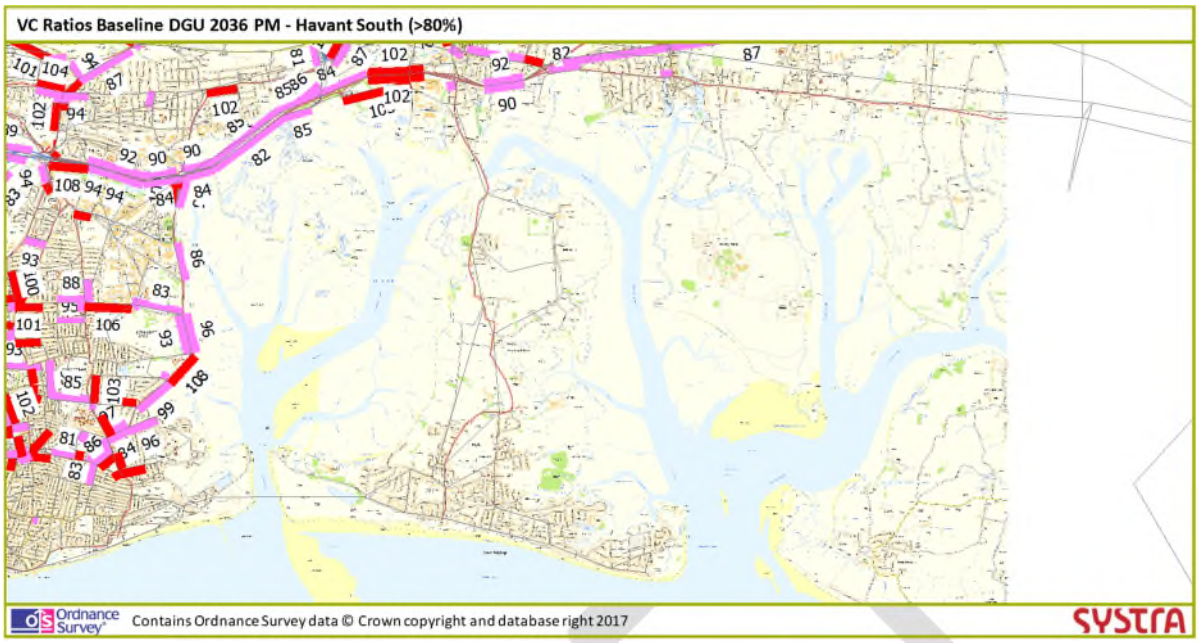


Figure 6-15 Volume Over Capacity - Baseline 2036 (PM)

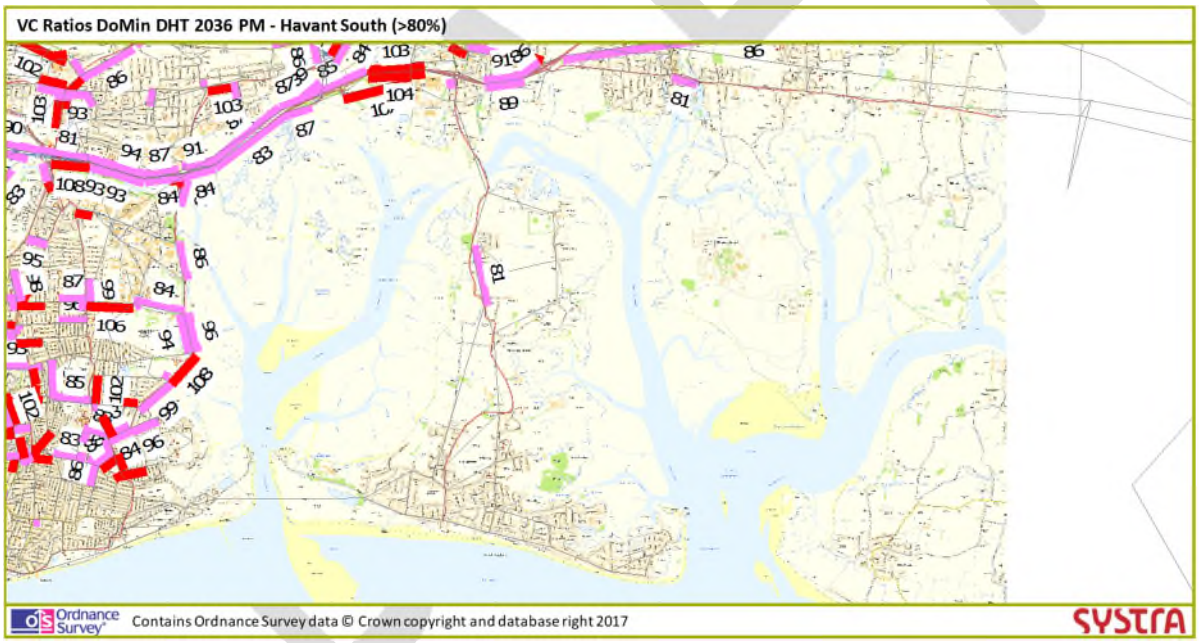


Figure 6-16 Volume Over Capacity - Do Minimum 2036 (PM)

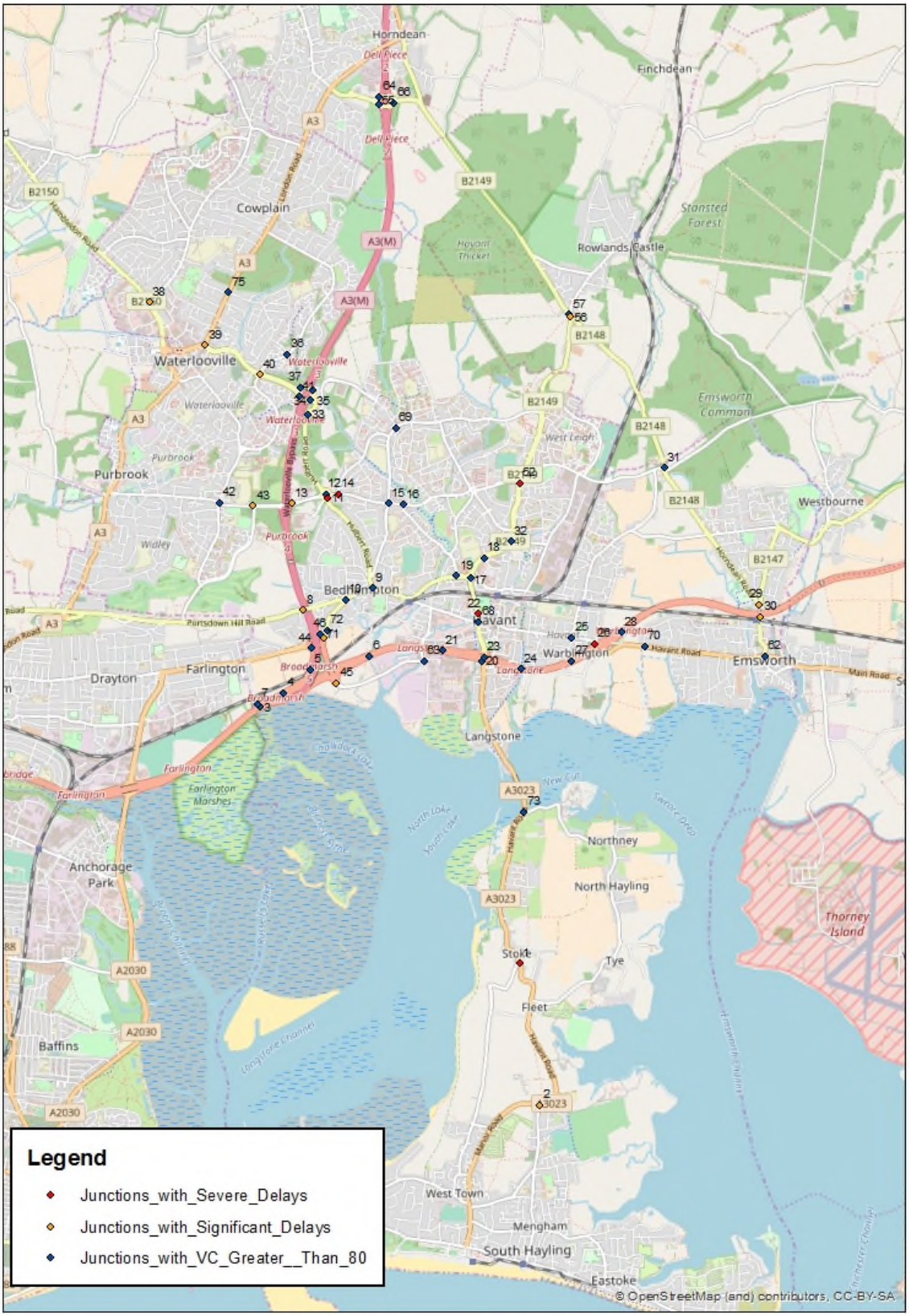


Figure 6-17 Junctions forecast to meet the 'significant' or 'severe' criteria or V/C >80%

6.3.22 The change in V/C between the Do Minimum, and Baseline scenarios has been calculated to identify locations where the V/C worsens as a result of the Local Plan development. In addition to identifying locations with an V/C greater than 80%, the following criteria has been applied to show junctions that worsen either significantly or severely:

- 'Significant' increase in V/C is where the V/C is greater than 85% and has increased in the Do Minimum by more than 5% compared to the Baseline
- 'Severe' increase in V/C is where the V/C is greater than 95% and has increased in the Do Minimum by more than 10% compared to the Baseline.

