

SWALE HIGHWAY MODEL

**LOCAL PLAN REVIEW - HIGHWAYS STRATEGIC MODEL - REGULATION 19
TRAFFIC FORECAST REPORT (2021)**



SWECO UK LIMITED

Change List

VER.	DATE	STATUS	PREPARED	REVIEWED	APPROVED
1	20/08/21	INTERNAL REVIEW	SB	JZ	WW
2	26/08/21	DRAFT FOR COMMENTS	SB	JZ	WW
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Glossary

ATC: Automatic Traffic Count

Constrained: Based on local plan but constrained to NTEM assumption

DfT: Department for Transport

Furness: process of growing base year matrices to produce future year matrices

GEH: Statistic used to compare two traffic flows

GIS: Geographical Information System

LMVR: Local Model Validation Report

LSOA: A Lower Layer Super Output Area

ME2: Matrix Estimation from Maximum Entropy

NTEM: National Trip End Model

NTM: National Transport Model

Overcapacity queues: Extra time spent in queues at over-capacity junctions waiting for the cycle in which the vehicle exits

PCU: Passenger Car Unit. A measure of how much space is taken up on the highway network by different vehicles e.g. HGV= 2 PCUs, Car= 1 PCU.

PPK: Pence Per Kilometre - a component of generalised cost

PPM: Pence Per Minute - a component of generalised cost

P1X: Interactive analysis of results in SATURN

RTF: Road Traffic forecast

SATURN: Simulation and Assignment of Traffic to Urban Road Networks- transport modelling software package used to develop highway assignment models

SATURN buffer network: Modelled area comprised of links with no explicit junction modelling

Screenline: an arbitrarily established line of reference at which traffic counts are made

SERTM: South-East Regional Traffic Model

SHM: Swale Highway Model

Simulation area: Area of detailed modelling provided by SATURN simulation network

Speed-flow area: Extension of the fully modelled area from the simulation area with capacity restraint provided by link speed-flow curves only

NTEM: Trip End Model Presentation Program

Transient queues: The time spent by vehicles in queues which, in the case of signals, clear during a single cycle

Unconstrained: Based on adjusted Local Plan

VOC: Vehicle Operating Cost

V/C: Volume/Capacity ratio. Weighted Volume /Capacity of a junction averages out capacity over all arms of the junction; and Highest Volume /Capacity reflects the case for the 'worst' arm of the junction.

VoT: Value of Time

TAG: Transport analysis guidance

Executive Summary

This report sets out the modelling approach and analysis undertaken to support the Regulation 19 Local Plan Review (LPR) in Swale. The Local Plan Review is prepared in accordance with the Local Development Scheme (LDS), with the primary objective to understand future transport infrastructure required to meet the development needs within the borough and its surrounding areas. The LPR contain an overall strategy for the pattern, location, and scale of future developments and make sufficient provision for the future growth needs of the Swale Borough for the plan period from 2022 to 2038.

The LPR is expected to deliver up to around 17,410 dwellings within the period between 2022 and 2037/38. The employment land needs for the same period are expected to be around 750,000m². The Swale Highway Model (SHM) was developed with a base year in 2017 to examine the traffic impacts of both future development proposals and transport infrastructure across Swale.

This work commissioned is to develop a refreshed set of SHM forecast models to examine a range of revised LPR options, with model outputs to be provided as an evidence base to support the LPR proposals. The key model outcomes are aimed to show the differences between a 2038 Reference Case (RC), as adapted to include the identified committed and extant permissions and schemes, and a 2038 Do Something (DS) model, which includes additional LPR development allocations and schemes. This will help to identify the transport hotspots in the region and design appropriate mitigations to ease traffic congestion. An interim model in the forecast 2027 has also been developed to demonstrate the impact of the 5-year from LP adoption.

Model assumptions

The key model assumptions are outlined as follows:

- The RC scenarios only include committed developments and transport schemes in future years. The DS scenario included the committed and all additional development (including windfalls) and schemes associated with the LPR.
- As the LPR is aimed to assess development proposals and not a road scheme, there should not be any overall growth constraint locally, countywide, or regionally. As agreed, the National Trip Ends Model (NTEM) growth factors were applied to the model external area.
- The TRICs rates were adopted to derive the demand for local housing and employment development, differentiated by geographic locations including Swale town centres (Sittingbourne, Faversham and Isle of Sheppey) and rural areas.
- Goods vehicle growth for Light Goods vehicles (LGV) and heavy Goods vehicles (HGVs) was updated by the DfT's 2018 Road Traffic Forecast (RTF 2018)

The table below summarises the differences between the RC and DS scenarios for the total housing and employment developments in the year 2027 and 2038. When comparing to the RC scenario, the total number of houses by the year 2038 is expected to increase by more than 10,000 and the total employment by around 600,000 sqm.

Year	Housing (total number of dwellings)			Employment (total sqm)		
	RC	DS	Change	RC	DS	Change
2027	6,163	8,307	+2,144	69,400	374,305	+304,905
2038	9,225	19,841	+10,616	138,800	748,609	+609,809

As agreed with KCC, SBC and Highways England, the car trip rates for housing development were undertaken by TRICs-based values, which are differentiated by two types of geographic locations, one for Swale town centre and the other for Swale rural area, as shown in Table 5-1 and 5-2 in the report. The employment demand was then calculated by the trip rate per job (after converted from ratios of square meters per job by land-use type) from NTEM for cars and TRICs for LGV and HGVs, as shown in Table 5-4.

Model outputs

Matrix totals

For the RC scenarios, when comparing to the 2017 base year, it is found that the overall demand increases by approximate 10.3% to 11.7% and 19.2% to 22.6% in the forecast year 2027 and 2038, respectively. The total demand in the DS scenarios is higher than the corresponding RC scenarios, up from the base year by 11.0% to 12.3% in the year 2027 and 21.7% to 24.2% in the year 2038. The results of demand comparisons are shown in Table 5-10 and 5-11.

Network Statistics

In the AM peak in the year 2027, it is found that the average travel speed in the core modelled area in Swale reduces to 63.6 KPH (-4.6%) in the RC scenario and to 62.3 (-6.5%) KPH. The speed reduces further in the year 2038, to 61.7 KPH (-7.4%) in the RC and 54.6 KPH (-18.0%) in the DS scenario. This reflects the level of demand increase, measured by the total distance travelled, which is up by 19.2% and 22.3% in the year 2038 for the RC and DS scenario respectively.

A similar pattern is found in the PM peak, with speed reduced to 64.4 KPH (-36%) and 62.9 (-5.8%) KPH in the year 2027, and 61.5 KPH (-7.9%) and 54.0 KPH (-19.2%) in the year 2038 when comparing to the base year. Meanwhile, the total distance travelled increase by 18.9 % and 22.5% in the year 2038 for the RC and DS scenario, respectively.

As expected, the scale of speed decrease in the Inter Peak in future years is less significant than that in the corresponding AM and PM peak since the demand in the Inter Peak is generally lower (e.g., around 18-19% less than demand in the RC and DS scenario in the AM peak in the year 2038).

The results of network statistics are shown in Table 7-1 to 7-3.

Journey Times

Journey time analysis along selected routes was carried out for the RC and DS scenarios in the future years. Overall, comparing to the base year, journey time increases on most routes in the RC scenarios in the year 2027 and 2038. The Journey time increases further in the corresponding DS scenarios, which reflects the level of additional demand related to the LP developments loaded to the network.

The routes showing heavy delays include the Selling Road, A2 between A249 and M2 through Sittingbourne and Faversham. Meanwhile, it is found the journey time along Sheppey to M2 J7 via M2 EB (R51 & R52) and Sheppey to M20/A249 SB (R55 & R56) showed some reduction or marginal increase in the year 2027 and 2038 RC and DS scenarios, due to the M2 J5 improvement scheme.

The journey time results are presented in Appendix C.

Traffic Flows

It is found that traffic flow increases on most key roads in the region, including M2, M20, A249 and A2, especially for the DS scenarios when comparing to the base year. It is also revealed that there is a level of traffic decrease on the A249 SB from M2 J5 to M20 J7 in the AM peak and PM peak in the 2037 RC scenario. An investigation showed this is due to the traffic rerouting following the M2 and A229 corridor to avoid the excessive delay at the A249 SB approach arm at M20 J7 gyratory, as well as the reduced congestion at M2 J5 with the improvement scheme in place.

It is also revealed that traffic increases on most local roads in the DS scenarios, when comparing to the RC scenarios. Figure 7-8 to 7-16 show the total flows (in PCUs) on key roads in Sittingbourne, Faversham and Sheppey areas in the base year 2017, 2038 RC, and 2038 DS scenarios. The results for the forecast year 2027 are shown in Appendix E.

Network Delays and Congestions

The analysis of Volume over Capacity ratio (V/C, also known as Degree of Saturation), a measure of network delays and congestions at key junctions and links, was undertaken across modelled scenarios. As expected, a few junctions (most of them along the A2 corridor between A249 and M2 J7) in the DS scenarios in the AM and PM peak in the year 2038 show heavy delays, including:

- Minster Road/ A250 Halfway Road
- A250 Lower Road/Sheppey Way
- A2 London Road/Western Link
- M2 Junction 7
- A2/A251 Ashford Road
- A2/Brogdale Road
- A2 Key Street/A249
- A2 Canterbury Road/Murston Road/Rectory Road
- A2 Canterbury Road/Murston Road/Rectory Road
- A249/2500 roundabout
- A2 London Road/Station Road (Teynham)
- A2 London Road/Hempstead Lane

The results of V/C are presented in Table 7-5 and 7-6, and Appendix F.

Conclusions

In summary, the modelling above was carried out in line with TAG and based on a validated base model. The forecasts described above appear to show sensible results that inform how the reference case and additional LPR developments would impact the local highway network and its surrounding area in future years.

The evidence and outputs from the forecast models are deemed suitable and provide a comparison base for evaluating alternative Local Plan, identifying appropriate mitigation packages, and assessing individual development proposals consistently and transparently.

1 Introduction

1.1 Background

The Swale Highway Model (SHM) was developed by SWECO for Kent County Council (KCC) to examine the traffic impacts of both future development proposals and transport infrastructure across Swale. The model has been used as an evidence base for the assessment of the Local Plan (LP) by Swale Borough Council (SBC). In addition, the model has also been adopted as the platform for the Transport Assessments for a few developments in Swale.

In May 2020, SWECO was commissioned to refresh the Swale LP forecast with a set of new local housing and employment assumptions. Since then, alternative LP growth assumptions and committed transport schemes have been proposed, along with the updated national forecast guidelines such as the DfT's Road Traffic Forecast. Therefore, the existing SHM forecast models need to be updated to assess the traffic impact of the revised LP and identify potential mitigation measures in support of local growth.

1.2 Context

A strategic highway assignment model represents a simplified version of the real-life situation. The structure and level of detail required for an application are determined by a consideration of the ultimate use of the model. As models serve a variety of functions, the nature of models is similarly varied, ranging from highly detailed urban situations to more strategic regional and inter urban contexts.

The SHM was designed to cover a sufficiently wide area to capture the strategic impacts within the Swale district and ensure local traffic conditions and routings are fully presented in Swale, Faversham and Sheppey.

1.3 Purpose of the Report

This Traffic Forecasting Report documents all key aspects of the future year traffic forecasting for Swale, including the revised housing and employment trajectory, modelling methodology and associated model parameters. It is intended that the Forecasting Report is a free-standing document that covers all aspects of the future year demand forecasting. However, more detail on many aspects of the modelling process can be referred to supplementary reports and technical notes.

1.4 Report Structure

This report summarises the development of the revised future year Swale Highway Models. This report is structured as follows:

- Chapter 2 provides a summary of the base year models development, calibration and validation.
- Chapter 3 presents the overall forecasting methodology and assumptions.
- Chapter 4 details the housing and employment developments from the uncertainty log in the forecast years.
- Chapter 5 details the method of producing forecast demand for all forecast year scenarios.
- Chapter 6 summarises the development of forecast networks.
- Chapter 7 details the model output analysis of the forecast models.
- Chapter 8 concludes the work.

2 Summary of Current Base Model

2.1 Overview

This chapter details the development and calibration of the SHM base year model, which was used as a basis for forecast year models. More information can be found in the Swale Highways Model Local Model Validation Report (LMVR) dated 18th May 2018.

2.2 Model area and network

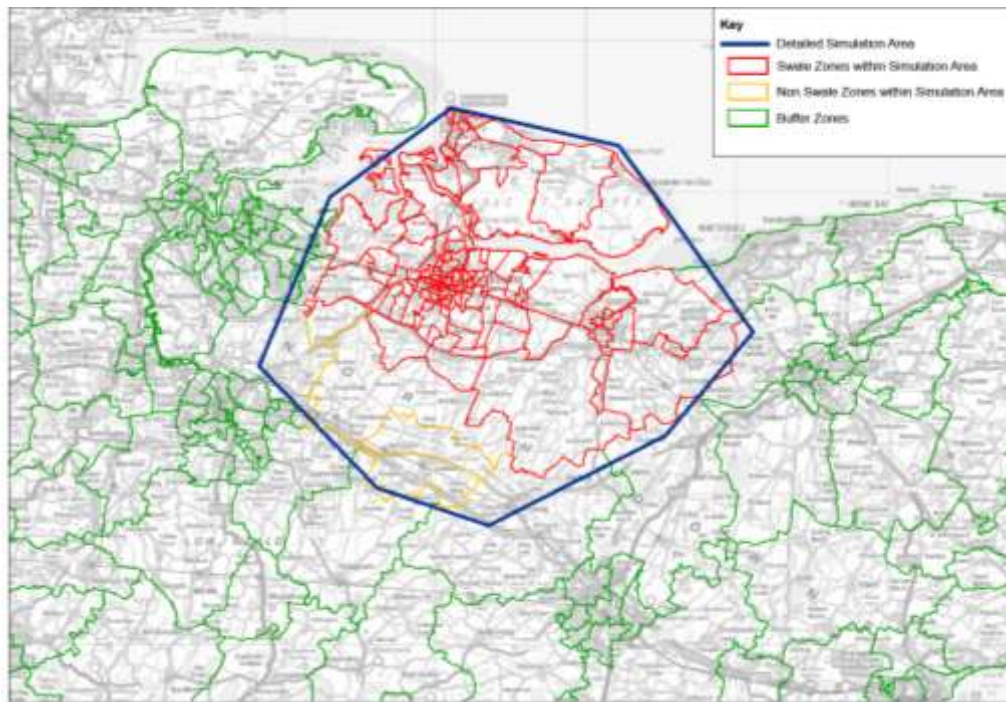
The Highways England's South-East Regional Traffic Model (SERTM) prior trip matrices and zoning system were utilised for the SHM. The provisional SERTM trip matrices have been constructed using mobile phone data, collected for 20 weekdays in March 2015. The data provides better resolution for long distance trips so synthetic matrices have been constructed to infill short distance trips.