6.3.23 There are a total of 12 junctions that meet the 'significant' change criteria and a further 6 are classified as 'severe' as summarised in Table 6-2 below and the locations shown on Figure 6-17. These are the sites that, based on SRTM outputs, we would recommend mitigation could be considered as part of the Local Plan. The final list of mitigation schemes taken forward is reported in the TA.

6.3.24 For each of the 18 junctions identified through the above filtering process, a brief summary is provided in Appendix H of the specific issues at those sites.

Table 6-2 Junctions Forecast to meet the 'significant' or 'severe' criteria

ID	JUNCTION	'SIGNIFICANT'	'SEVERE'
1	A3023/ West Lane		✓
2	A3023/ Copse Lane	✓	
8	A3(M) N/B merge from Rusty Cutter	✓	
11	Purbrook Way approach to Asda Roundabout		✓
13	Purbrook Way junction with A3(m) 4 SB onslip (B&Q Rndbt)	✓	
14	Purbrook Way / Parkhouse Farm Way		✓
22	Park Road South / Elm Lane		✓
26	Emsworth Road junction with A27 EB off-slip		✓
29	B2148 Horndean Road / New Brighton Road	✓	
30	B2148 Horndean Road / Interbridges Emsworth	✓	
38	B2150 Hambledon Road/ Milton Road	✓	
39	A3 London Road/ B2150 Hulbert Road	✓	
40	B2150 Hulbert Road/ Tempest Avenue	✓	
43	Purbrook Way/ College Road	✓	

ID	JUNCTION	'SIGNIFICANT'	'SEVERE'
45	Harts Farm Way approach to Teardrop junction	✓	
52	B2149 Petersfield Road/ Stockheath Road		✓
56	B2149 Durrants Road/ B2148 Whichers Gate Road	✓	
71	B2177 Bedhampton Hill/ Rusty Cutter Roundabout	✓	

7. HIGHWAY MODEL RESULTS DO SOMETHING

7.1 Introduction

7.1.1 This Chapter summarises the highway outputs for the Do Something scenario that includes for the highway mitigation measures identified in the Local Plan TA and relate to a forecast year of 2036. The mitigation locations are as follows (see Appendix N for conceptual layouts):

- Bedhampton Hill / Rusty Cutter Roundabout
- Purbrook Way junction with junction 4 A3(M) on slip
- Bedhampton Road / Bedhampton Hill Roundabout
- Purbrook Way / Parkhouse Farm Way
- Emsworth Road / A27 Slips
- Asda roundabout (Purbrook Way/ Hulbert Rd)
- Park Road / Elm Way
- Manor Lodge Road / Redhill Road / Whichers Gate Road / Durrants Road
- Harts Farm Way approach to Tear Drop
- Petersfield Road / Stockheath Road

7.2 Highway Network Performance

7.2.1 Table 7-1 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, Do Minimum and Do Something. The difference between Baseline and Do Something outputs are also tabulated. The impact across the whole Core model area is diluted and we have therefore focussed on the changes within Havant Borough itself.

7.2.2 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 the Do Minimum and thus reflect the positive impact of the mitigation. The average speed (48.6 kph) 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 where the average forecast speed dropped to 48.1 kph.

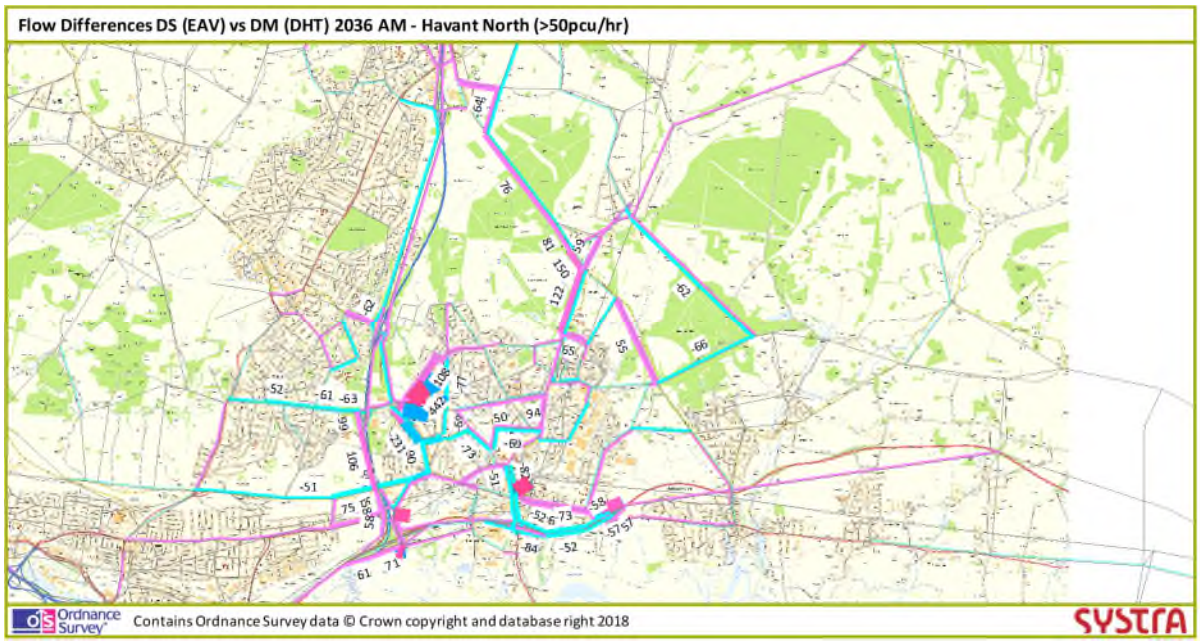
Table 7-1 24hr Period Highway model network statistics, DS 2036 vs Baseline 2036

PARAMETER		BASELINE 2036	DO MIN 2036	DO SOM 2036	*DIFF*	*% DIFF*
Vehicle Hrs	Core Model Area	710,980	721,438	720,491	*9511*	*1.3%*
	Havant Borough	52,803	58,091	57,425	*4622*	*8.8%*
Vehicle Kms	Core Model Area	33,773,876	34,024,774	34,033,452	*259,576*	*0.8%*
	Havant Borough	2,657,959	2,793,512	2,791,704	*133,745*	*5.0%*
Average Speed (kph)	Core Model Area	47.5	47.2	47.2	*-0.3*	*-0.6%*
	Havant Borough	50.3	48.1	48.6	*-1.7*	*-3.4%*

7.3 Highway Link Flows, Delays and Capacity Hotspots

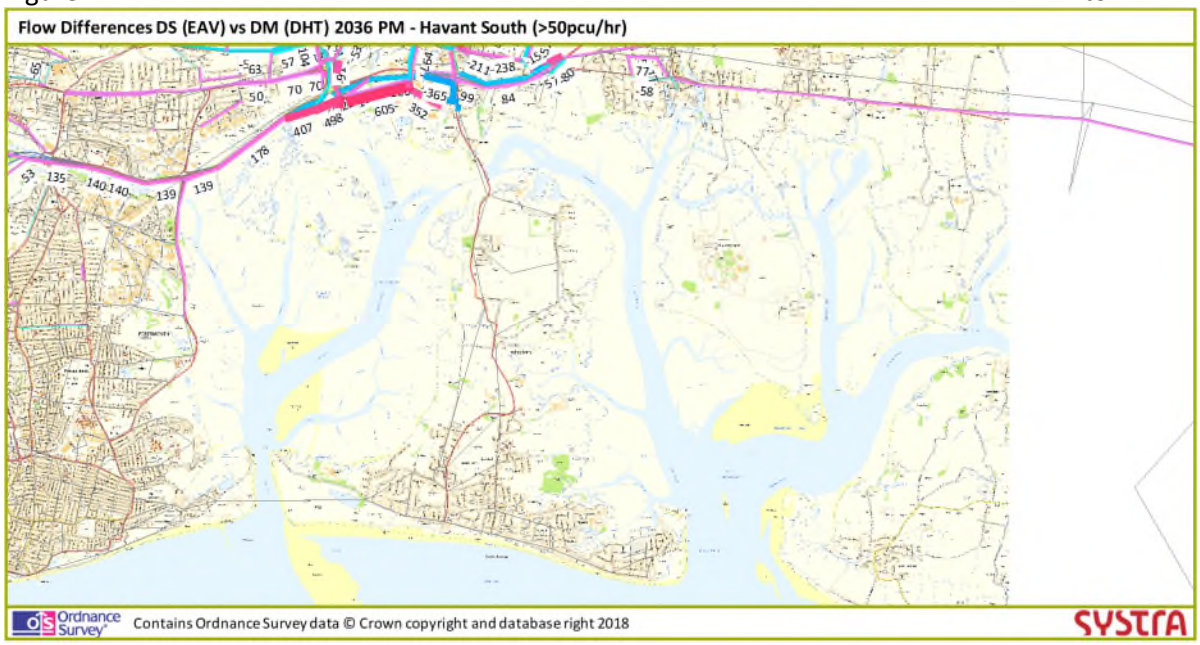
7.3.1 The following section summarises the forecast change in network flows and delay. The difference plots provide a comparison between the 2036 Do Minimum and 2036 Do Something networks in order to isolate the impact of the mitigation. Both Do Minimum and Do Something networks include for the proposed traffic growth as generated by the Local Plan allocations.