The SHM study area covers the whole of Swale Borough Council with a slight overlap into the neighbouring authorities of Canterbury, Medway, and Maidstone areas. The number of zones was increased from the initial SERTM cordoned model, containing 256 zones, to 321 zones for the entire study area, of which 126 zones were within the (detailed) simulation area. The SERTM zones were split based on the proportion of land uses within the zone and by the lower layer super output area (LSOA) spatial definition. Census data was used to identify the proportions of each newly split zone from their donor zone.

For the finer zones where using LSOAs to disaggregate was considered too coarse, zones were split further. Car, LGV and HGV trips were split between the split zones based on land use densities (residential or employment), and where sources of trips are known (such as car parks, supermarkets and business parks) as shown by Google Maps.

As the Isle of Sheppey is represented by a single large SERTM zone, it was further disaggregated into 12 finer zones. These were based on LSOA boundaries, however, where the LSOAs were considered too fine, several zones were aggregated to form the final zone. The main trip generators and attractors within each new SHM zone were reviewed and where observed trip end count data was available, at sources such as stations, car parks and supermarkets, the observed data was applied for replacement. The disaggregated zones are illustrated in Figure 2-1.

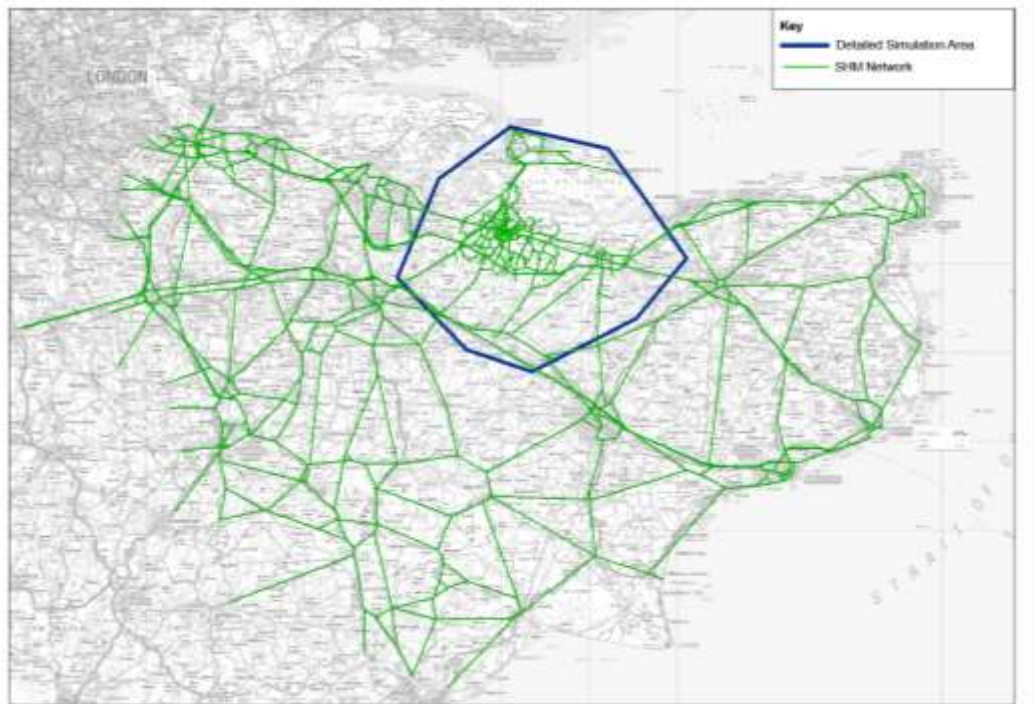
Figure 2-1 SHM zoning system



The base year for the SHM is 2017, and the network structure was enhanced to represent two distinct spatial areas as follows:

- Simulation network (within the Swale Study Area in Figure 2-1): a detailed simulation highway network coded directly from raw data. It covers the proposed residential, employment and commercial centre development sites, and included all A and B roads in the region covering Sittingbourne and Faversham Town Centre and the Isle of Sheppey. Modelling within this area is characterised by the representation of all trip movements, small zones and detailed network representation with junction modelling (including flow metering and blocking back); and
- Buffer network (outside of the SHM simulation area in Figure 2-2 below): it included a skeletal strategic network for the wider region covering the extent of the network to the Kent County boundary using SERTM model network coding. This enabled the accurate routing of most long-distance trips into the core study area. For the network immediately around the simulation area, speed flow curves were used to represent the network characteristics whereas for the rest of the buffer area fixed speeds were used.

Figure 2-2 SHM network



Speed flow curves were applied to all major A-roads, B-roads and other strategically significant major roads (as required) to restrict capacity and to reflect a realistic speed in association with traffic volume. Some examples of SATURN speed flow curves as used within the SATURN model are shown in Table 2-1 below.

Table 2-1 SATURN speed flow curve examples

Road name	No. of lanes	Free-flow speed	Speed at Capacity	Capacity	Power
M2	2	112	45	4860	3.85
A249	2	112	73	4200	2.8
A2 (Boughton bypass)	2	112	73	4200	2.8
M20 weaving sections	3	112	45	5440	3.85
A299 Dual carriageway	2	115	89	4200	2.8

2.3 Modelled time periods

Three representative weekday single hours are modelled that cover the most important periods of traffic flow. The selected modelled time periods for Swale Model were as followed which are also consistent with SERTM:

- AM peak hour: 0800 – 0900.
- Average IP hour: 1000 – 1600; and
- PM Peak hour: 1700 – 1800.

2.4 User class segmentation

The SHM uses 5 User Classes that are consistent with the SERTM user classes. These user classes have been selected to meet current TAG guidance and for suitability for

subsequent forecast demand modelling. Table 2-2 lists the modelled user classes and their associated PCU factor.

Table 2-2 Modelled user classes and PCU factors

User Class	Vehicle Type/ Purpose	PCU factor
1	Car - Employer's Business	1
2	Car - Home-based Work	1
3	Car - Other	1
4	Light Goods Vehicles (LGV)	1
5	Heavy Goods Vehicles (HGV)	2

2.5 Software

The SHM uses SATURN (Simulation and Assignment of Traffic to Urban Road Networks), which satisfies the requirements for modelling highway networks as set out in TAG unit M3-1.

2.6 Assignment procedure and generalised cost parameters

The SATURN assignment procedure uses the 'SATALL' module to iterate between successive loops of 'SATASS' module and 'SATSIM' module. The SATASS model assigns the input user class matrices to the network by Wardrop's first principle of traffic equilibrium using the Frank-Wolfe algorithm. Whereas SATSIM takes the flows derived by SATASS and calculates the revised flow/delay relationships at each junction within the simulated area. These two modules are iterated until the resulting travel times and flows do not change significantly; it is then deemed that the process has 'converged'. Using the combined SATASS-SATSIM routine enables the impact of blocking back and downstream flow metering to be robustly assessed. Further details may be found in the SATURN user manual.

Wardrop user equilibrium is based on the following proposition:

'Traffic arranges itself on congested networks such that the cost of travel on all routes used between each origin-destination pair is equal to the minimum cost of travel and unused routes have equal or greater costs.'

The generalised cost parameters (Value of Time and Vehicle Operating Cost) used in the base model were derived from TAG databook (July 2017), in line with the v1.8 TAG release. The derived values are shown in Table 2-3 and

Table 2-4, which are calculated in 2017 prices.

Table 2-3 Value of time, pence per minute (PPM, 2017 prices, 2017 values)

User Class	PPM		
	AM	IP	PM
Car - Employer's Business	30.49	31.24	30.93
Car - Commuting	20.45	20.78	20.52
Car - Other	14.11	15.03	14.77
LGV	21.55	21.55	21.55
HGV	50.32	50.32	50.32

Table 2-4 Value of vehicle operating cost, pence per kilometre (PPK, 2017 prices, 2017 values)

User Class	PPK (same for all time periods)
Car - Employer's Business	12.05
Car - Commuting	5.51
Car - Other	5.51
LGV	13.19
HGV	39.88

2.7 Model calibration and validation

Figure 2-3 below shows a high-level summary of the top line statistics for each modelled time period. These are displayed as a “spider” graph, where the area of the graph represents the total level of calibration/validation of the model. Analysis of these graphs confirms the above analysis, in that a high level of model calibration and validation performance has been achieved.

Based on this assessment, it is considered that the model is fit for future year traffic forecasting. In summary, the following results of model calibration and validation have been achieved:

- Link calibration greater than 92%.
- Link validation AM = 86%, IP = 92%, PM = 92%.
- Turn calibration greater than 89%.
- Screenline calibration: AM = 83%, IP = 93%, PM = 83%.
- Screenline validation: AM = 83%, IP = 83%, PM = 100%.
- Journey time validation: AM = 96%, IP = 96%, PM = 98%.

Figure 2-3 Topline summary statistics



The SHM has been designed in compliance with current best practice guidance as set out in the Department for Transport's TAG. The performance of the model has been assessed in the two standard fundamental areas: the ability to replicate traffic flows either at screenline or link level across the model area and the ability to reflect observed journey times (which reflect travel costs).

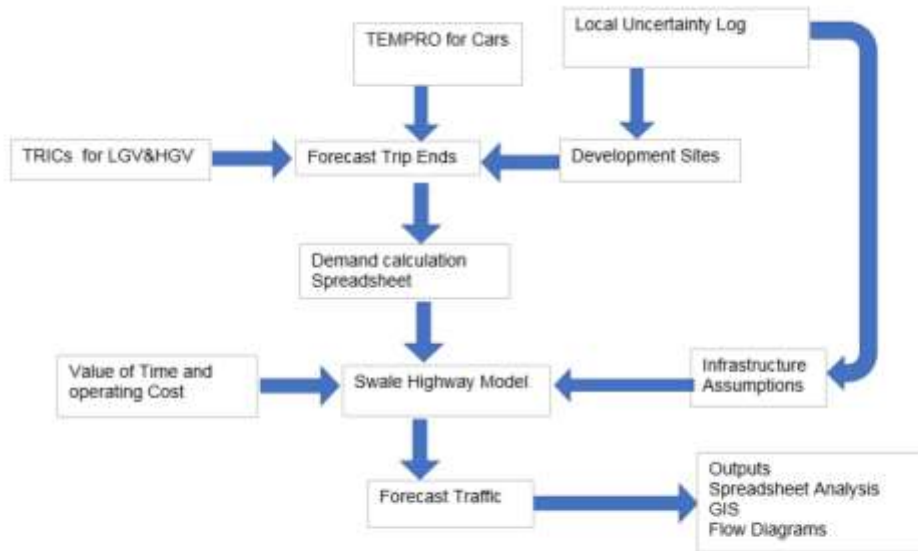
The robustness of the highway model as a forecasting tool was measured by comparing link flows and journey times against observations. The comparisons were benchmarked against TAG calibration and validation standards. Whilst the TAG criteria is missed slightly for a few individual calibration and validation screenlines, the final highway model validates very well against the link flow criteria and modelled journey times exceed TAG acceptability guidance in both the AM and PM peaks. These results were achieved without excessive matrix estimation.

3 Forecast Approach

3.1 Introduction

An overview of the approach for the SHM forecast models can be seen in Figure 3-1 below.

Figure 3-1 Flowchart of the forecasting process



The traffic forecasts account for future proposals for residential and employment developments in the local area and corresponding transport network changes. The forecast scenarios comprise the following:

- A set of transport network changes based on the local uncertainty log.
- Assumptions about changes in values of time and vehicle operating costs in future forecast years.
- A specific set of development assumptions based on the local uncertainty log.
- Application of National Trip End Model (NTEM) growth factors extracted from NTEM7.2 for car trip growth.
- Application of growth of freight traffic from the DfT's Road Transport Forecasts.

3.2 Revised LP traffic forecast

This work commissioned is to develop a refreshed set of SATURN strategic forecast models to examine a range of revised LP options, with model outputs to be provided as an evidence base to support the LP proposals. The key model outputs are aimed to show the differences between a 2038 Reference Case (RC)¹, as adapted to include the identified committed and extant permissions and schemes, and a 2038 Do Something (DS) model. This will help to identify the transport hotspots in the region and design appropriate mitigations to ease traffic congestion.

¹ In previous SHM Traffic Forecast a model with a horizon of year 2037 was developed.

The revised Local Plan is expected to deliver up to around 17,410 dwellings within the period between 2022 and 2037/38. The employment land needs for the same period are expected to be around 750,000m². As part of the commission, an interim model in the forecast 2027 has also been developed to demonstrate the impact of the 5-year from LP adoption.

As agreed with KCC and SBC (and following the feedback from Highways England²), several key model assumptions are listed as:

- The RC scenario should include committed development only for any future year assessment. The LP scenario would be all additional development associated with it, including windfalls.
- As the LP is aimed to assess development proposals and not a road scheme, there should not be any overall growth constraint locally, countywide, or regionally. As agreed, the NTEM growth factors were applied to the model external area.
- The TRICs rates were adopted to derive the demand for local housing and employment development.

Following these, the SHM is then updated from the existing reference case models³, with the following key changes:

- A revised horizon forecast year of 2038, in contrast to the previous forecast year of 2037.
- A set of revised TRICs-based trip rates for developments.
- A new housing development plan for both RC and DS in the year 2027 and 2038.
- A new employment development plan for both RC and DS in the year 2027 and 2038.
- A set of revised committed highway schemes.
- Additional new development zones included for several large settlements.
- Goods vehicle growth for LGV and HGVs was updated by the DfT's 2018 Road Traffic Forecast (RTF 2018)⁴.

² From the email sent by Nigel Walkden from Highways England on 09 June 2021

³ The RC has two forecast years of 2027 and 2037. The network of the existing RC models has been recently enhanced by Sweco from the work undertaken for a Traffic Assessment study. In particular, the schemes at M2 J5 and on A249 have been updated with the latest published layout.

⁴ Based on rft18-scenario-1-reference.xlsx

4 Uncertainty Log and Forecast Years

4.1 Introduction

As outlined in TAG guidance unit M4, Forecasting and Uncertainty, a core scenario should be developed based on the most unbiased and realistic set of assumptions. Thus, the core scenario will include the following assumptions:

- Inputs categorised as ‘near certain’ should be included; and
- Inputs categorised as ‘more than likely’ should be included.

In line with TAG unit M4, an uncertainty log has been developed. As stated in the unit, the purpose of the uncertainty log is to record the central forecasting assumptions that underpin the core scenario and record the degree of uncertainty around these central assumptions. These assumptions will be the basis for developing a set of alternative scenarios.

The uncertainty log deals with local uncertainty about future land use (demand side uncertainty), and transport schemes (supply side uncertainty) which will affect the transport network. The uncertainty relates to the likelihood of a specific scheme or development taking place, as well as the nature and size of the development. Table 4-1 provides the TAG definitions of the uncertainty log classifications.

Table 4-1 Classification of near certain and more than likely schemes as per TAG

Probability of the input	Local authority / development scheme
Near certain: The outcome will happen or there is a high probability that it will happen.	<ul style="list-style-type: none"> • Intent announced by proponent to regulatory agencies. • Approved development proposals; and • Projects under construction
More than likely: The outcome is likely to happen but there is some uncertainty.	<ul style="list-style-type: none"> • Submission of planning or consent application imminent. • Development application within the consent process; and • Projects under construction

4.2 Forecast years

The following years have been agreed to the SHM traffic forecast models:

- 2027 – five years into the Swale LP.
- 2038 – the end of the current Swale LP.

4.3 Modelled Scenarios

As briefed in chapter 3, the following scenarios were modelled:

- 2027 Reference Case
- 2027 Do Something
- 2038 Reference Case
- 2038 Do Something

4.4 Uncertainty log

4.4.1 Housing development for RC and DS scenarios

The uncertainty log has been developed by the data provided by KCC and SBC. The total house allocation for each year from the base year 2017 to 2038 for the RC and DS scenarios are shown in Table 4-2 and Table 4-3, respectively. Detailed housing development plans are shown in **Appendix A**.

A summary of the house allocation is given as:

- A number of the Bearing Fruit house development sites don't have planning permission, which is therefore included in the DS instead of the RC scenario.
- The total of 2200 windfall houses are assumed to be allocated from the year 2027. Since they don't have any planning permission, those houses are only included in the DS scenario, proportionally spreading across all developments in Swale.
- A total of 445 houses are proposed for the Faversham Neighbourhood Plan (NP) and the LP for Park Home. They are assumed to be allocated from the year 2027 for the DS scenario, proportionally spreading across all the development sites in Faversham.

In the RC scenarios, there are a total of 6163 and 9225 houses with planning permission by the year 2027 and year 2038, respectively. Additional houses without planning permission, including Bearing Fruit, LP allocations, windfall, and Faversham NP and Park home are included in the DS scenarios. Additional housing development sites with the number of dwellings greater than 500 by the year 2038 are listed as:

- South East Faversham
- Land at Lady Dane Farm
- Land at The Port of Sheerness, Rushenden Road
- Sittingbourne Town Centre
- Teynham Area of Opportunity

Table 4-2 Total housing each year from 2017 to 2038 for the RC scenarios

Planning year	Large PPs	Small PPs	BFs allocations (with planning permission)	BFs allocations (without planning permission)	LP Allocation	Windfalls	Fav NP + Park homes	Total by year	Total Cumulative
2017-2022	2419	13						2432	2432
2022-2023	556	56	110					722	3154
2023-2024	497	8	275					780	3934
2024-2025	441		430					871	4805
2025-2026	318		420					738	5543
2026-2027	260		360					620	6163
2027-2028	251		382					633	6796
2028-2029	131		300					431	7227
2029-2030	131		305					436	7663
2030-2031	131		265					396	8059
2031-2032	91		240					331	8390

2032-2033	32		135					167	8557
2033-2034	1		120					121	8678
2034-2035	1		120					121	8799
2035-2036	246		120					366	9165
2036-2037			60					60	9225
2037-2038			0					0	9225
Total	5506	77	3642	0	0	0	0	9225	

Table 4-3 Total housing each year from 2017 to 2038 for the DS scenarios

Planning year	Large PPs	Small PPs	BFs allocations (with planning permission)	BFs allocations (without planning permission)	LP Allocation	Windfalls	Fav NP + Park homes	Total by year	Total Cumulative
2017-2022	2419	13						2432	2432
2022-2023	556	56	110	23	30			775	3207
2023-2024	497	8	275	167	75			1022	4229
2024-2025	441		430	244	216			1331	5560
2025-2026	318		420	366	340			1444	7004
2026-2027	260		360	308	375			1303	8307
2027-2028	251		382	237	410	200	35	1515	9822
2028-2029	131		300	165	410	200	35	1241	11063
2029-2030	131		305	149	440	200	35	1260	12323
2030-2031	131		265	60	440	200	35	1131	13454
2031-2032	91		240	81	390	200	35	1037	14491
2032-2033	32		135	115	460	200	35	977	15468
2033-2034	1		120	40	410	200	45	816	16284
2034-2035	1		120		460	200	45	826	17110
2035-2036	246		120		520	200	50	1136	18246
2036-2037			60		520	200	50	830	19076
2037-2038					520	200	45	765	19841
Total	5506	77	3642	1955	6016	2200	445	19841	

Error! Reference source not found. and **Error! Reference source not found.** show the housing developments for the RC and DS scenarios by the forecast year 2038, respectively.

Figure 4-1 RC housing developments by the year 2038

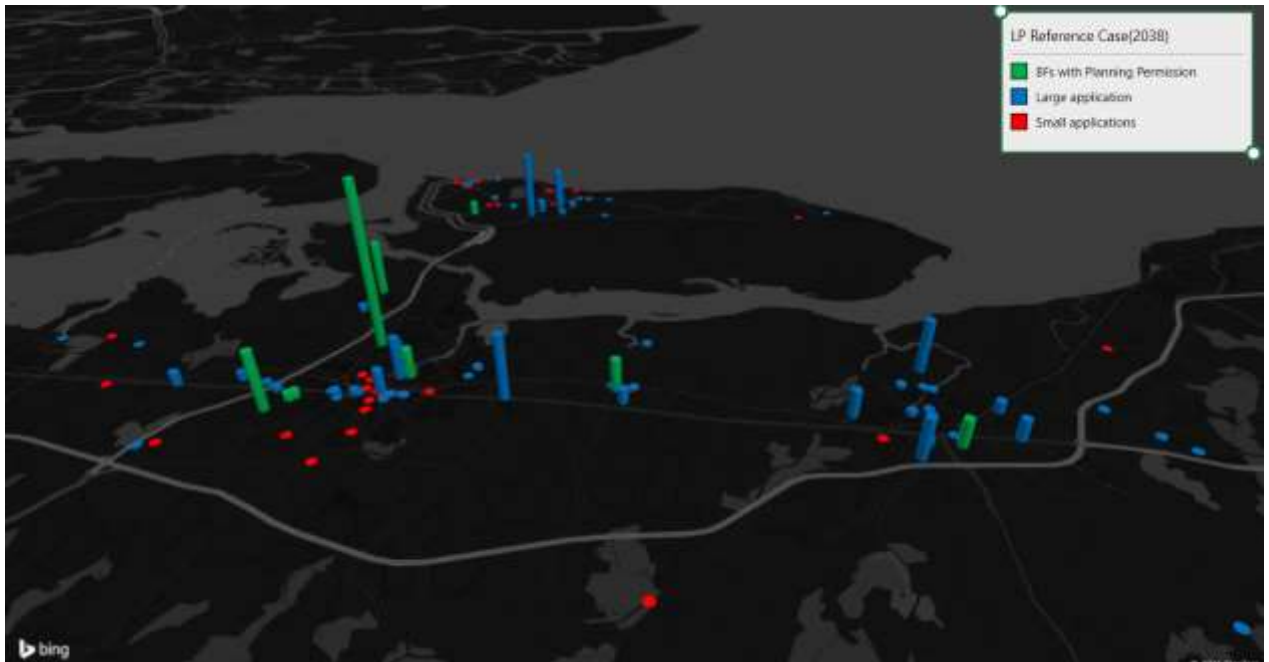
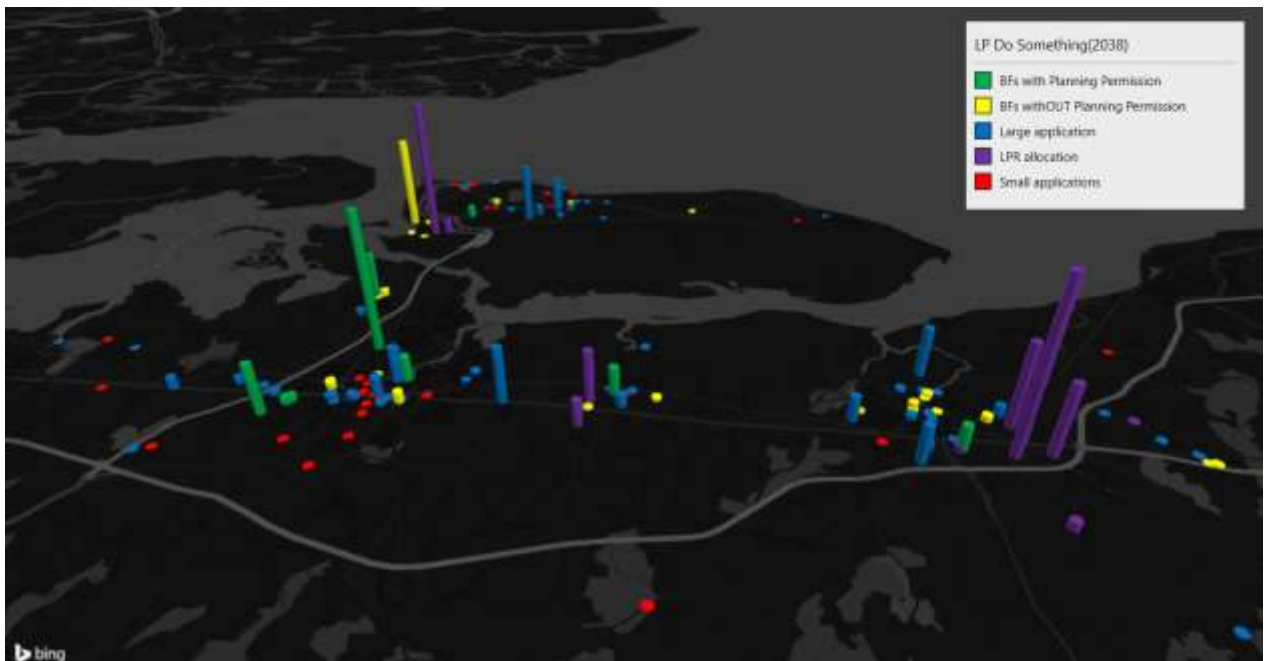


Figure 4-2 DS housing developments by the year 2038



4.4.2 Employment development for RC and DS scenarios

The employment developments for the RC scenario from 2022 to 2038 were inherited from the previous LP 1054 scenario, as shown in Table 4-4. Additional employment sites by the year 2038 for the DS scenarios are proposed, as illustrated in Table 4-5. The employment development in the interim year 2027 is assumed as 50% of its equivalent scenario in the year 2038.

Table 4-4 Swale employment development from 2017 to 2038 for the RC scenarios

Ref	Site name	Employment (sqm)* 2022-2038
1	Faversham site 1	300
2	Faversham site 2	2500
3	Waterham, Faversham	24000
4	West Frogna Lane	42000
5	Lamberhurst Farm	15000
6	Sittingbourne Industrial estate	15000
7	Bobbing site reallocation	30000
8	Wallend Farm Sheppey	10000
Total plan period		138800

*It has been agreed that all employment sites will be split into B1:B2:B8 33%:33%:34% except Wallend Farm B1:B8 10%:90%

*Table 4-5 Swale additional employment development from 2017 to 2038 for the DS scenarios**

ID	Type	Site Name	B1 (sqm)	B2 (sqm)	B8 (sqm)	C1 (sqm)	Total
1	Existing committed employment allocations	Ridham and Kemsley, Sittingbourne		72993	72993		145985
2		Neatscourt, Queenborough, Isle of Sheppey	25101	25101	25862		76064
3		Land south of Kemsley Mill	2640	2640	2720		8000
4		Land at West Minster, Sheerness	2475	2475	2550		7500
5		Land at Cowstead Corner, Queenborough	1848	1848	1904	4760	10360
6		Land at Selling Road, Faversham	18000				18000
7		Land at Graveney Road, east of Faversham	2310	2310	2380		7000

8	Proposed allocations in the local plan review Reg 19	SE Fav (Duchy)	33000	33000	34000		100000
9		East Fav (Attwood)	33000	33000	34000		100000
10		Lamberhurst Farm	7227	7227	7446		21900
11		Sittingbourne Town Centre	4950	4950	5100		15000
12		Rushenden South	33000	33000	34000		100000
	Total		163551	218544	222954	4760	609809

* If no specific land-use information is available, all employments sites will be split into B1:B2:B8 by 33%:33%:34%

4.4.3 Forecast Network Supply

From the uncertainty log, the following transport schemes have been identified as either 'Near certain' or 'More than likely' and have hence been included in the core scenario.

A list of highway schemes was provided by KCC, as illustrated in Figure 4-3. The schemes are differentiated by forecast year and strategic nature. Following a review of the schemes, it was found that some schemes are related to the access road to the local network for a specific development site, as shown in Table 4-6. To maintain an integrated highway network between the RC and DS scenarios, all those schemes have been included in both scenarios⁵. The remaining highway schemes are fully committed and included in both RC and DS scenarios, as shown in Table 4-7. In both tables, a few schemes will not be completed in the year 2027, which were excluded from the interim 2027 forecast models.

⁵ If a development site is only related to the DS scenario, no demand will be generated and assigned for the RC scenario.