Change in Traffic Flow



7.3.2

7.3.3 Figure 7-1 to



7.3.4 Figure 7-4 show the change in traffic flow in the AM and PM peak hours between the Do Something and Do Minimum scenarios in 2036, at an overall Borough level (Appendix I

includes more local level plots) . These plots highlight any re-routing of traffic that result from the proposed mitigation measures. The knock-on impact of re-routing traffic is that new congestion points can be created not forecast in the earlier Do Minimum.

7.3.5 For the flow difference plots the absolute difference in passenger car units (PCUs) is identified adjacent to the appropriate link. Blue lines identify a reduction compared to the 2036 Do Minimum and pink/red lines an increase. In addition, the scale of the change is represented graphically with the coloured lines of varying bandwidth. Only flow differences of 50 PCUs or greater and are displayed in the plots.

7.3.6 In general, the forecast traffic flows increase at the locations where mitigation measures have been implemented as the measures help alleviate capacity issues at these locations and draw in further traffic. In most locations the forecast flow changes as a result of the mitigation measures are more pronounced in the PM peak. Sections 7.3.7 to 7.3.15 provide more detailed commentary on the forecast larger flow changes and include for the interaction of adjacent junctions/ mitigation.

Asda Roundabout and Park House Farm Way

7.3.7 The proposed traffic signals at the Park House Farm Way/ Purbrook Way junction make it significantly easier for traffic to join Purbrook Way from the side road (particularly right turners) and this is also drawing traffic from the parallel route of Linkenholt Way. The increased use of Park House Farm Way at the expense of Linkenholt Way is also the cause of the increase in the east to south movement at the Asda Roundabout. That movement is now more convenient than the west to south movement at the Purbrook Way/ Park Lane roundabout for vehicles that previously used Linkenholt Way.

7.3.8 The proposed mitigation at the Asda roundabout has a very pronounced forecast impact on flows compared to the Do Minimum in the PM peak. The increased capacity on both the approach of Hulbert Road S/B and the circulating movement on the roundabout see a large switch in traffic to Hulbert Road S/B heading towards the central areas of Havant at the expense of the A3(M) and Stakes Hill Road.

Park Road/ Elm Lane and Emsworth Road/ A27

7.3.9 The new displaced left turn lane from Park Road North to Elm Lane produces a forecast increase in north to east flows that continue on to join the A27 via Emsworth Road at the revised A27 junction. This, in turn, reduces southbound flows on Park Road South that join the A27 at the Langstone Road junction.

Harts Farm Way/ Teardrop Junction, Rusty Cutter Junction and Bedhampton Hill/ Bedhampton Rd Junction

7.3.10 The proposed left turn 'jet lane' from Harts Farm Way to the A27/A3M westbound on-slip at the Teardrop junction results in forecast increased flows on Harts Farm Way particularly in the PM peak. This reduces the volume of traffic that in the Do Minimum had been routing westbound via Brockhampton Road/ West Street/ Bedhampton Road/ Portsdown Hill Road.

7.3.11 The increased capacity on Harts Farm Way is also influencing routing for those exiting Langstone Technology Park with an increased number leaving via Harts Farm Way as opposed to Langstone Road.

7.3.12 The increased capacity on Bedhampton Hill, resulting from conversion to signal control, at the junction with Bedhampton Road is increasing the forecast northbound traffic volume towards Bedhampton on this link. This increased traffic volume is fed by vehicles approaching from A27 westbound and routing via the Teardrop and Rusty Cutter junctions instead of via the Langstone Road junction and Park Road.

7.3.13 The addition of a dedicated left turn lane 'jet lane' from Bedhampton Lane towards the Teardrop at the Rusty Cutter junction resolves a capacity problem but is not forecast to have a significant impact on the traffic flows in this area in either peak period.

Whichers Gate Road/ Redhill Road Junction

7.3.14 The proposed conversion of the Whichers Gate Road / Redhill Road / Manor Lodge Road from two mini roundabouts to a single, signalised junction results in increased traffic flow in the AM peak on Redhill Road northbound and Manor Lodge Road northbound towards A3(M). This increase is, in part, offset by a reduction northbound on Woodberry Lane.

7.3.15 In the PM there is a forecast flow increase southbound on Manor Lodge Road and Whichers Gate Road with corresponding reductions on Bowes Hill and Woodberry Lane. The forecast reduction in the reverse direction (northbound) is due to a wider re-routing of trips to A27/ A3(M) as a result of reduced delay on A27 westbound following the removal of trips (compared to the Do Minimum) to Harts Farm Way