Figure 4-3 – Network Assumptions

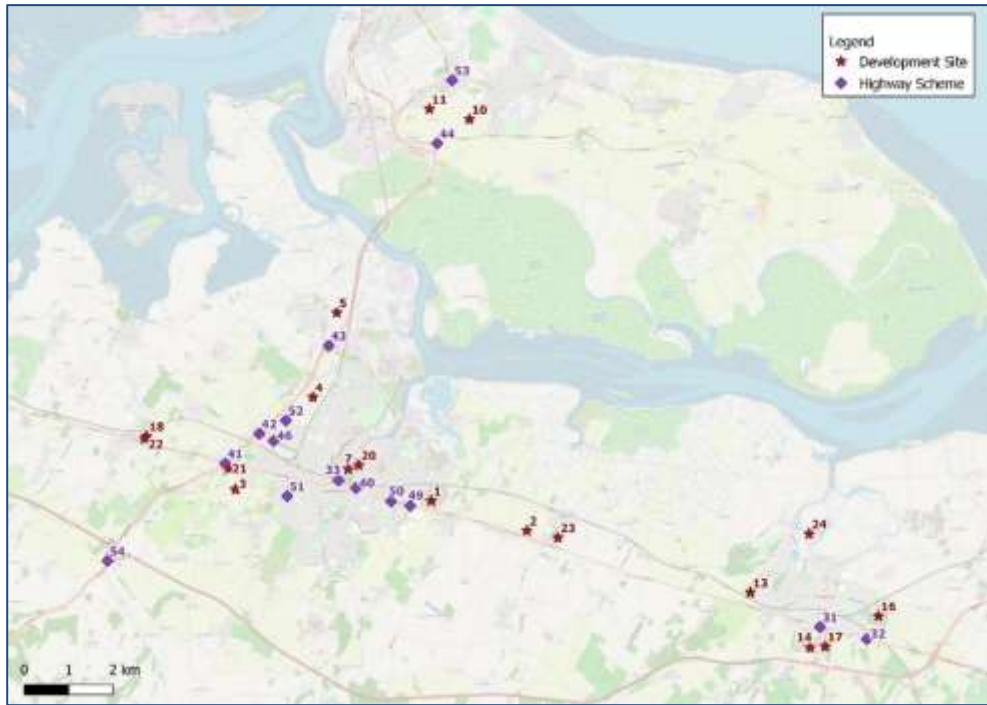


Table 4-6 – Network Assumptions (Development Sites Related)

ID	Title of Development	Details	2027	2038
1	Stones Farm	A2 access only	✓	✓
2	Frognall Lane	A2 access only	✓	✓
3	SW Sittingbourne	Access to Chestnut St, Wises Lane, Borden Lane with link road between	✗	✓
4	NW Sittingbourne	Access to Quinton Road and Grovehurst Road with link road between	✗	✓
5	Iwade Expansion	Access to Grovehurst Road only	✓	✓
7	Crown Quay Redrow	Access to Crown Quay Lane and Eurolink Way	✓	✓
10	Barton Hill Drive	Access to Lower Road and Barton Hill Drive	✓	✓
11	Land off Belgrave Road	Access to Belgrave Road	✓	✓
24	Oare Gravel Works	Access to Ham Road	✓	✓
13	Ospringe Brickworks	Access to Western Link	✓	✓
14	Perry Court	Access to Brogdale Lane and A251	✓	✓
16	Lady Dane Farm	Access to Graveney Road and Love Lane with connecting link	✓	✓
17	Preston Fields	Access to A2 and A251 with connecting (slow) link	✓	✓
18	High St Newington	Access to A2	✓	✓
5	Pond Farm	Access to Grovehurst Road	✓	✓

ID	Title of Development	Details	2027	2038
20	Crown Quay Bellway	Access to Crown Quay Lane	✓	✓
21	Manor Farm	Access to Chestnut Street	✓	✓
22	Newington Eden Meadows	Access to A2 Newington	✓	✓
23	Teynham Station Road	Access to Statio Rd Teynham	✓	✓

Table 4-7 – Network Assumptions (Highway Schemes)

ID	Location	2027	2038
31	A2/A251 Junction Improvements	✓	✓
32	A2/Love Lane Junction Signalisation	✓	✓
33	Spirit of Sittingbourne TC works	✓	✓
40	St Michaels Road/rown Quay Lane Junction Improvements	✓	✓
41	Key St Roundabout Improvements	✓	✓
42	Bobbing Roundabout Improvements	✗	✓
43	Grovehurst Junction Improvements	✓	✓
44	Lower Road/Cowstead Corner Capacity Improvements	✓	✓
46	B2006/Sonora Way Roundabout Capacity Improvements	✓	✓
49	A2/Swanstree Ave Junction Improvements	✗	✓
50	A2/Rectory Rd Junction Improvements	✗	✓
51	Borden Lane/Homewood Mini Roundabout	✗	✓
52	Quinton Road Mini Roundabouts	✓	✓
53	Halfway Road Traffic Lights	✓	✓
54	M2/J5	✓	✓

5 Forecast Demand

5.1 Overview

This chapter summarises the approach adopted to produce reference demand in the future forecast year 2027 and 2038.

Based on the uncertainty log, future car growth was calculated by spatially allocating development trips using the TRICs-based trip rates provided by KCC by area within Swale, and splits by user class derived from NTEM version 7.2. LGV and HGV trip rates were derived from TRICs and LGV/HGV growth factors derived from the Department for Transport (DfT) National Transport Model (NTM) database. A Furness process was then carried out to constrain the growth to NTEM.

5.2 Trip generation and distribution for modelled developments

As agreed with KCC, SBC and Highways England, the car trip rates for housing development were undertaken by TRICs-based values, which are differentiated by two types of geographic locations, one for Swale town centre and the other for Swale rural area, as shown in Table 5-1 for total vehicles⁶. The Swale town centre is defined as for a development site within a mile of Sittingbourne, Faversham, Sheerness and Queenborough. Otherwise, it is assumed to be in the Swale rural area. The trip rates per dwelling for car employer business, car commute, car other, LGV and HGVs in the modelling periods are shown in

⁶ Note that the total vehicles include motorcycle, PSV, taxi, car, LGV and OGVs

Table 5-2.

To calculate the trip generation for employment development, the number of jobs for each site was derived based on the existing assumptions of square meters per job by land-use class (e.g., B1, B2 or B8). The methodology applied was based on the guidance outlined in the home and community's agency employment density guide (2015), with the conversion factors shown in Table 5-3. The employment demand was then calculated by the trip rate per job derived from NTEM for cars and TRICS for LGV and HGVs, as shown in

Table 5-4. Peak period trip rates for LGV and HGV were obtained from the TRICs database and converted into peak hour trip rates using the factors found in Table 5-5 below. The trip rates for employment development remain unchanged from the existing RC forecast models.

Table 5-1 Trip rates for Swale LP housing development (total vehicles)

Land Use Class	TRICS Land Use Type	Source	Use	TOTAL VEHICLE					
				AM Peak (0800-0900)		Average Inter Peak (1000-1600)		PM Peak (1700-1800)	
				Dep	Arr	Dep	Arr	Dep	Arr
C3 – Dwellings	03-M (mixed private/affordable housing)	TRICS - 8 sites in UK	Swale Town Centre	0.297	0.101	0.121	0.122	0.133	0.274
C3 - Dwellings	03-A (residential/houses privately owned)	TRICS - 8 sites in UK	Swale rural	0.382	0.150	0.144	0.139	0.153	0.367

Table 5-2 Trip rates (per dwelling) for Swale LP housing development (car, LGV and HGVs)

Time Period	Area	Car EB		Car Commute		Car Other		LGV		HGV	
		Dep	Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep	Arr
AM Peak (0800-0900)	Town centre	0.023	0.003	0.181	0.026	0.068	0.055	0.018	0.011	0.000	0.001
	Rural	0.030	0.005	0.235	0.040	0.089	0.084	0.020	0.017	0.001	0.000
Average Inter Peak (1000-1600)	Town centre	0.005	0.005	0.014	0.019	0.082	0.077	0.016	0.017	0.001	0.001
	Rural	0.006	0.005	0.017	0.022	0.098	0.089	0.021	0.021	0.002	0.002
PM Peak (1700-1800)	Town centre	0.004	0.017	0.018	0.127	0.099	0.105	0.010	0.021	0.000	0.000
	Rural	0.004	0.023	0.021	0.173	0.115	0.143	0.010	0.023	0.000	0.002

Table 5-3 Employment density by land use class

Land Use Class	Details	Sqm per job
A1	Retail	20.00
A1	Retail warehouse	90.00
A2	Finance and professional services	16.00
A3	Restaurants and cafes	20.00
A4	Drinking establishments	20.00
A5	Hot food takeaway	20.00
B1a	Offices	13.00
B1b	R&D space	50.00
B1 c	Light industrial	47.00
B1 mixed	B1 mixed	60.00
B2	Industrial and manufacturing	60.00
B8	Storage and distribution	86.00
Mixed B1-B8	Mixed B1-B8	40.00
C1	Hotels	55.74
C2	Residential institutions	20.00
D1	Non-residential institutions	50.00
D2	Fitness/cinema/visitor/amusement	108.75
SG	Sui Generis	950.00

Table 5-4 Trip rates (per job) for Swale LP employment development (car, LGV and HGVs)

Time Period	Land use class	Car EB		Car Commute		Car Other		LGV		HGV	
		Dep	Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep	Arr
AM Peak (0800-0900)	B1	0.007	0.019	0.006	0.117	0.014	0.029	0.029	0.036	0.007	0.008
	B2	0.007	0.019	0.006	0.117	0.014	0.029	0.053	0.058	0.023	0.021
	B8	0.007	0.019	0.006	0.117	0.014	0.029	0.041	0.021	0.039	0.029
Average Inter Peak (1000-1600)	B1	0.010	0.009	0.010	0.008	0.034	0.035	0.028	0.029	0.006	0.005
	B2	0.010	0.009	0.010	0.008	0.034	0.035	0.045	0.046	0.019	0.021
	B8	0.010	0.009	0.010	0.008	0.034	0.035	0.026	0.027	0.026	0.028
PM Peak (1700-1800)	B1	0.014	0.006	0.069	0.007	0.042	0.028	0.020	0.014	0.002	0.002
	B2	0.014	0.006	0.069	0.007	0.042	0.028	0.034	0.027	0.010	0.010
	B8	0.014	0.006	0.069	0.007	0.042	0.028	0.032	0.037	0.023	0.033

Table 5-5 Factors applied to convert from peak period to peak hour

Time		TRICs trip rate	Weighted trip weight	Factor applied
AM	7:00-8:00	0.235	-	
	8:00-9:00	0.327	0.472	2.119
	9:00-10:00	0.131	-	
IP	11:00-12:00	-	-	6
PM	16:00-17:00	0.200	-	
	17:00-18:00	0.271	0.375	2.668
	18:00-19:00	0.252	-	

The trip ends have been produced for both RC and DS scenarios, with the following agreed assumptions⁷:

- Since the total number of developments in Swale is projected higher than NTEM for both scenarios, it was assumed that the local growth would be fully fulfilled by the developments. The existing zone trip ends in Swale was kept the same as the base year (i.e. no growth), which means the reference case trip ends were not constrained to NTEM in Swale.
- With no local growth information in the surrounding area, NTEM growths apply to the external zones outside of Swale.
- Any future transport network changes outside of Swale were not included in the forecast models.
- The trip generation was calculated based on the TRICS trip rates with no trip internalisation, work from home adjustment, or mode shift discounts applied.

The future forecast matrices were created through the SATURN Furness process. The Furness process attempts to match the target trip ends for each zone for both Origins and Destinations and it goes through several iterations until the total trip ends are balanced.

⁷ The assumptions were based on the conversation with KCC, SBC and Highways England, with a reference to the feedback from Highways England on the LP study for Tunbridge Wells.

Based on the suggestion from Highways England on the LP study for Turnbridge Well, it has been agreed that:

- Origin constraint for modelled AM peak.
- Doubly constraint for modelled Inter Peak.
- Destination constraint for modelled PM peak.

Therefore, it is possible that when there are more new housings (mainly origins in AM peak) than new jobs then the destination trips are factored up accordingly in the process until the trip ends are fully balanced.

The distribution of future developments was based on the existing distribution for the associated zone. In rare occurrences where the base zone was empty, a nearby zone with a similar travel pattern was chosen to distribute the development trips. The same approach has been adopted when development trips were missing in the base year matrices, and in that case, a distribution taken from a nearby similar zone was used. This was likely the case where a new development site was allocated in the post-2022 period, where there was very little other development in the zone (such as for the new settlements). The results were also 'sense checked' for how the model was allocating trips from such a development to the network and adjusted if necessary.

5.3 Matrix Building

5.3.1 Growth Factors

Car background growth factors across the entire modelled area were derived from NTEM and split by purpose and time period. Table 5-6 to Table 5-8 below shows a summary of the NTEM v7.2 growth factors for AM, IP and PM peak, respectively.

Table 5-6 NTEM v7.2 growth factors for AM peak

Area	2017-2027						2017-2038					
	Commute		Emp Business		Other		Commute		Emp Business		Other	
	O	D	O	D	O	D	O	D	O	D	O	D
GB	1.079	1.079	1.082	1.082	1.118	1.118	1.144	1.144	1.150	1.150	1.220	1.220
Bromley	1.043	1.079	1.050	1.084	1.118	1.147	1.080	1.137	1.091	1.148	1.230	1.278
South East	1.075	1.079	1.080	1.083	1.132	1.131	1.129	1.139	1.138	1.147	1.246	1.245
Kent	1.062	1.075	1.070	1.080	1.139	1.140	1.104	1.133	1.120	1.144	1.263	1.268
Ashford	1.110	1.078	1.109	1.083	1.184	1.156	1.197	1.138	1.197	1.149	1.357	1.301
Canterbury	1.106	1.077	1.103	1.081	1.161	1.143	1.164	1.135	1.167	1.146	1.298	1.273
Dartford	1.105	1.079	1.099	1.083	1.170	1.161	1.196	1.139	1.185	1.149	1.333	1.308
Dover	1.072	1.076	1.079	1.080	1.161	1.145	1.127	1.134	1.142	1.145	1.304	1.276
Gravesham	1.070	1.075	1.072	1.079	1.140	1.145	1.123	1.133	1.128	1.144	1.270	1.278
Maidstone	1.076	1.076	1.081	1.081	1.153	1.145	1.125	1.134	1.137	1.146	1.286	1.276
Medway	1.065	1.075	1.072	1.080	1.137	1.137	1.105	1.132	1.121	1.144	1.255	1.262
Sevenoaks	0.996	1.071	1.017	1.077	1.082	1.120	0.997	1.127	1.033	1.139	1.162	1.232
Shepway	1.034	1.074	1.049	1.080	1.123	1.133	1.032	1.129	1.065	1.142	1.212	1.247
Swale	1.045	1.073	1.056	1.078	1.127	1.133	1.068	1.130	1.091	1.141	1.241	1.254
Thanet	1.032	1.073	1.046	1.078	1.110	1.129	1.047	1.129	1.074	1.142	1.209	1.246

Area	2017-2027						2017-2038					
	Commute		Emp Business		Other		Commute		Emp Business		Other	
	O	D	O	D	O	D	O	D	O	D	O	D
Tonbridge and Malling	1.059	1.074	1.067	1.080	1.138	1.139	1.107	1.133	1.122	1.144	1.271	1.268
Tunbridge Wells	1.031	1.073	1.046	1.079	1.115	1.134	1.050	1.129	1.078	1.141	1.222	1.256
Rother	1.069	1.085	1.079	1.090	1.125	1.127	1.139	1.150	1.151	1.160	1.242	1.238