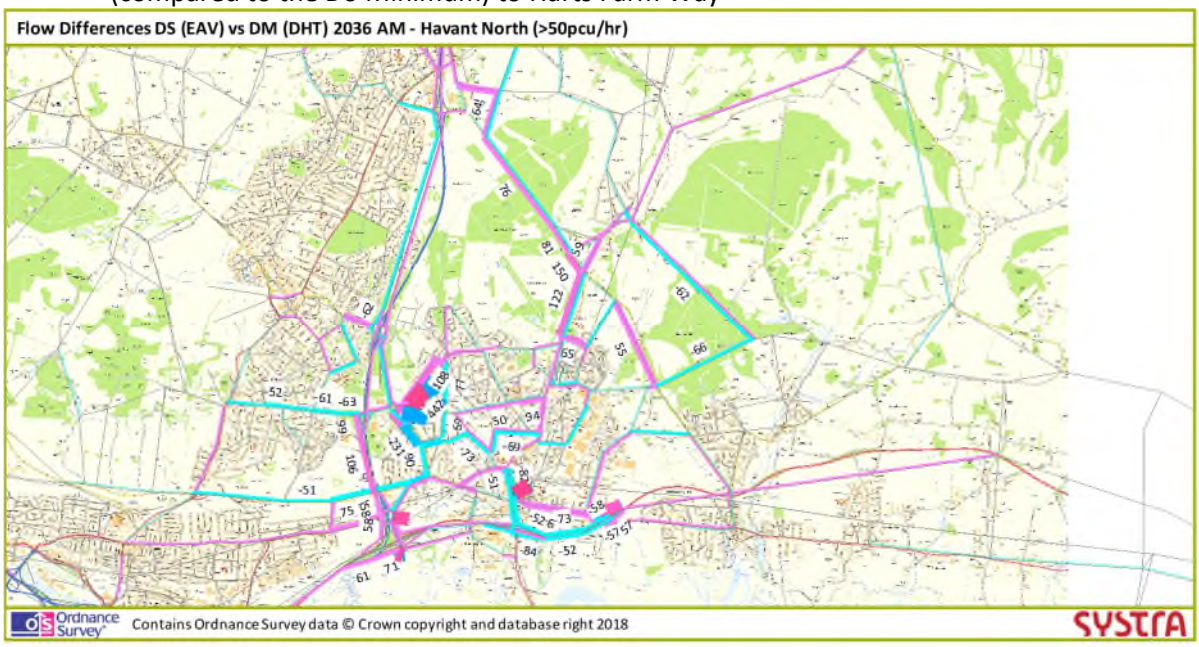


Figure 7-1 AM Flow Difference North - Do Something vs. Do Minimum 2036

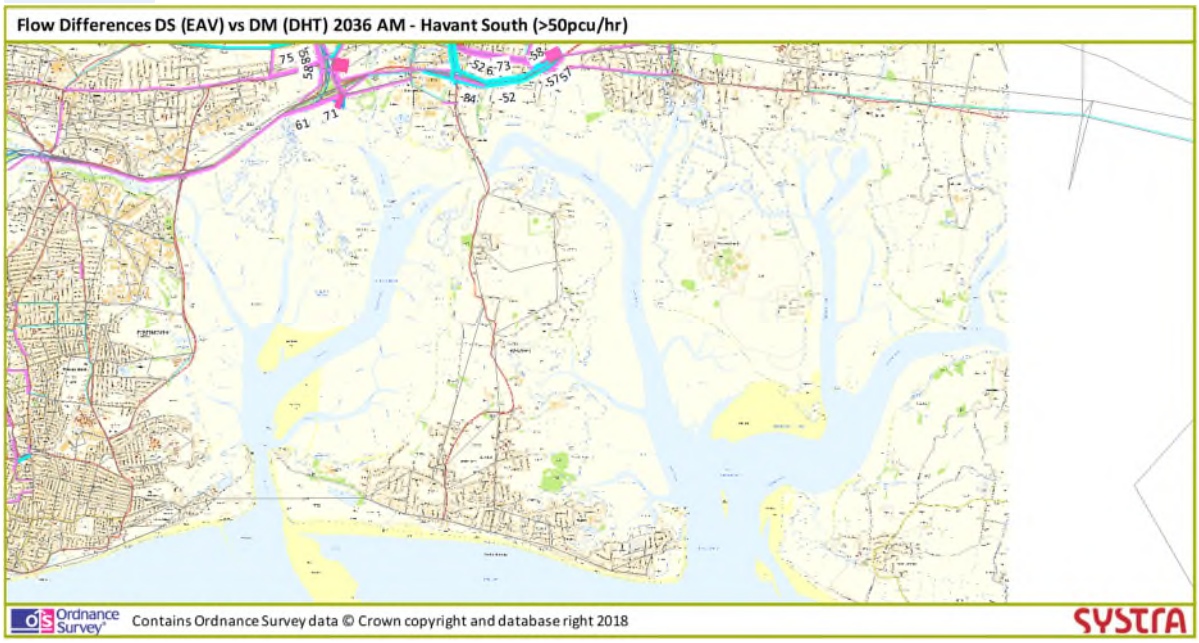


Figure 7-2 AM Flow Difference South – Do Something vs. Do Minimum 2036

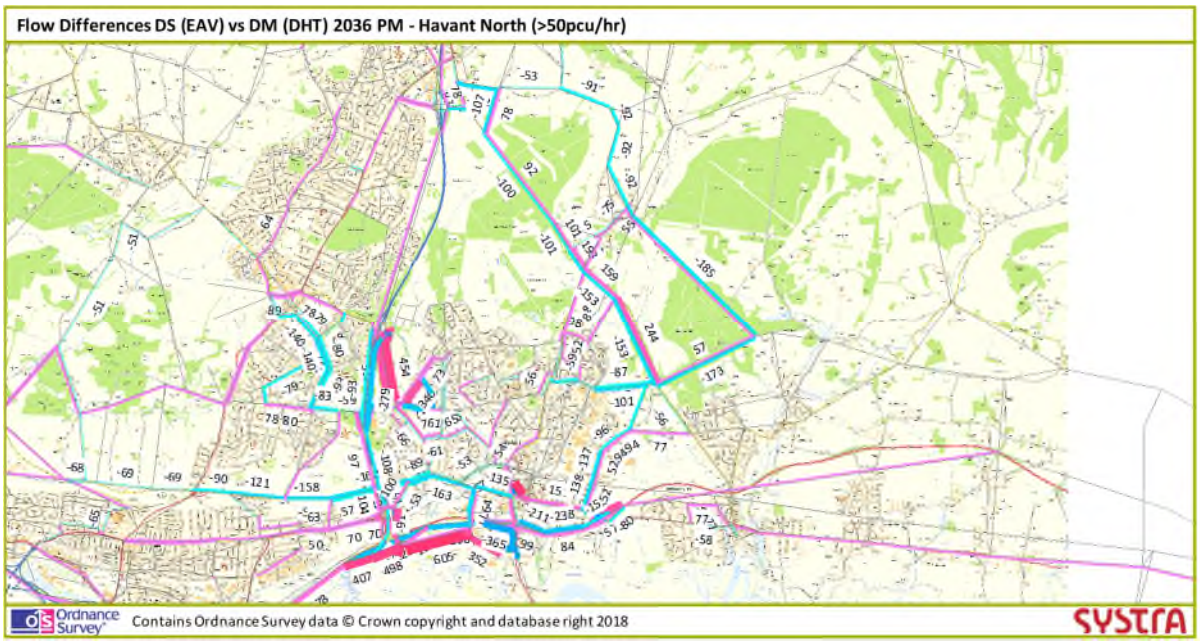


Figure 7-3 PM Flow Difference North - Do Something vs. Do Minimum 2036

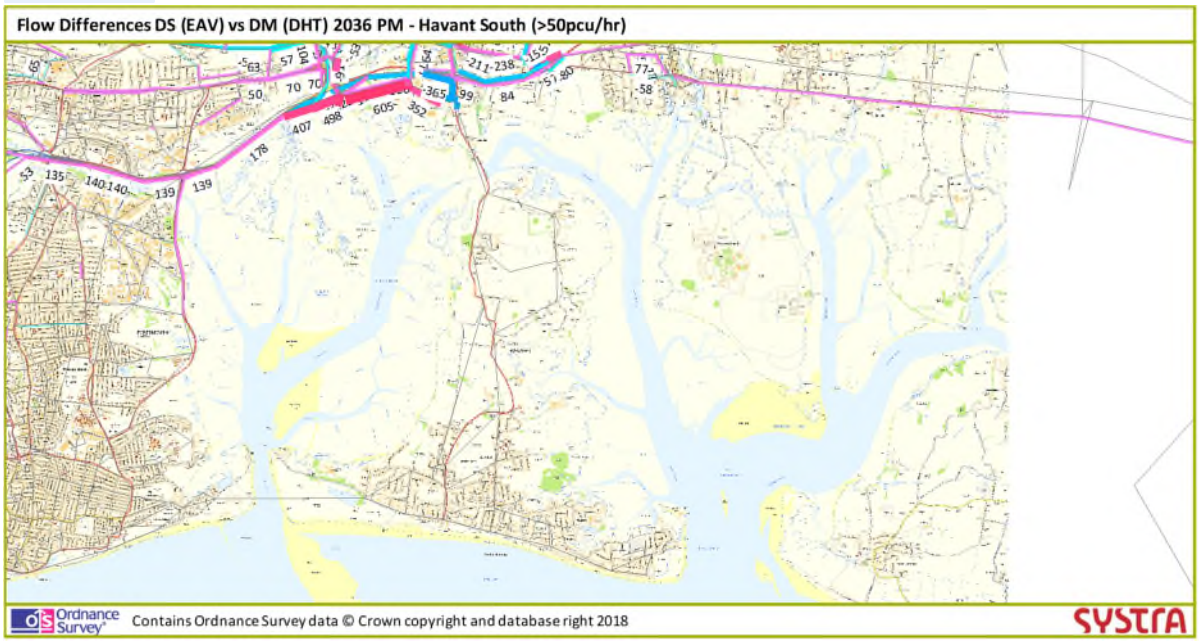
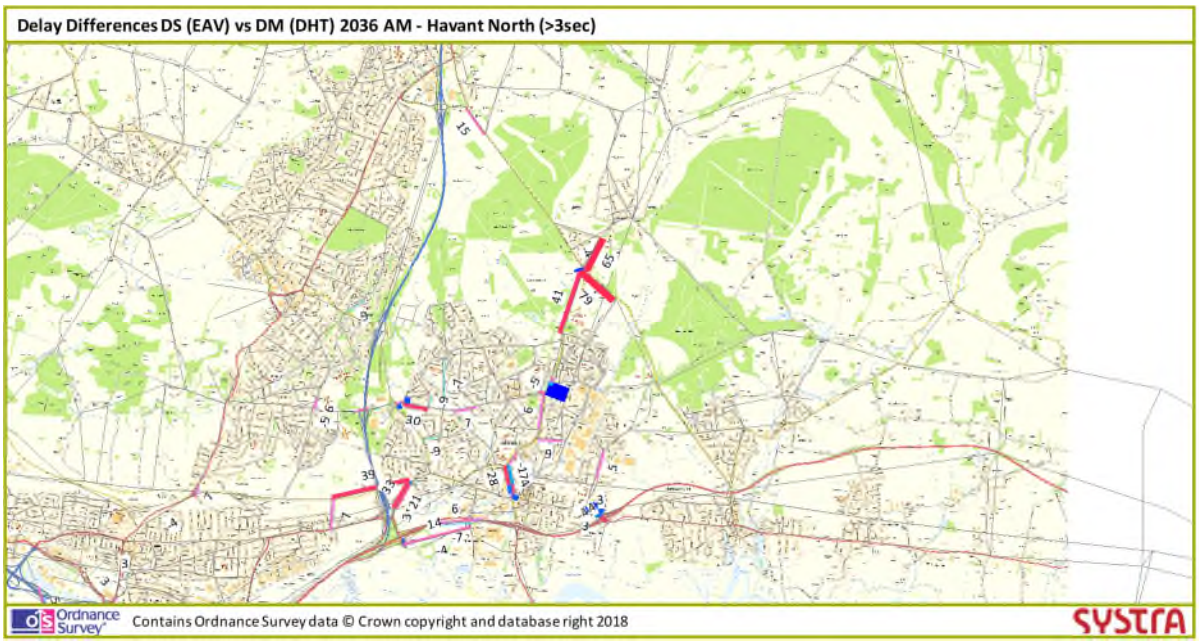
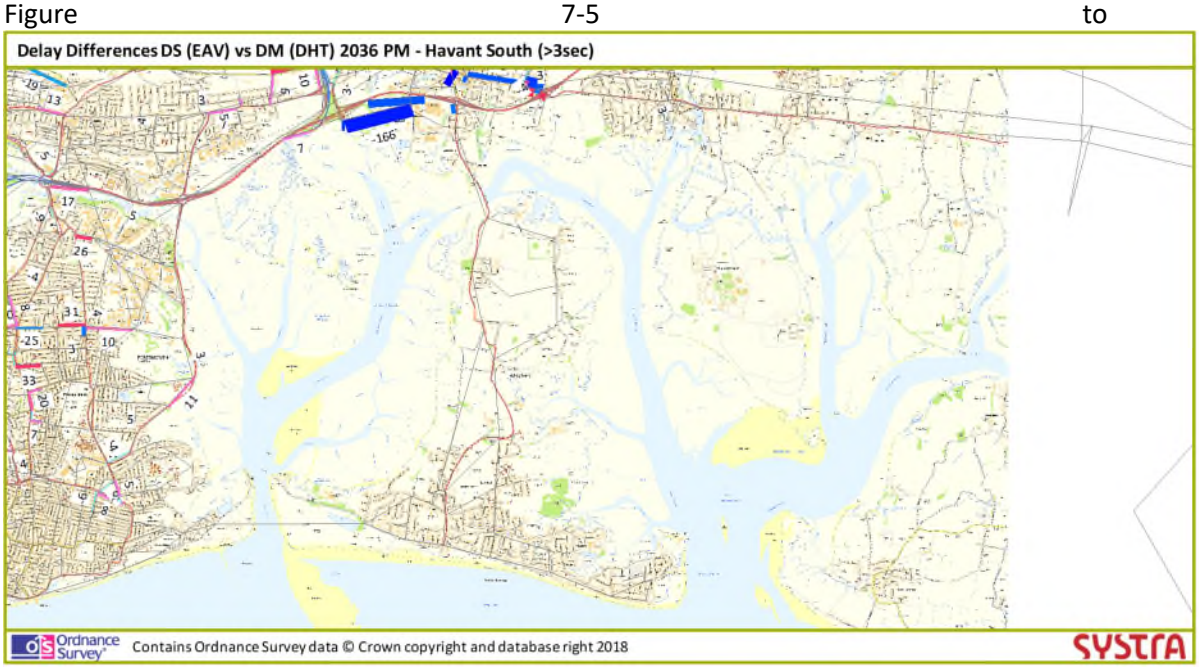


Figure 7-4 PM Flow Difference South – Do Something vs. Do Minimum 2036



7.3.16

7.3.17 Figure 7-5 to



7.3.18 Figure 7-8 display the forecast change in link delay, per PCU, for the AM and PM peak hours between the Do Something and Do Minimum scenarios in 2036 at a Borough wide level (Appendix J includes more localised plots). The absolute difference in delay in seconds is identified adjacent to the appropriate link. Blue lines identify a reduction compared to the 2036 Do Minimum scenario and pink/red lines an increase. In addition, the scale of the change is represented graphically with the coloured lines of varying bandwidth. All delay differences in excess of 3 seconds are displayed in the plots.

7.3.19 The forecast delay changes between the 2036 Do Something and Do Minimum scenarios predominantly correspond with the those locations where the transport mitigation measures

have been added and there is a general trend of decreased delay in both the AM and PM peak periods.

7.3.20 It should be noted that where mitigation measures increase capacity and attract further traffic, the expected reduction in delay from the mitigation may be dampened or absorbed entirely by the impact of the increased traffic volume. In addition, the provision of Traffic signals will inherently produce an element of delay due to the red signal periods and this may be greater than the scenario without the signals particularly in time periods where capacity or congestion issues are not present/ forecast.

7.3.21 The delay at Park House Farm Way is reduced by approximately 45 seconds during the AM peak and 30 seconds in the PM peak following the introduction of traffic signals at this location. The westbound approach to Asda roundabout also sees a reduction in delay. However, there are increases in delay of between 20-30 seconds on Purbrook Way westbound to the Park House Farm Way junction in both peak periods and for traffic travelling eastbound in the AM peak (approximately 15s) as a result of the signals (without signals these movements would be unopposed and so would have minimal delay).

7.3.22 Delay on Bedhampton Hill approach to the proposed signal junction with Portsdown Hill Road reduces slightly (approx. 5s) in the PM but increases in the AM due to the provision of traffic signal. The delay on the eastbound approach of Portsdown Hill Road also increases in the Do Something scenario.

7.3.23 Harts Farm Way sees a significant reduction in delay of over 2 minutes during the PM peak with the provision of the left turn jet lane. The AM peak delay reduction is much more modest at approximately 5 seconds but delay was already forecast to be low in this period.

7.3.24 The delay on Elm Lane westbound at the junction with Park Road reduces by approximately one minute in the AM and by over three minutes in the PM peak. There is a forecast increase in delay of approximately 20s in both peaks for traffic travelling southbound on Park Road North through the junction.

7.3.25 The adjustment to signal timings at the Stockheath Road / Petersfield Road junction significantly reduces delay southbound on Petersfield Road in the AM peak by approximately 270 seconds with only a minor reduction in the PM peak.

7.3.26 Delays for traffic travelling eastbound on Emsworth Road to the A27 junction 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. The westbound movement approaching the signals does have a forecast delay increase (35s AM, 65s PM) due to the presence of the new signals. The westbound approach to the junction of Emsworth Road/ Southleigh Road immediately west of the A27 is now forecast to be over capacity with delays increasing by over 1 minute in the PM.

7.3.27 Finally, at the proposed signalised Redhill Road / Manor Lodge Road / Whichers Hill junction, the Manor Lodge Road southbound arm benefits from reduced delay in the AM and PM peak period, however there are increased delays on the other three approaches to the junction of upto 90s.