Table 5-7 NTEM v7.2 growth factors for Inter Peak

Area	2017-2027						2017-2038					
	Commute		Emp Business		Other		Commute		Emp Business		Other	
	O	D	O	D	O	D	O	D	O	D	O	D
GB	1.069	1.069	1.078	1.078	1.121	1.121	1.127	1.127	1.143	1.143	1.225	1.225
Bromley	1.060	1.051	1.076	1.073	1.137	1.136	1.110	1.094	1.135	1.130	1.265	1.262
South East	1.069	1.068	1.080	1.080	1.136	1.135	1.121	1.119	1.141	1.141	1.255	1.254
Kent	1.061	1.060	1.076	1.076	1.150	1.148	1.108	1.104	1.135	1.135	1.285	1.282
Ashford	1.081	1.090	1.087	1.089	1.180	1.179	1.146	1.161	1.157	1.161	1.350	1.347
Canterbury	1.080	1.086	1.084	1.086	1.164	1.163	1.133	1.140	1.149	1.149	1.308	1.305
Dartford	1.083	1.085	1.089	1.086	1.166	1.167	1.152	1.156	1.162	1.157	1.322	1.323
Dover	1.065	1.066	1.077	1.079	1.165	1.163	1.115	1.117	1.140	1.142	1.312	1.309
Gravesham	1.067	1.064	1.080	1.077	1.148	1.148	1.121	1.115	1.144	1.139	1.287	1.286
Maidstone	1.066	1.068	1.078	1.079	1.159	1.158	1.116	1.117	1.139	1.141	1.301	1.298
Medway	1.060	1.059	1.075	1.076	1.148	1.145	1.105	1.101	1.134	1.134	1.280	1.274
Sevenoaks	1.030	1.018	1.059	1.057	1.109	1.107	1.061	1.038	1.106	1.104	1.211	1.207
Shepway	1.048	1.043	1.068	1.069	1.139	1.136	1.075	1.061	1.116	1.116	1.250	1.245
Swale	1.053	1.048	1.070	1.070	1.140	1.138	1.092	1.082	1.124	1.125	1.267	1.263
Thanet	1.045	1.038	1.069	1.068	1.130	1.127	1.080	1.064	1.122	1.121	1.249	1.242
Tonbridge and Malling	1.062	1.059	1.074	1.075	1.149	1.148	1.111	1.108	1.135	1.136	1.290	1.288
Tunbridge Wells	1.048	1.040	1.067	1.067	1.136	1.133	1.087	1.071	1.121	1.120	1.262	1.256
Rother	1.070	1.068	1.083	1.085	1.132	1.132	1.139	1.150	1.151	1.160	1.242	1.238

Table 5-8 NTEM v7.2 growth factors for PM peak hour

Area	2017-2027						2017-2038					
	Commute		Emp Business		Other		Commute		Emp Business		Other	
	O	D	O	D	O	D	O	D	O	D	O	D
GB	1.071	1.071	1.080	1.080	1.107	1.107	1.130	1.130	1.146	1.146	1.200	1.200
Bromley	1.074	1.036	1.081	1.054	1.123	1.107	1.130	1.068	1.144	1.097	1.234	1.207
South East	1.072	1.068	1.081	1.078	1.116	1.117	1.126	1.117	1.144	1.137	1.217	1.219
Kent	1.068	1.055	1.078	1.069	1.122	1.125	1.120	1.092	1.140	1.120	1.232	1.236
Ashford	1.073	1.105	1.084	1.104	1.147	1.163	1.129	1.188	1.151	1.188	1.284	1.316
Canterbury	1.072	1.100	1.082	1.097	1.137	1.147	1.126	1.152	1.146	1.160	1.256	1.270

Area	2017-2027						2017-2038					
	Commute		Emp Business		Other		Commute		Emp Business		Other	
	O	D	O	D	O	D	O	D	O	D	O	D
Dartford	1.076	1.098	1.086	1.096	1.147	1.146	1.135	1.183	1.156	1.178	1.283	1.283
Dover	1.068	1.066	1.079	1.077	1.131	1.142	1.121	1.116	1.142	1.139	1.250	1.269
Gravesham	1.070	1.063	1.081	1.073	1.131	1.126	1.126	1.111	1.146	1.130	1.251	1.242
Maidstone	1.069	1.069	1.079	1.079	1.128	1.137	1.122	1.114	1.142	1.135	1.241	1.255
Medway	1.067	1.057	1.077	1.070	1.119	1.122	1.118	1.092	1.139	1.119	1.223	1.228
Sevenoaks	1.060	0.988	1.070	1.021	1.087	1.077	1.109	0.985	1.126	1.040	1.170	1.152
Shepway	1.065	1.028	1.074	1.050	1.110	1.111	1.112	1.020	1.130	1.069	1.197	1.194
Swale	1.064	1.038	1.075	1.057	1.112	1.115	1.115	1.059	1.134	1.095	1.211	1.216
Thanet	1.062	1.022	1.074	1.047	1.104	1.100	1.111	1.031	1.133	1.078	1.198	1.190
Tonbridge and Malling	1.068	1.054	1.077	1.067	1.121	1.126	1.121	1.097	1.139	1.122	1.234	1.245
Tunbridge Wells	1.064	1.023	1.074	1.046	1.108	1.105	1.115	1.037	1.133	1.081	1.208	1.201
Rother	1.077	1.063	1.087	1.079	1.116	1.114	1.137	1.128	1.156	1.150	1.220	1.222

A tiered approach to growth factors has been applied to the car demand. Growth factors have been adopted at a district level for Swale and its hinterland areas in Kent. For the rest of Kent and the external areas, the factors for the entire Kent or GB are applied. This structure is displayed in Figure 5-1.

Figure 5-1 NTEM regions



The goods vehicle growths (LGV and HGV) were updated by the DfT's Road Traffic Forecast 2018 (RTF 2018). The comparisons of growth factors between the Road Traffic Forecast 2015 (RTF 2015, as applied in the previous Swale Traffic Forecasts), and RTF2018 are shown in Table 5-9. It is found that the growth rates with the RTF 2018 are generally less than those from the RTF 2015, especially for LGVs.

Table 5-9 comparisons of goods vehicle growth between RTF15 and RTF18

Vehicle Class	RTF2015	RTF2018	% diff	RTF2015	RTF2018	% diff
	2017-2027	2017-2027		2017-2038	2017-2038	
LGV	1.260	1.141	-9.4%	1.520	1.310	-13.8%
HGV	1.073	1.036	-3.5%	1.146	1.105	-3.5%

5.3.2 Matrix total comparisons

The comparisons of demand matrix totals in the forecast year 2027 and 2038 by user class and time period for the RC and DS Scenarios are shown in Table 5-10 and Table 5-11, respectively. The existing reference case scenarios⁸ in 2027 and 2037 are also presented.

For the RC scenarios, when comparing to the base year, it can be seen that the overall demand increases by approximate 10.3% to 11.7% and 19.2% to 22.6% in the forecast year 2027 and 2038, respectively. The total demand in the DS scenarios is higher than the corresponding RC scenarios, uplifting from the base year by 11.0% to 12.3% in the year 2027 and 21.7% to 24.2% in the year 2038. The total demand for each scenario is less than the equivalent existing RC models because of the revised model assumptions including trip rates, forecast horizon year, goods vehicle growth and housing & employment plan in the RC and DS scenarios.

Overall, the level of demand changes and associated patterns are sensible.

⁸ The existing RCs are based on the TRICS rates, without TEMPRO constraints, and the housing and employment forecasts which are superseded by the revised plan as described in section 4.1 and 4.2.

Table 5-10 Total Trip Ends Comparisons year 2027 vs Base Year

AM(8000-0900)							
User Class	Base year	Existing RC (2027)	(% Diff to Base Year)	2027 RC	(% Diff to Base Year)	2027 DS	(% Diff)
Car Business	16771	18193	8.5%	17915	6.8%	18045	7.6%
Car Commute	66857	74302	11.1%	72296	8.1%	73133	9.4%
Car Other	89410	102462	14.6%	101392	13.4%	101750	13.8%
LGV	17627	22202	26.0%	20029	13.6%	20247	14.9%
HGV	13636	14729	8.0%	14106	3.4%	14184	4.0%
Total	204302	231888	13.5%	225738	10.5%	227360	11.3%
IP (av. 1000:1600)							
User Class	Base year	Existing RC (2027)	(% Diff to Base Year)	2027 RC	(% Diff to Base Year)	2027 DS	(% Diff)
Car Business	11907	12840	7.8%	12631	6.1%	12684	6.5%
Car Commute	23408	25047	7.0%	24917	6.4%	25020	6.9%
Car Other	99922	115283	15.4%	114342	14.4%	114802	14.9%
LGV	13925	17538	26.0%	15878	14.0%	16072	15.4%
HGV	12985	13988	7.7%	13432	3.4%	13495	3.9%
Total	162148	184696	13.9%	181199	11.7%	182072	12.3%
PM(1700-1800)							
User Class	Base year	Existing RC (2027)	(% Diff to Base Year)	2027 RC	(% Diff)	2027 DS	(% Diff)
Car Business	15571	16800	7.9%	16549	6.3%	16650	6.9%
Car Commute	51721	56679	9.6%	55566	7.4%	56183	8.6%
Car Other	108892	123320	13.2%	122250	12.3%	122844	12.8%
LGV	16966	21371	26.0%	19228	13.3%	19401	14.4%
HGV	9042	9748	7.8%	9360	3.5%	9412	4.1%
Total	202193	227919	12.7%	222953	10.3%	224491	11.0%

Table 5-11 Total Trip Ends Comparisons year 2038 vs Base Year

AM(8000-0900)							
User Class	Base year	Existing RC (2037)	(% Diff)	2038 RC	(% Diff)	2038 DS	(% Diff)
Car Business	16771	19225	14.6%	18716	11.6%	19144	14.1%
Car Commute	66857	79818	19.4%	75805	13.4%	78779	17.8%
Car Other	89410	113436	26.9%	111939	25.2%	113146	26.5%
LGV	17627	26805	52.1%	22821	29.5%	23376	32.6%
HGV	13636	15643	14.7%	14992	9.9%	15151	11.1%
Total	204302	254927	24.8%	244274	19.6%	249596	22.2%
IP (av. 1000:1600)							
User Class	Base year	Existing RC (2037)	(% Diff)	2038 RC	(% Diff)	2038 DS	(% Diff)
Car Business	11907	13515	13.5%	13197	10.8%	13335	12.0%
Car Commute	23408	26239	12.1%	26037	11.2%	26356	12.6%
Car Other	99922	128354	28.5%	127168	27.3%	128630	28.7%
LGV	13925	21175	52.1%	18136	30.2%	18640	33.9%
HGV	12985	14886	14.6%	14271	9.9%	14405	10.9%
Total	162148	204169	25.9%	198809	22.6%	201366	24.2%
PM(1700-1800)							
User Class	Base year	Existing RC (2037)	(% Diff)	2038 RC	(% Diff)	2038 DS	(% Diff)
Car Business	15571	17660	13.4%	17257	10.8%	17587	12.9%
Car Commute	51721	60302	16.6%	58058	12.3%	60225	16.4%
Car Other	108892	135412	24.4%	133890	23.0%	135852	24.8%
LGV	16966	25797	52.1%	21842	28.7%	22327	31.6%
HGV	9042	10367	14.7%	9956	10.1%	10065	11.3%
Total	202193	249538	23.4%	241003	19.2%	246056	21.7%

6 Forecast Supply

6.1 Introduction

This section summarises the assumptions applied in the development of the forecast networks.

6.2 Reference Case Network

The schemes included in the forecast models in the year 2038 can be seen in Figure 6-1, which illustrates the network structure changes (coloured blue indicates new links being added and red for existing links being removed or modified).

In addition, a total of 11 new zones, as shown in Figure 6-2, have been included in the forecast models for several LP large development zones so that the traffic movements can be robustly presented. Those include the Land at North West Sittingbourne, South East Faversham, Land west of Barton Hill Drive, Land at Lady Dane Farm, and Land West of Frogna Lane etc. The total number of zones in the SHM forecast models is 332.

Figure 6-1 Network changes between the base year and RC 2038 scenario



Figure 6-2 New development zones



6.3 Generalised cost

Cost changes have been calculated for each forecast year. The highway trip costs comprise time, distance and charge impacts. The Value of Time (VoT) and Vehicle Operating Cost (VOC) vary by journey purpose and vary by forecast year to represent changes in fuel costs and income. Changes in fuel costs, vehicle efficiency and values of time have been taken from the TAG data book July 2017. These have been used to calculate the forecast year values of time (expressed as pence per minute in SATURN) and operating costs (expressed as pence per kilometre in SATURN). Table 6-1 and details the highway generalised cost coefficients used for 2027 and 2038 in pence per minute (PPM) and pence per kilometre (PPK).

Table 6-1 Value of time, pence per minute (PPM, 2010 prices, 2027/2038 values)

User Class	PPM					
	2027			2038		
	AM	IP	PM	AM	IP	PM
Car - Employer's Business	35.32	36.19	35.83	43.16	44.22	43.78
Car - Commuting	23.69	24.07	23.77	28.94	29.41	29.04
Car - Other	16.34	17.41	17.11	19.97	21.27	20.91
LGV	24.96	24.96	24.96	30.50	30.50	30.50
HGV	58.29	58.29	58.29	71.22	71.22	71.22

Table 6-2 Value of vehicle operating cost, pence per kilometre (PPK, 2010 prices, 2027/2038 values)

User Class	PPK (same for all time periods)	
	2027	2038
Car - Employer's Business	12.00	11.88
Car - Commuting	5.43	5.28
Car - Other	5.43	5.28
LGV	13.77	13.81
HGV	45.34	47.78

6.4 Forecast network calibration

During the development of future forecast networks, a review process was undertaken including:

- Review the completeness of the network around the forecast year schemes to ensure that the modelled and designed representations were appropriate.
- Reviewed the directionality and connectivity of the proposed network changes around scheme locations.
- Sense check on the flow and delay changes between the base, RC and DS scenarios, carrying out Select Link Analysis in Saturn to ensure traffic rerouting is sensible.

From these checks, minor amendments to the scheme coding were identified. In accordance with these checks any identified issues were then incorporated in the network development process.

7 Model Results

Forecast Network Overall Performance **Error! Not a valid bookmark self-reference.**, Table 7-2 and Table 7-3 compare the assignment network performance statistics between the base year, RC and DS scenario in the year 2027 and 2038 for AM peak, Inter peak and PM peak hour respectively, including:

- Total travel time, PCU-hours: The sum of all time taken for all vehicles to travel across the simulation network for all link and junctions
- Total travel distance, PCU-kms: The sum of all distance travelled in the simulation network
- Simulation network speed, kph: Defined by total simulation distance / total simulation time

More detailed network performance measure results can be found in **Appendix B**.