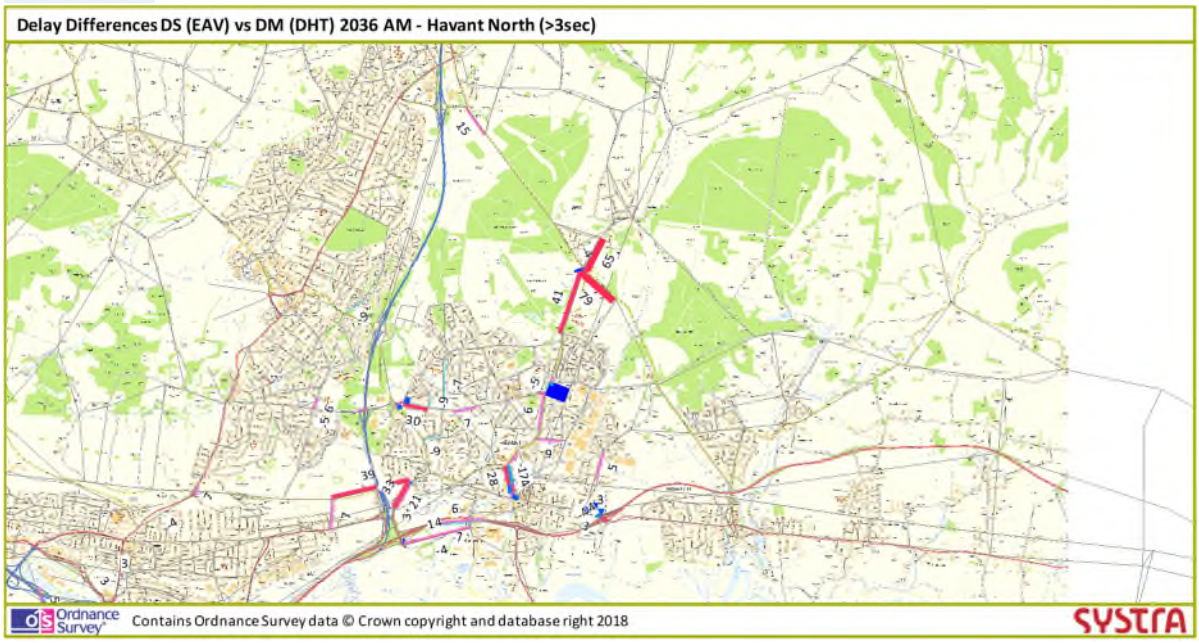


Figure 7-5 AM Delay Difference North - Do Something vs. Do Minimum 2036

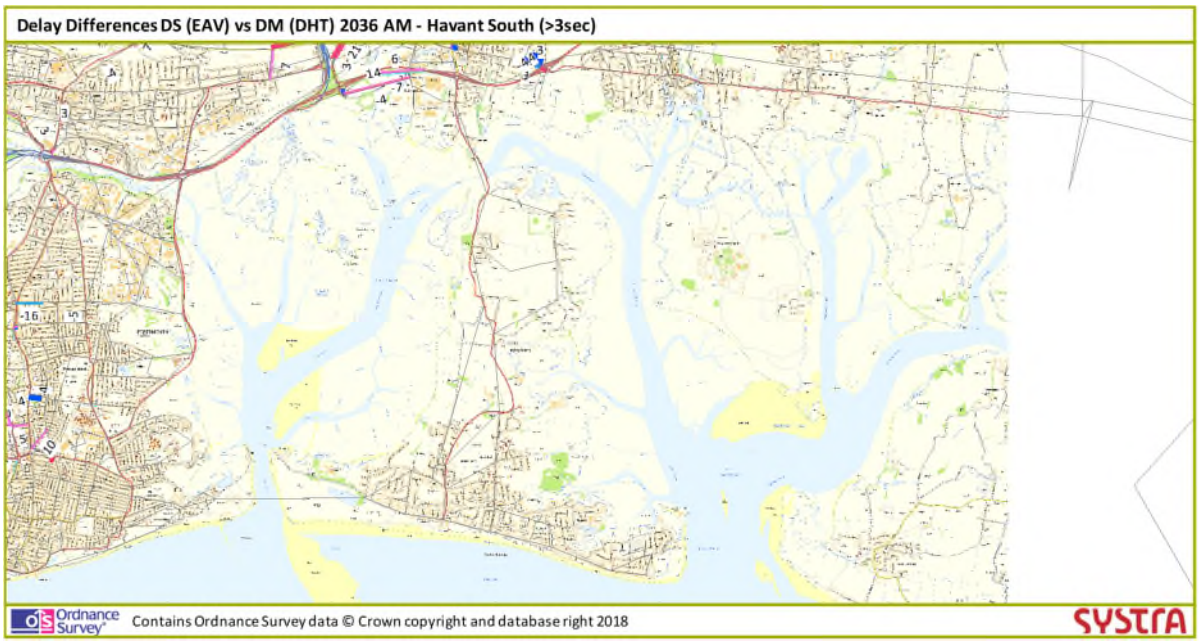


Figure 7-6 AM Delay Difference South– Do Something vs. Do Minimum 2036

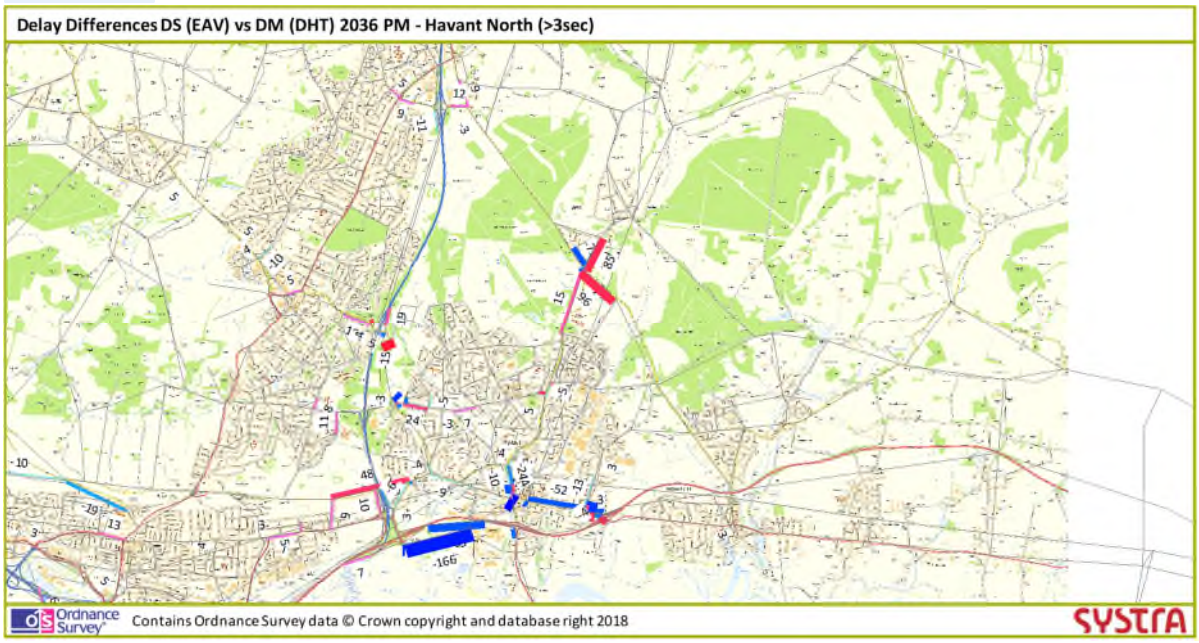


Figure 7-7 PM Delay Difference North - Do Something vs. Do Minimum 2036

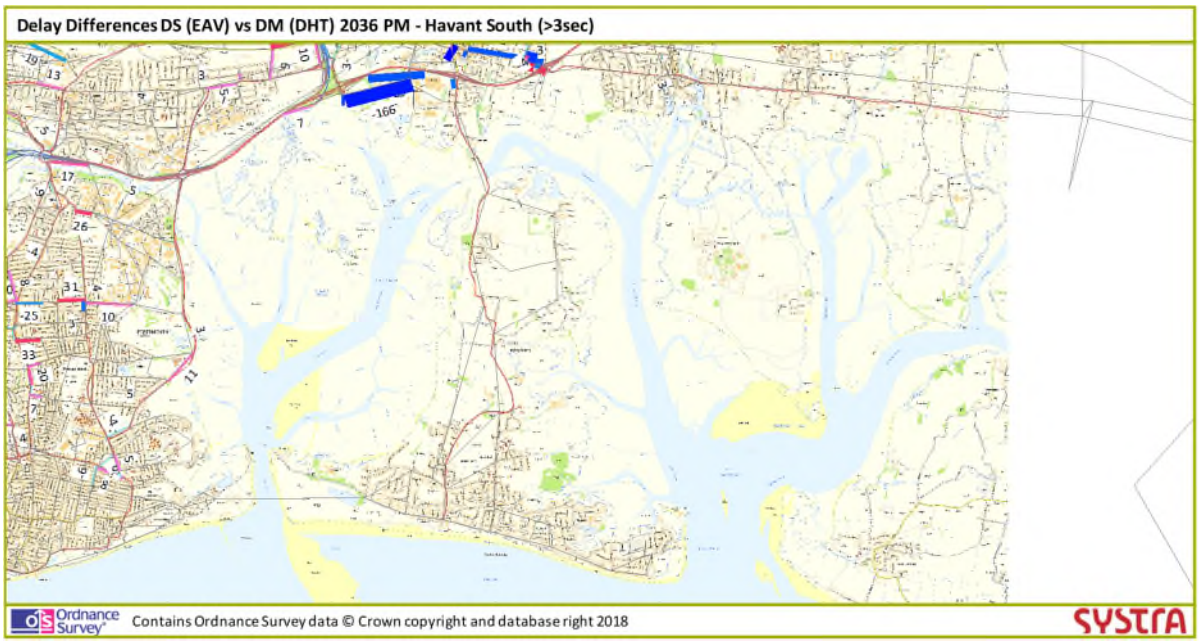
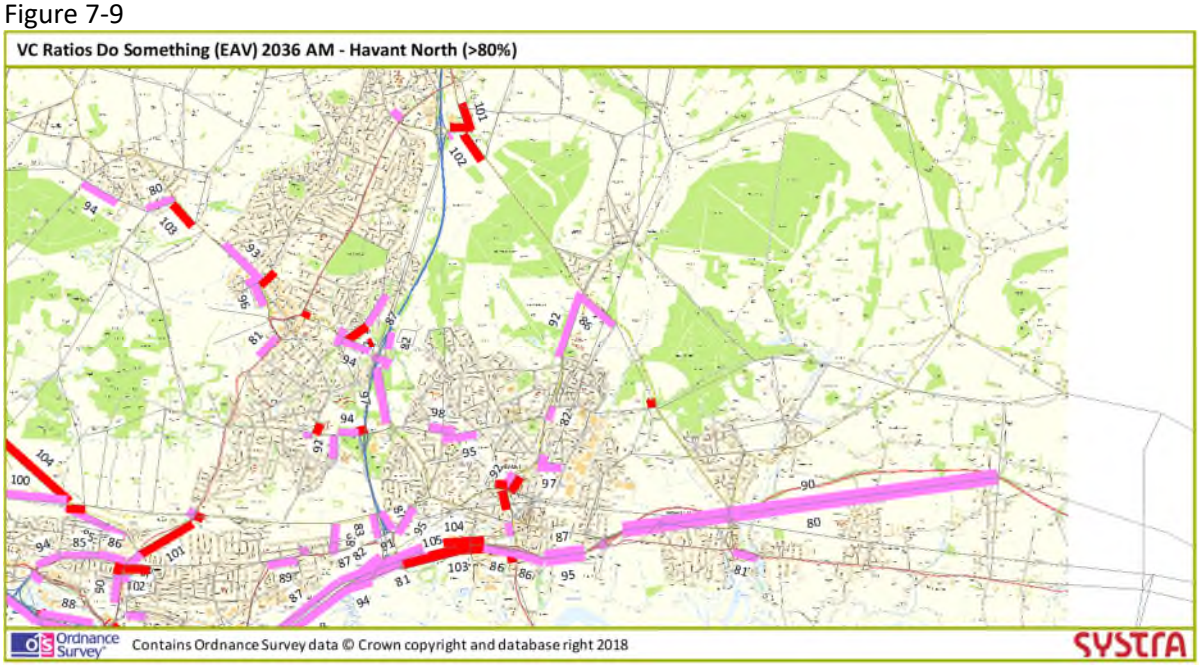


Figure 7-8 PM Delay Difference South – Do Something vs. Do Minimum 2036

Figure 7-9



7.3.28 Figure 7-9 to Figure 7-12 display the V/Cs for the AM and PM peak hours for the Do Something scenario (more localised plots are provided Appendix K). For the V/C plots the performance of the link is identified through the colour of the link as follows:

- > 80% - Pink
- > 100% - Red

7.3.29 If the V/C is near, or in excess of 90%, then the junction will be subject to queuing and delays; a value of 90% is normally taken as the practical capacity value for design purposes. A value of >100% means that the junction is over capacity and significant queues and delay could occur.

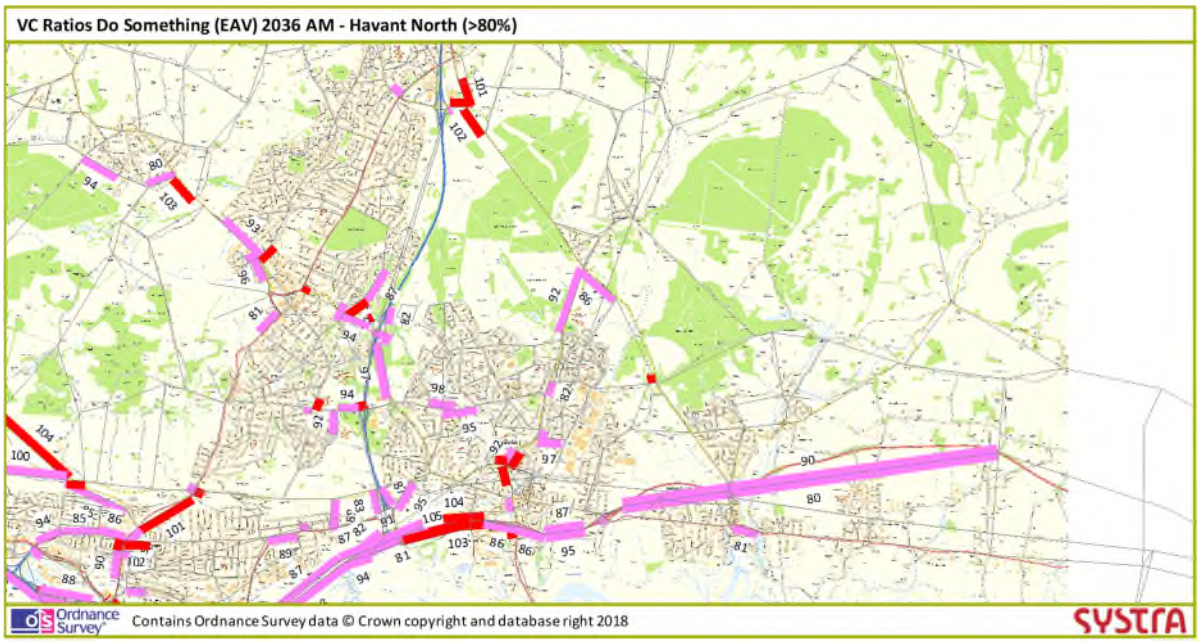


Figure 7-9 AM V/C North - Do Something 2036

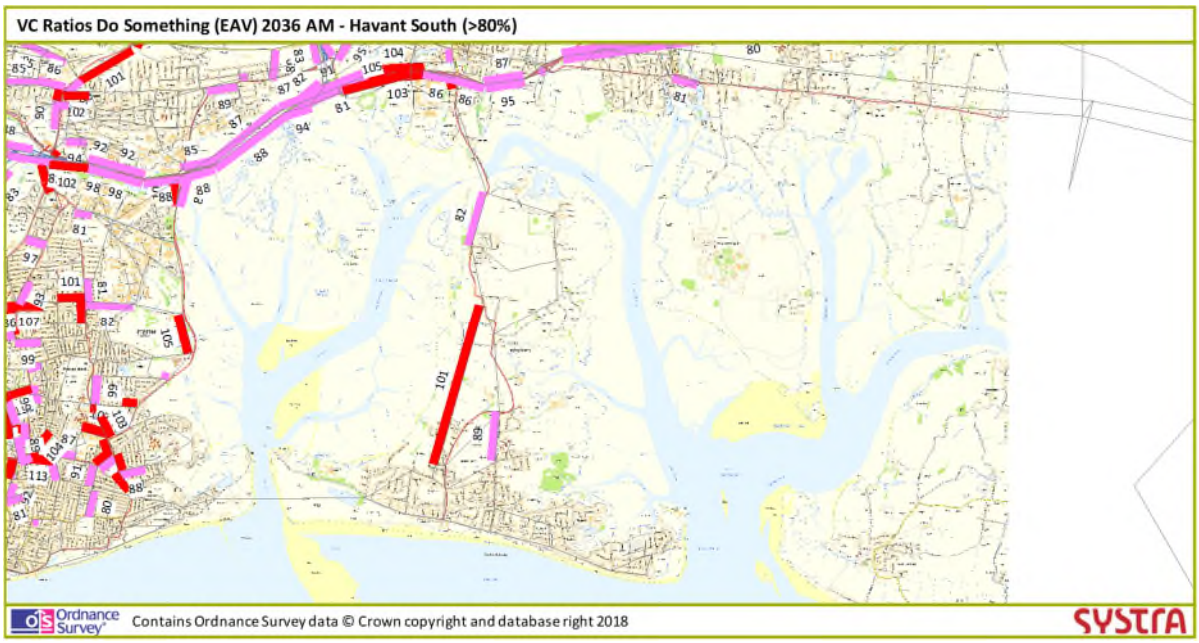


Figure 7-10 AM V/C South - Do Something 2036

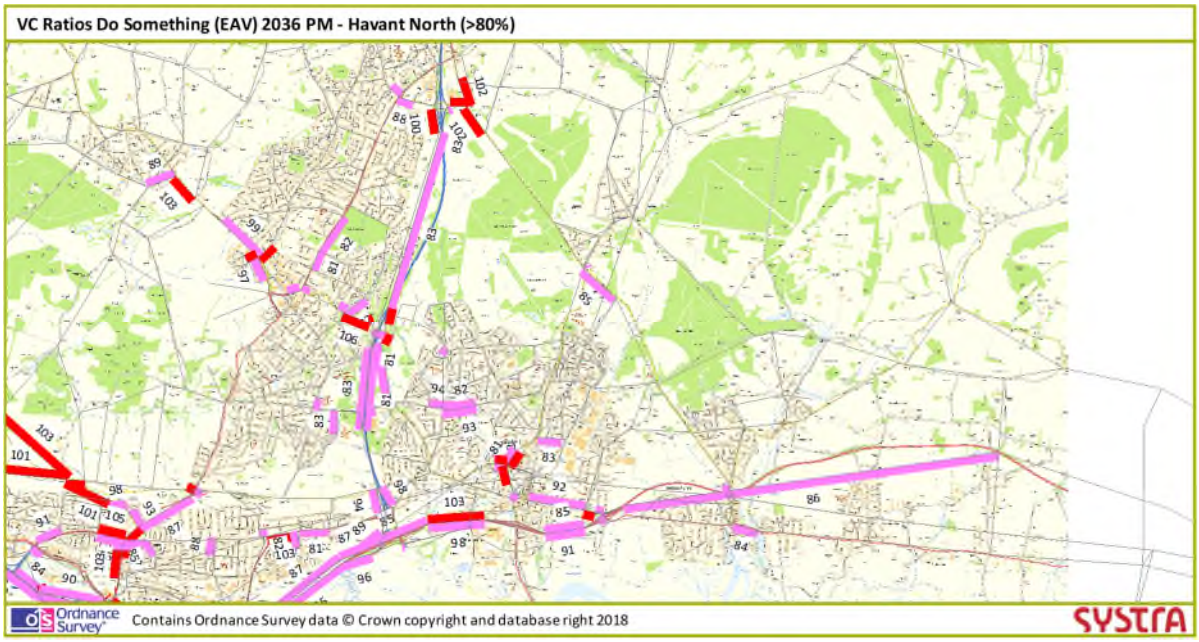


Figure 7-11 AM V/C North - Do Something 2036

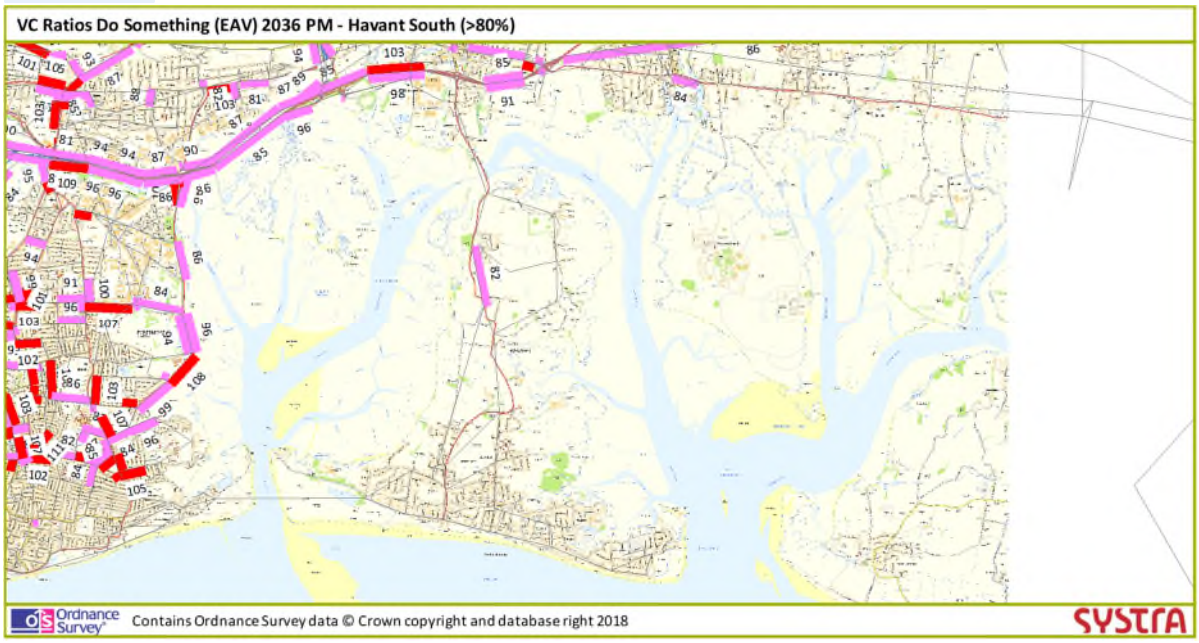


Figure 7-12 AM V/C South - Do Something 2036

7.3.30 Section 6.3.22 outlined a procedure for identifying junctions most impacted by traffic generated from the Local Plan allocation sites in terms of operational performance. For the Do Something we have rerun that procedure to identify any junctions that are either forecast to continue to experience significant impact from the Local Plan or any site that may now be impacted due to the proposed mitigation and resulting traffic reassignment (junction longlist contained in Appendix L).

7.3.31 Table 7-2 below lists the junctions identified in the Do Minimum as the most impacted in addition to how the junction performs in the Do Something scenario. For consistency with earlier Chapters of this report, the table also includes those junctions where mitigation measures have not been identified through the TA (highlighted junctions include mitigation proposals). Appendix M gives a more detailed summary of junction performance for each of those junctions where mitigation is proposed.

7.3.32 Based on the SRTM outputs there is no meaningful change in performance in the Do Something at those junctions in Table 7-2 where mitigation has not been proposed. For the sites with mitigation proposed all but three are forecast to no longer experience a 'significant' or 'severe' impact. The remaining three sites are discussed further in the paragraphs below.

7.3.33 For Junction 13 (Purbrook Way junction with A3(M) SB on-slip aka B&Q Rndbt), 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 there is 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).

7.3.34 At Junction 26 (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 proposed improvements address the forecast capacity issues on Emsworth Road eastbound and the A27 off-slip, however traffic travelling westbound on Emsworth Road has increase in V/C to 91% in the PM peak that is classified as significant.

7.3.35 At Junction 56 (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 are proposed to be combined into 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%. Durrants Road has an increase in V/C in the AM peak and a reduction in the PM peak.

Table 7-2 Junction Performance Summary, 2036

ID	JUNCTION	DO MINIMUM		DO SOMETHING	
		'SIGNIFICANT'	'SEVERE'	'SIGNIFICANT'	'SEVERE'
1	A3023/ West Lane		✓		✓
2	A3023/ Copse Lane	✓		✓	
8	A3(M) N/B merge from Rusty Cutter	✓		✓	
11	Purbrook Way approach to Asda Roundabout		✓	ok	ok
13	Purbrook Way junction with A3(m) 4 SB onslip (B&Q Rndbt)	✓		✓	
14	Purbrook Way / Parkhouse Farm Way		✓	ok	ok
22	Park Road South / Elm Lane		✓	ok	ok
26	Emsworth Road junction with A27 EB off-slip		✓	✓	
29	B2148 Horndean Road / New Brighton Road	✓		✓	
30	B2148 Horndean Road / Interbridges Emsworth	✓		✓	
38	B2150 Hambledon Road/ Milton Road	✓		✓	
39	A3 London Road/ B2150 Hulbert Road	✓		✓	
40	B2150 Hulbert Road/ Tempest Avenue	✓		✓	
43	Purbrook Way/ College Road	✓		✓	
45	Harts Farm Way approach to Teardrop junction	✓		ok	ok
52	B2149 Petersfield Road/ Stockheath Road		✓	ok	ok
56	B2149 Durrants Road/ B2148 Whichers Gate Road	✓		✓	
71	B2177 Bedhampton Hill/ Rusty Cutter Roundabout	✓		ok	ok

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

- Junction 3 – Merge from Teardrop with A3(M)
- Junction 25 - Emsworth Road/ Southleigh Road junction
- Junction 33 - Hulbert Road/ Dunsbury Farm junction

7.3.37 The impact at Junction 3 is a knock-on from the mitigation scheme at the Harts Farm Road approach to the Teardrop junction. The Harts Farm Road jet lane increases the capacity of and traffic volume using this approach towards the merge with A3(M) and that pushes the V/C up to 96% at the merge in the PM and which results in an impact classified as severe.