Table 7-1 Network performance for the base year, RC and DS in the AM peak hour

Metrics	2017	2027				2038			
	Base	RC	% diff	DS	% diff	RC	% diff	DS	% diff
Simulation network Speed, kph	66.6	63.6	-4.5%	62.3	-6.5%	61.7	-7.4%	54.6	-18.0%
Total travel time, PCU hrs	51350	58608.5	14.1%	59328	15.5%	63672	24.0%	67159.2	30.8%
Total travel distance, PCU kms	3303786.5	3633791.5	10.0%	3664347.8	10.9%	3937167.5	19.2%	4040004.5	22.3%

Table 7-2 Network performance for the base year, RC and DS in the Inter peak hour

Metrics	2017	2027				2038			
	Base	RC	% diff	DS	% diff	RC	% diff	DS	% diff
Simulation network Speed, kph	72.3	72	-0.4%	71.4	-1.2%	71.1	-1.7%	68.8	-4.8%
Total travel time, PCU hrs	38139.6	42886	12.4%	43186.8	13.2%	46971.4	23.2%	48022.9	25.9%
Total travel distance, PCU kms	2511537.3	2780634.8	10.7%	2798003.3	11.4%	3045779.8	21.3%	3101266	23.5%

Table 7-3 Network performance for the base year, RC and DS in the PM peak hour

Metrics	2017	2027				2038			
	Base	RC	% diff	DS	% diff	RC	% diff	DS	% diff
Simulation network Speed, kph	66.8	64.4	-3.6%	62.9	-5.8%	61.5	-7.9%	54	-19.2%
Total travel time, PCU hrs	51568.7	58657.2	13.7%	59426.9	15.2%	63853.3	23.8%	67630.7	31.1%
Total travel distance, PCU kms	3286032.5	3610026	9.9%	3642969.8	10.9%	3906627.5	18.9%	4024208	22.5%

An analysis of the information has the following findings:

- The overall average speeds are highest in the base year and decreases in the future years. The lowest average speeds are observed in the 2038 AM and PM peak period in the DS scenarios.
- In all time periods, the total travel time and travel distance increases from base year to future years and is highest in 2038. This reflects the levels of total distance travelled increase across modelled scenarios and forecast years.
- Overall, the patterns of the network statistics changes are consistent across modelling time periods, forecast years, and between RC and DS scenarios.

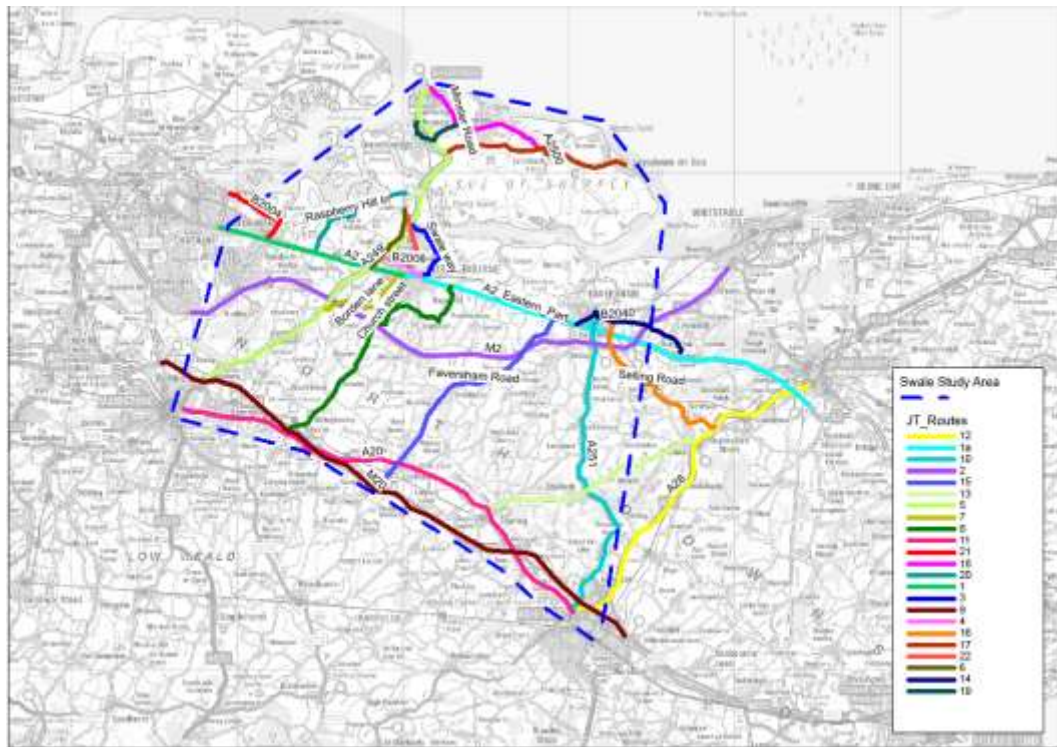
7.1 Journey Times

Journey time analysis along 22 selected routes as shown in Figure 7-1 was carried out for the RC and DS scenarios in the year 2027 and 2038 to compare against the base year. Meanwhile, the journey time for four additional routes (8 by direction, as shown in **Appendix C**) has also been extracted, as:

- Sheppey to M2 J7 via M2 near Canterbury (R51 & R52)
- Sheppey to M2 J7 via A2 through Sittingbourne (R53 & R53)
- Sheppey to M20/A249 near Maidstone (R55 & R56)
- Faversham to A2/A2050 near Canterbury (R57 & R58)

The results are given in **Appendix C**.

Figure 7-1 Swale highway model TrafficMaster-based journey time routes



An analysis of the journey time results shows the following trends:

- Overall, comparing to the base year, journey time increases on most routes in the year 2027 and 2037 RC scenario and increases further in the corresponding DS scenarios which reflects the level of additional demand related to the LP developments.
- For AM scenarios, there are large increases along:
 - R31 Selling Road NB (+8% in 2038 RC and +91% in 2038 DS).
 - R31 Selling Road SB (+11% in 2038 RC and +36% in 2038 DS).
 - R34 A2500 WB (+28% in 2038 RC and +48% in 2038 DS).
 - R1a A2_EB (Eastern Part) (+10% in 2038 RC and +33% in 2038 DS).
 - R1a A2_WB (Eastern Part) (+11% in 2038 RC and +27% in 2038 DS).
 - R53 Sheppey to M2 J7 via A2 EB(+3% in 2038RC and +28% in 2038DS).

- R53 Sheppey to M2 J7 via A2 WB (+8% in 2038RC and +29% in 2038DS).
- R57 Faversham to A2/A2050 EB (+17% in 2038RC and +71% in 2038DS).
- R58 Faversham to A2/A2050 EB (+44% in 2038RC and +83% in 2038DS).
- The journey time along Sheppey to M2 J7 via M2 EB (R51 & R52) and Sheppey to M20/A249 SB (R55 & R56) showed some reduction or marginal increase in the year 2027 and 2038 RC and DS scenarios, due to the M2 J5 improvement scheme.
- A similar pattern is found in the IP, to a much smaller extent.
- For PM, there are large increases along:
 - R28 B2040 WB (+29% in 2038 RC and +98% in 2038 DS).
 - R31 Selling Road NB (+9% in 2038 RC and +81% in 2038 DS).
 - R31 Selling Road SB (+9% in 2038 RC and +44% in 2038 DS).
 - R1a A2_EB (Eastern Part) (+10% in 2038 RC and +33% in 2038 DS).
 - R54 Sheppey to M2 J7 via A2 WB (+10% in 2038 RC and +33% in 2038 DS).
 - R53 Sheppey to M2 J7 via A2 EB (+10% in 2038RC and +57% in 2038DS).
 - R57 Faversham to A2/A2050 EB (+27% in 2038RC and +49% in 2038DS).
 - R58 Faversham to A2/A2050 EB (+38% in 2038RC and +112% in 2038DS).

In summary, the journey time results reveal the following travel condition changes between Swale and its neighbouring authorities:

- By the year 2038, the travel time between Sheppey and Canterbury increases marginally, just over 11% in the PM peak in the RC scenario, whereas in the DS scenario the travel condition would become very congested, with the journey time increase by more than 13 minutes (+49%) for the WB traffic travelling along the M2 and 19 minutes (+57%) along the A2 in the PM peak, when comparing to the base year.
- Similar travel pattern is also found for travelling between Sheppey and Maidstone along A249 corridor but to a lesser extent, with journey time increased by around 8 minutes from the base year for the NB traffic in the DS scenario in the PM peak in 2038.
- The travel condition between the Sittingbourne and Gillingham in Medway along the A2 corridor has less affected by the future demand growth, with journey time increase by less than 10% in both AM and PM peak in 2038 above the base year.
- Heavy delay is found for the traffic travelling between Sittingbourne and Canterbury along the A2 corridor through the M2J7, with the most significant travel time increased by more than 12 minutes (+40%) for the EB traffic in the PM peak in 2038, when comparing to the base year.
- For the through traffic along the M2 and A299 Thanet Way, the most significant increase is found for the WB traffic in the PM peak in 2038, with the journey time increase by more than 13 minutes (+33%) over the base year.

7.2 Traffic Flows

Figure 7-2, Figure 7-3, and Figure 7-4 show the comparisons of the modelled total actual flow in the core area around Sittingbourne, Faversham and Isle of Sheppey between the 2037 RC and the base year in the AM peak, Inter Peak and PM peak, respectively, with green bars showing an increase in modelled flow and blue bars for a decrease.

Overall, it is found that traffic flow increases on most key roads in the region, including M2, M20, A249 and A2. It is also revealed that there is a level of traffic decrease on the

A249 SB from M2 J5 to M20 J7 in the AM peak and PM peak in the 2037 RC scenario. An investigation showed this is due to the traffic rerouting following the M2 and A229 corridor to avoid the excessive delay at A249 SB approach arm at M20 J7 gyratory, as well as the reduced congestion at M2 J5 with the improvement scheme in place.

The comparisons of the modelled total actual flow in the core area between the 2037 RC and the DS scenarios in the AM peak, Inter Peak and PM peak are shown in Figure 7-5, Figure 7-6, and Figure 7-7, respectively. Overall, traffic increases on most local roads in the DS scenarios, comparing to the RC scenarios.

The total flow comparisons between the base year and the forecast year 2027 are given in **Appendix D**. The results are consistent with those between the base year and the year 2038 but to a lesser extent.