7.3.38 Junction 25 is immediately west of the mitigated Junction 26 (Emsworth Road/ A27 junction). The junction is signal controlled and the westbound approach volume increases due to the improved arrangement at J26. This pushes the V/C on the westbound approach over 100% in the PM and triggers a severe impact classification.

7.3.39 At Junction 33, the forecast flows on Hulbert Road in the PM increase significantly as a result of the mitigation measures on the Asda roundabout to the south. The increased flows push the V/C on the northern approach arm to 103% and southern arm to 97% and trigger a severe impact classification.

8. SUMMARY AND CONCLUSIONS

8.1 Introduction

8.1.1 Solent Transport's SRTM has been utilised to test three modelling scenarios as to help inform the development and appraisal of the update to Havant Borough's Local Plan:

- Scenario 1 – 2036 Baseline, No Havant Local Plan development
- Scenario 2 – 2036 Do Minimum, With Havant Local Plan development, no mitigation measures
- Scenario 3– 2036 Do Something, With Havant Local Plan development and mitigation measures

8.2 2036 Baseline

8.2.1 The Baseline scenario includes residential and employment growth based on committed sites within the Havant Borough, and any committed highway infrastructure schemes up to a forecast year of 2036. Outside of Havant Borough, growth continues in accordance with adopted Local Plans and Tempro v7.2. The Baseline scenario confirms the forecast transport network performance without the proposed Havant Local Plan growth.

8.3 2036 Do Minimum

8.3.1 The 2036 Do Minimum scenario includes the proposed Havant Local Plan development for residential and employment allocations, whilst the growth outside of the Borough is unchanged from the Baseline.

8.3.2 The addition of the Local Plan growth increases trip generation to/from/within the Borough. Borough wide there is a forecast 10% increase in Vehicle hours and a 5% increase in Vehicle Kilometres over a 24 hour period on the unmitigated network and average speed is forecast to reduce by 4.5%. There is a forecast small shift (<1%) away from Highway to PT and Active modes. These outputs are indicative of a network subject to increasing delay.

8.3.3 At a more detailed level and to quantify the number and location of junctions where Local Plan growth has the greatest impact on the unmitigated network, we have applied a set of criteria to the change in junction approach Volume against Capacity ratio (V/C). This has identified a total of 12 junctions classified as experiencing 'significant' impact and 6 as experience 'severe' impact.

8.4 2036 Do Something

8.4.1 The Do Minimum SRTM model outputs fed in to Transport Assessment undertaken by Hampshire Services and which identified 10 junctions where mitigation was proposed. The mitigation measures were incorporated in to a Do Something SRTM model scenario that used the identical Local Plan development allocations as the Do Minimum. The purpose of this scenario was to assess the impact of the proposed mitigation and to identify any wider effect, such as reassignment, that may require consideration of further mitigation.

8.4.2 Compared to the Do Minimum, the Do Something scenario does result in a forecast reduction in Vehicle hours and Vehicle Kilometres and an increase in average speed that demonstrate

that the mitigation is having a positive impact at a Borough wide level albeit values are still forecast to be above Baseline values.

8.4.3 For the 10 mitigated junctions, all but three are forecast to have the significant or severe impacts addressed. For the three remaining junctions there remains forecast residual impacts that are still classified as significant although these are typically on different approaches to where the original Do Minimum impact was identified. The mitigated junctions do often attract further traffic that can dampen or fully absorb the mitigation scheme benefits in terms of junction performance.

8.4.4 The Do Something scenario resulted in a further three junctions where impacts were classified as severe and that were not classified as significant or severe in the Do Minimum scenario. In all three cases, this was the result of additional traffic coming from upstream junctions that had been mitigated.

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