Figure 7-2 Actual flow(PCUs) comparison between 2038 RC and base year-AM Peak

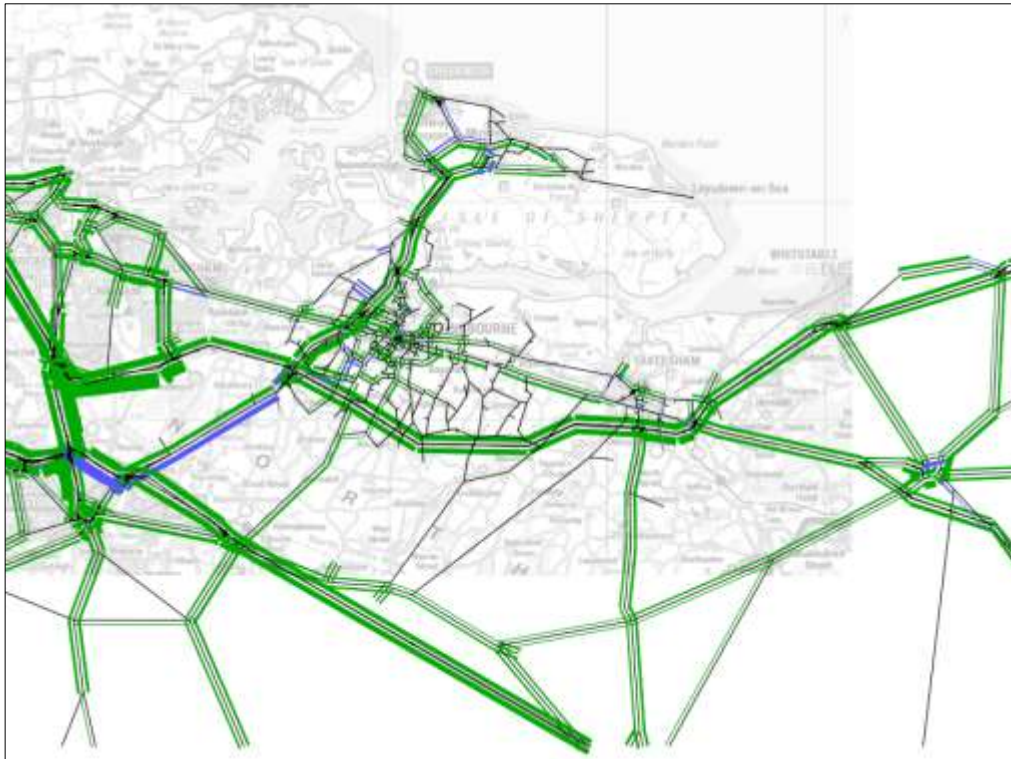


Figure 7-3 Actual flow(PCUs) comparison between 2038 RC and base year-Inter Peak

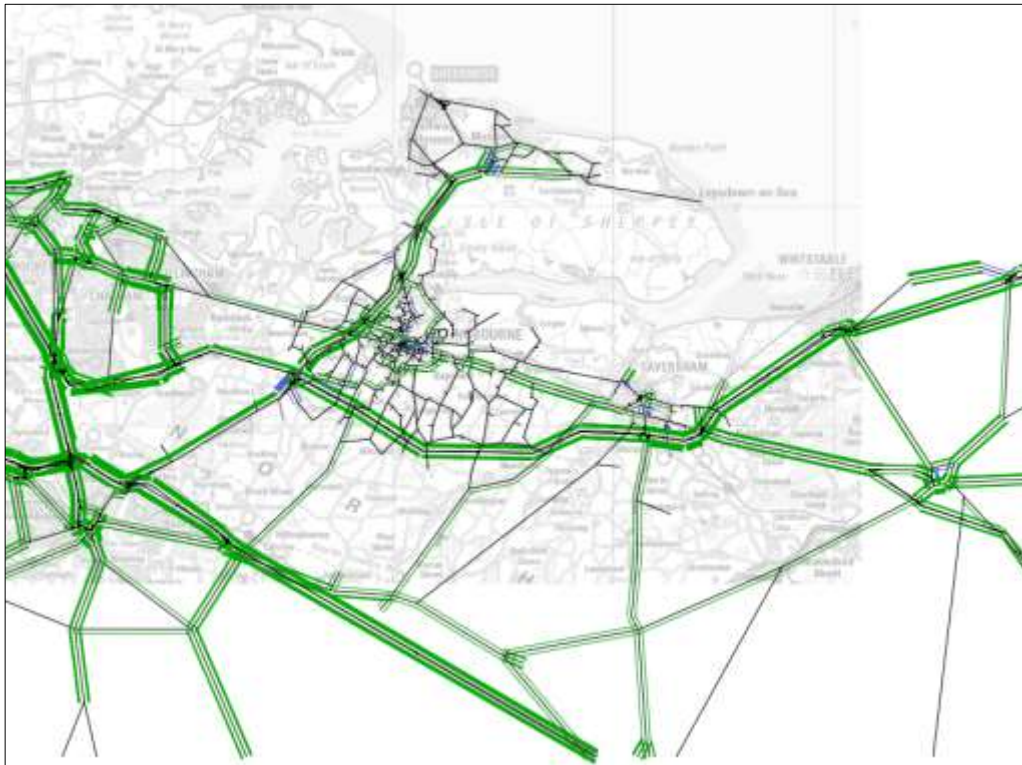


Figure 7-4 Actual flow(PCUs) comparison between 2038 RC and base year-PM Peak

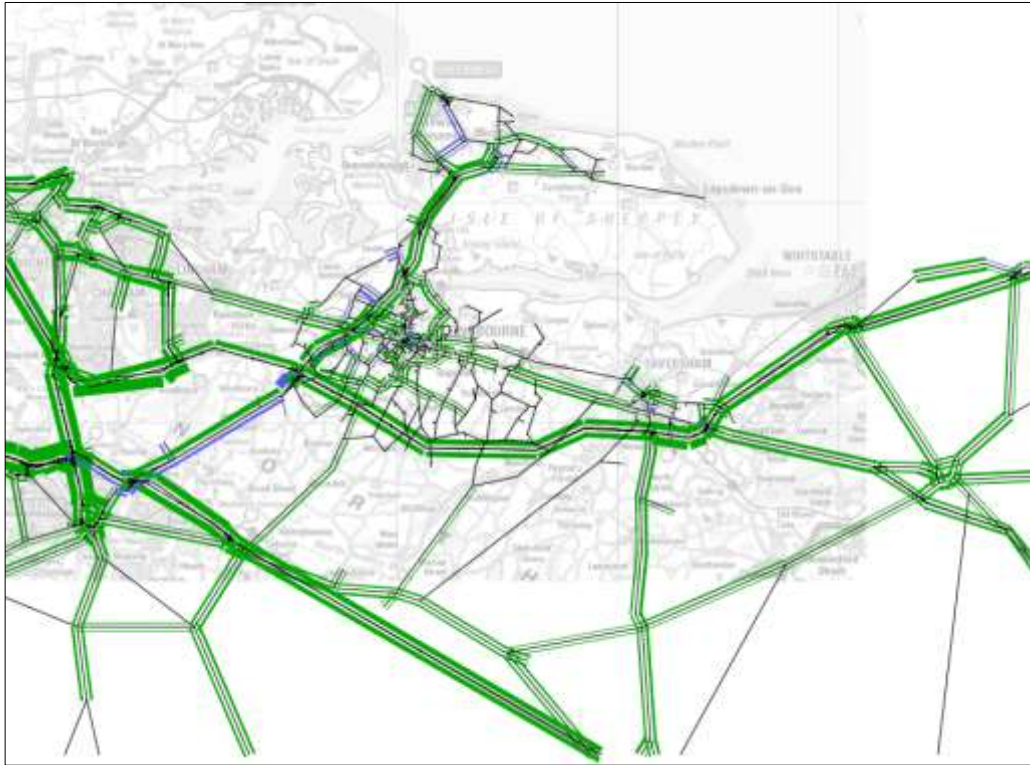


Figure 7-5 Actual flow(PCUs) comparison between 2038 RC and DS Scenario- AM Peak

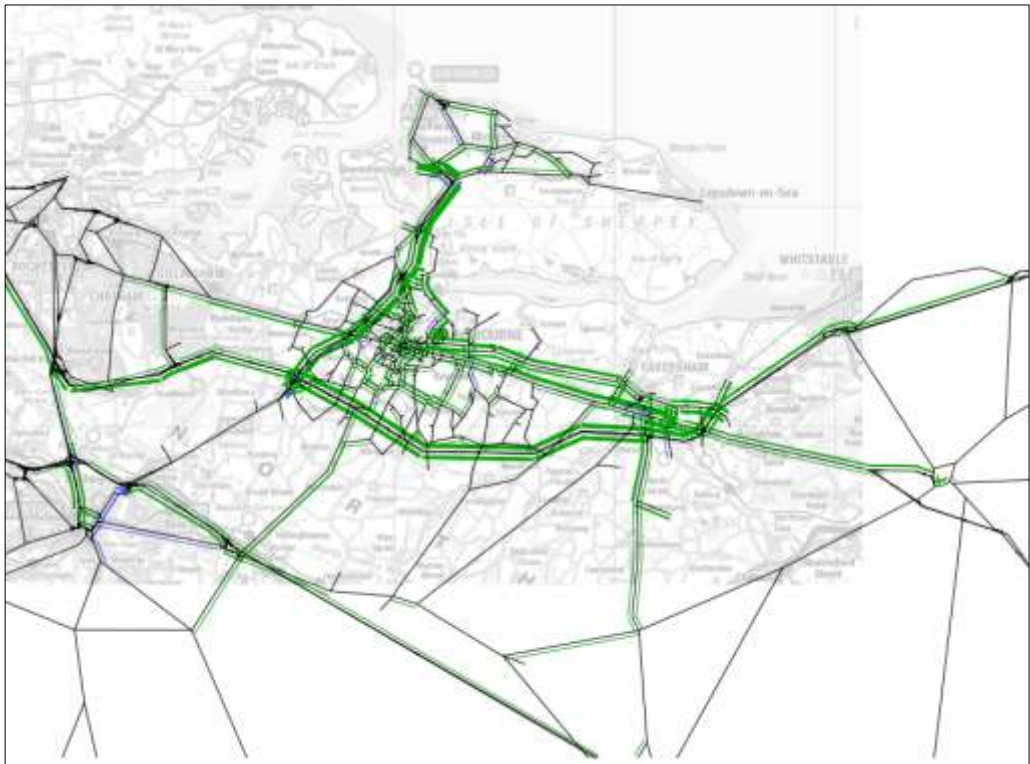


Figure 7-6 Actual flow(PCUs) comparison between 2038 RC and DS Scenario-Inter Peak

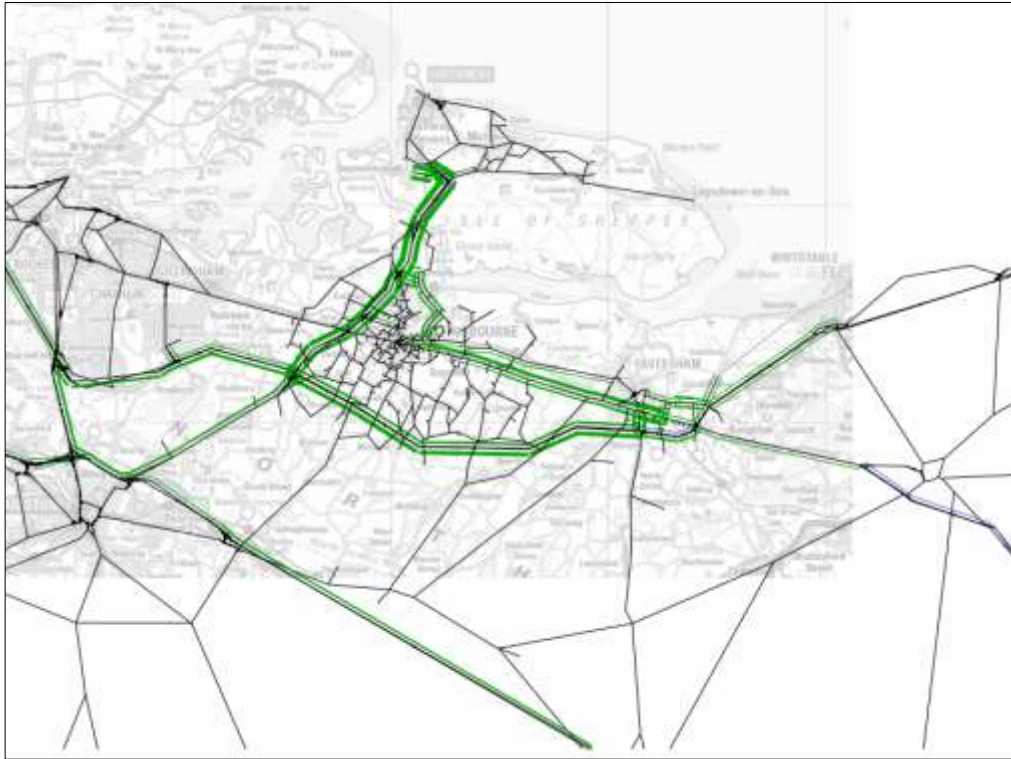


Figure 7-7 Actual flow(PCUs) comparison between 2038 RC and DS Scenario- PM Peak

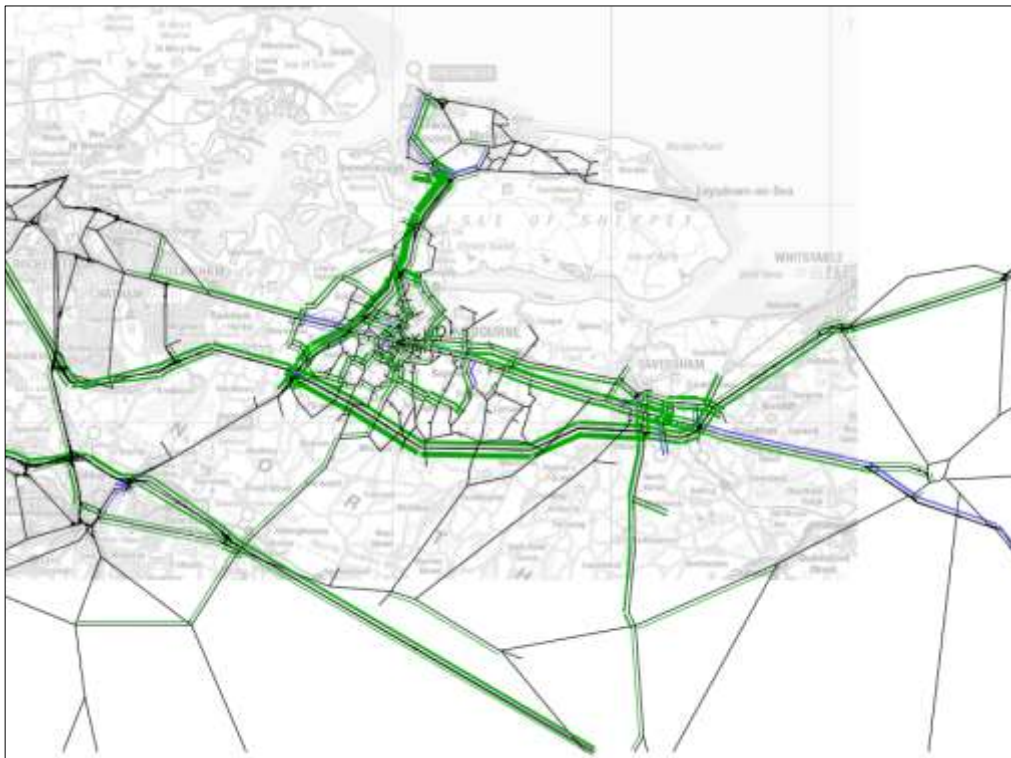


Figure 7-8 to Figure 7-16 show the total flows (in PCUs) on key roads in Sittingbourne, Faversham and Sheppey areas in the base year 2017, 2038 RC, and 2038 DS scenarios. On most roads, the flows are highest in the year 2038 DS scenarios.

The flow results of the stick diagram in the forecast year 2027 are presented in **Appendix E**.

Figure 7-8 Flows on key roads in Sittingbourne AM

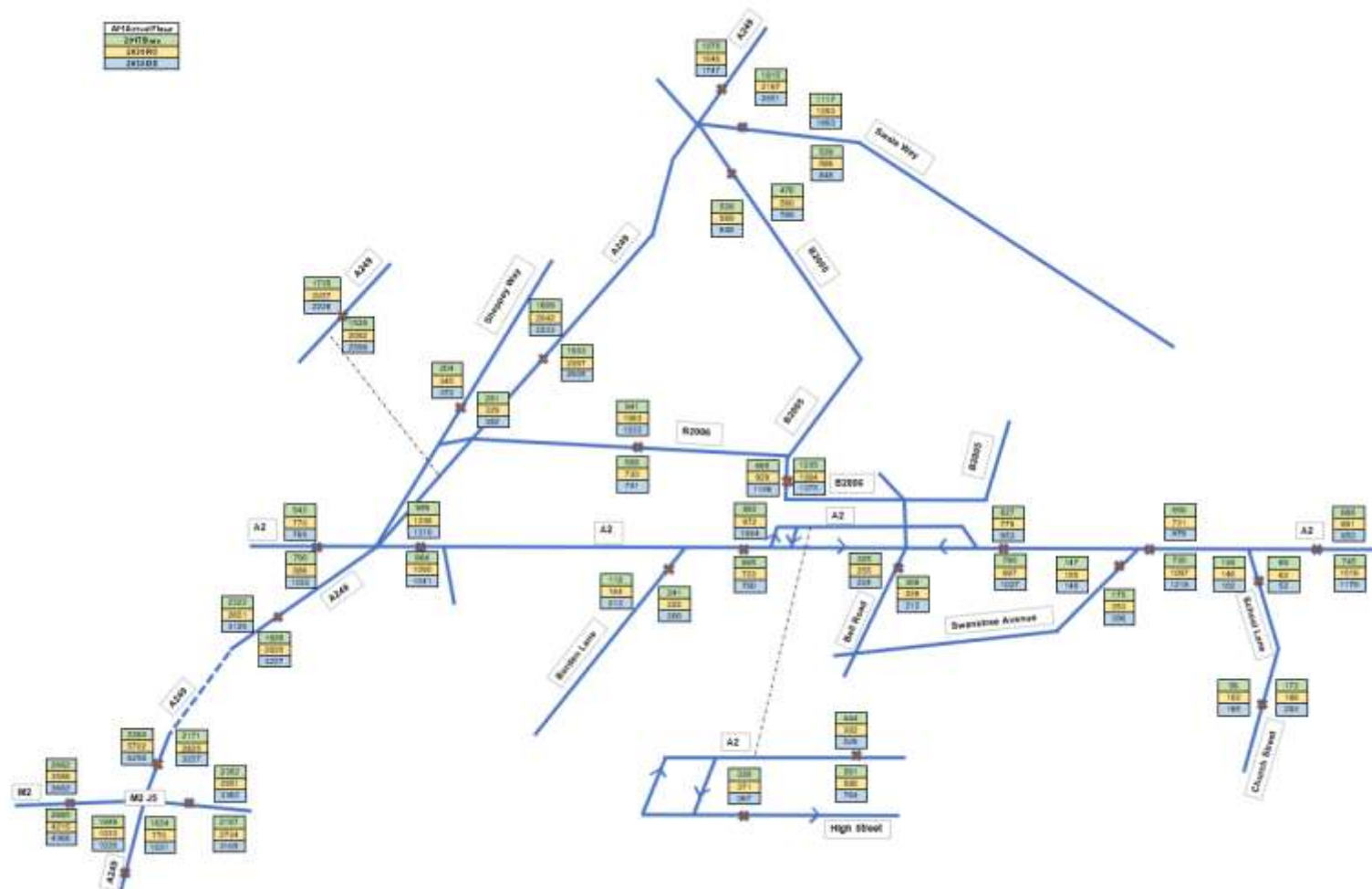


Figure 7-9 Flows on key roads in Faversham AM

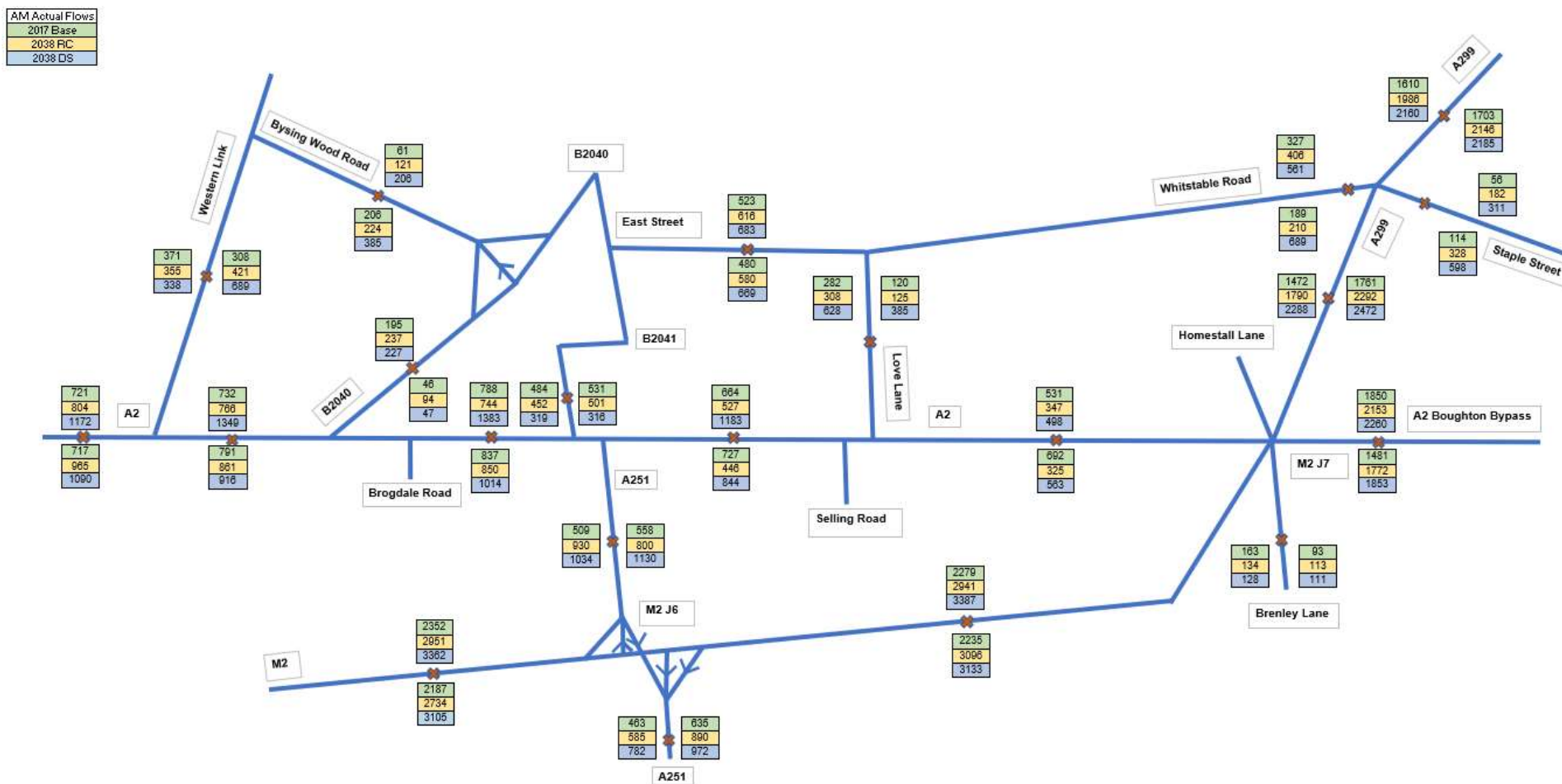


Figure 7-10 Flows on key roads in Isle of Sheppey AM

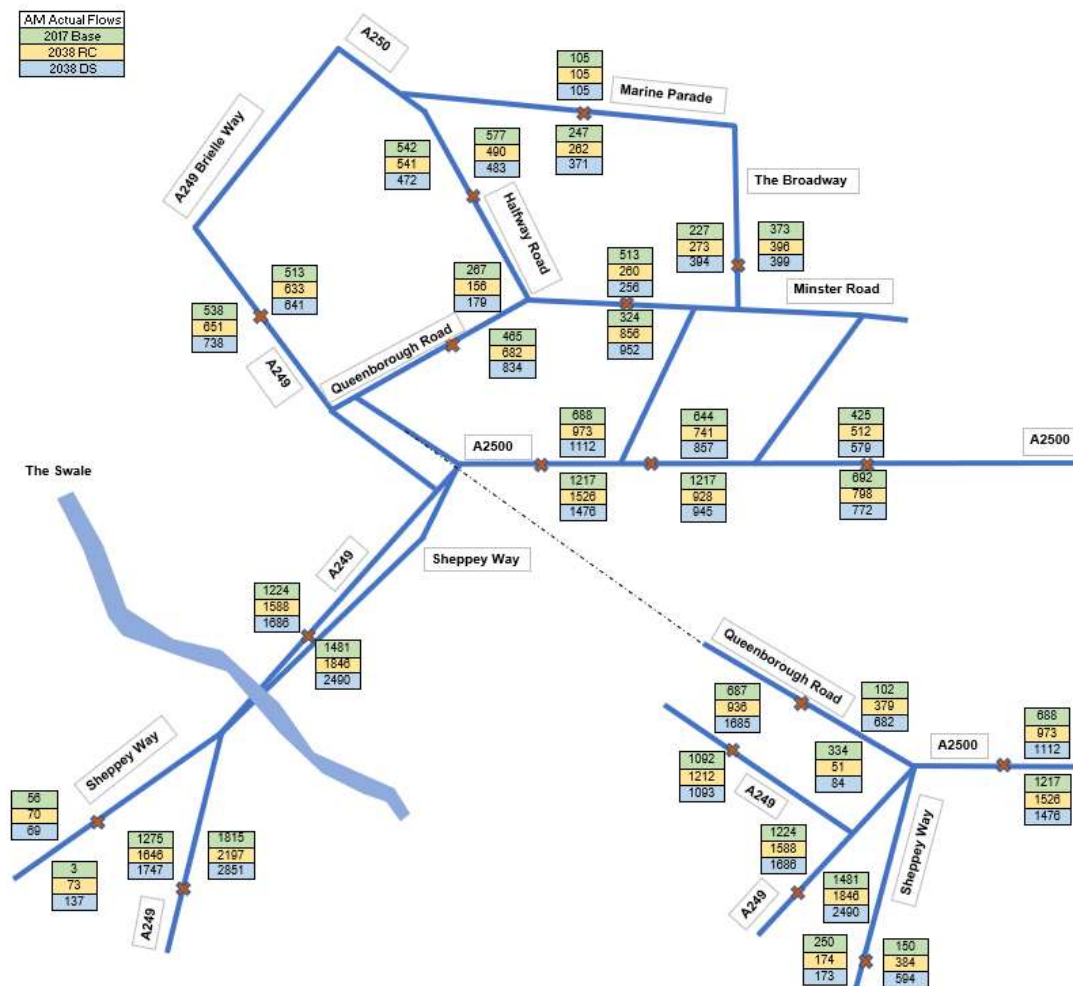


Figure 7-11 Flows on key roads in Sittingbourne Inter Peak

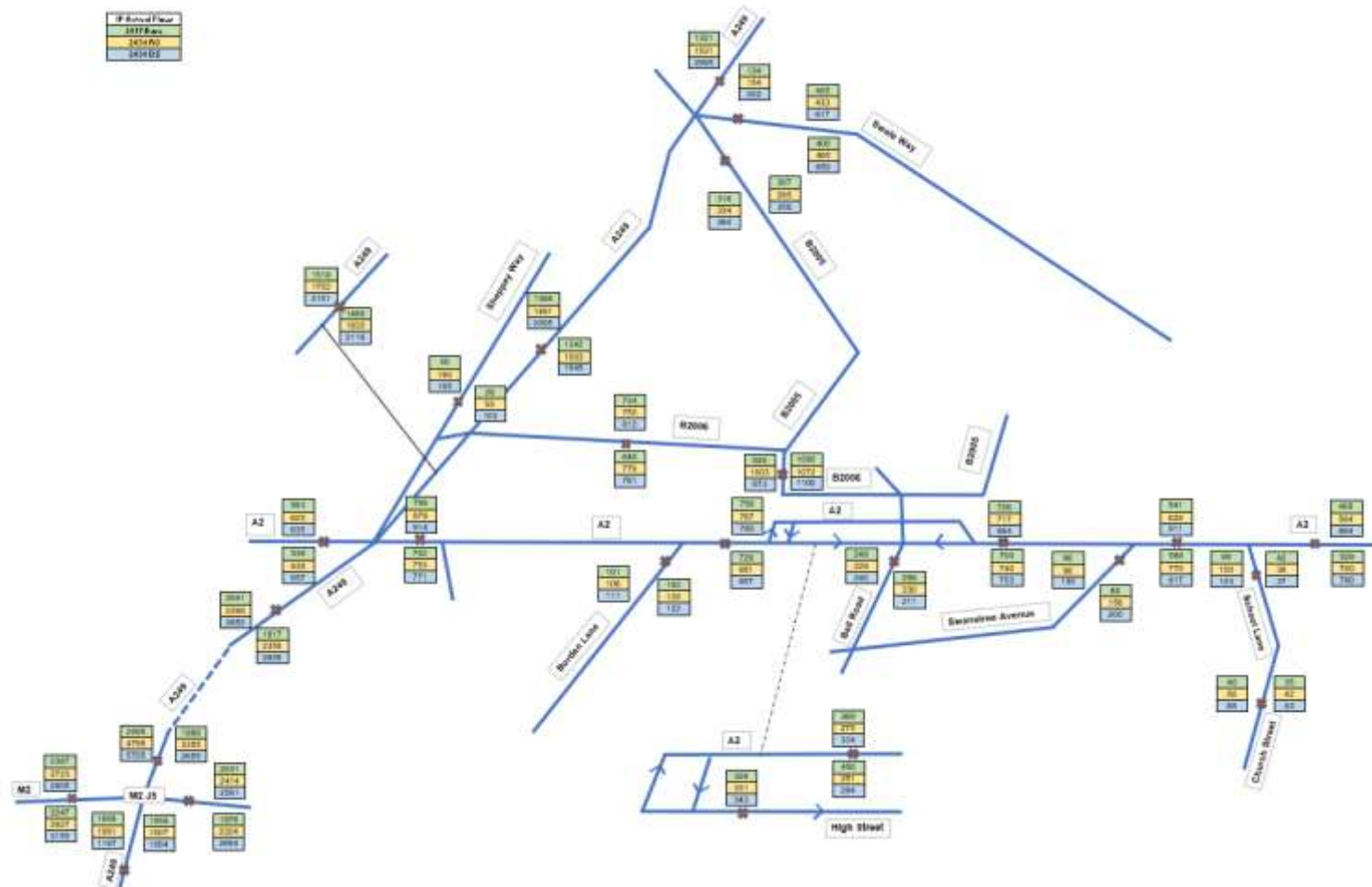


Figure 7-12 Flows on key roads in Faversham Inter Peak

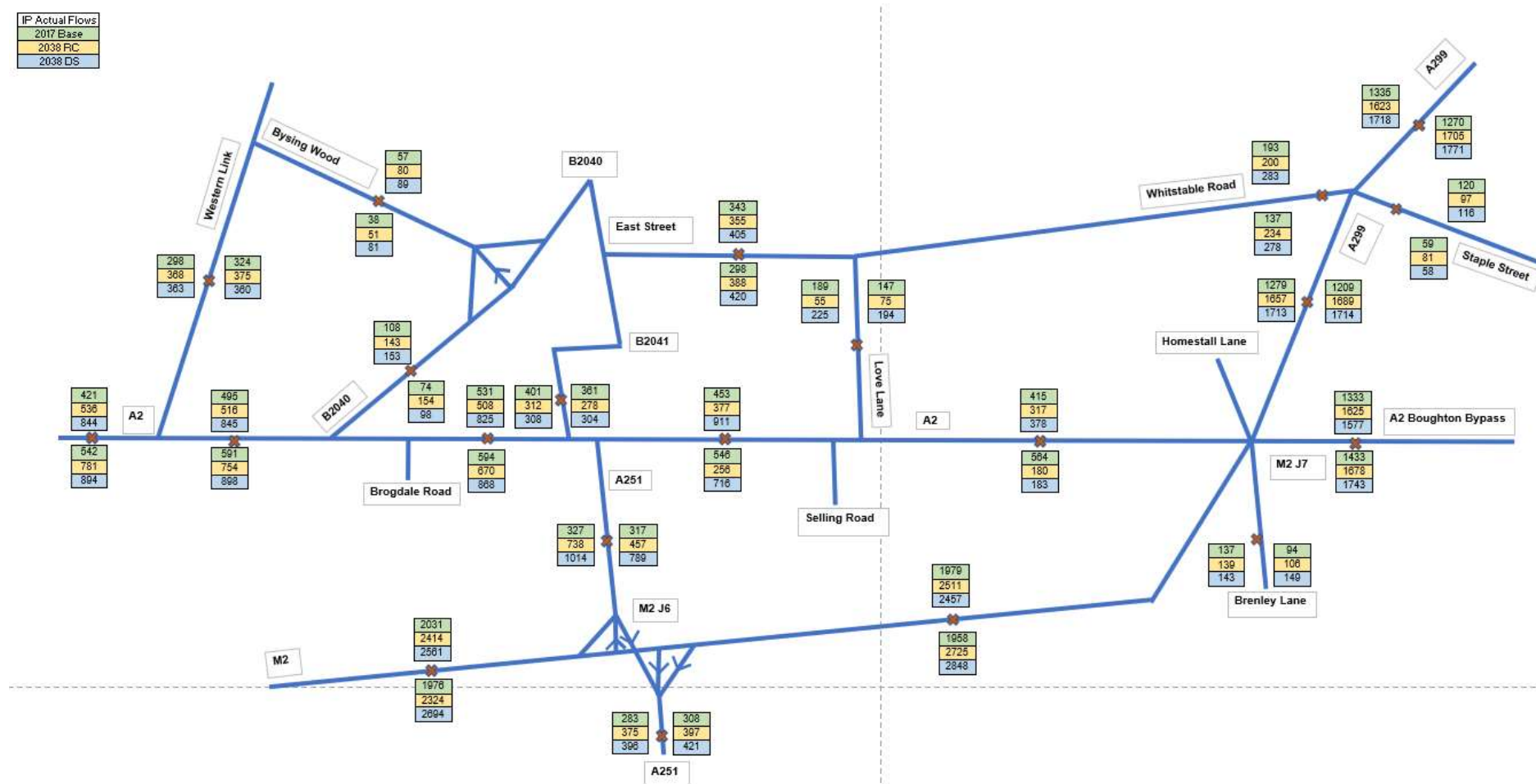


Figure 7-13 Flows on key roads in Isle of Sheppey Inter Peak

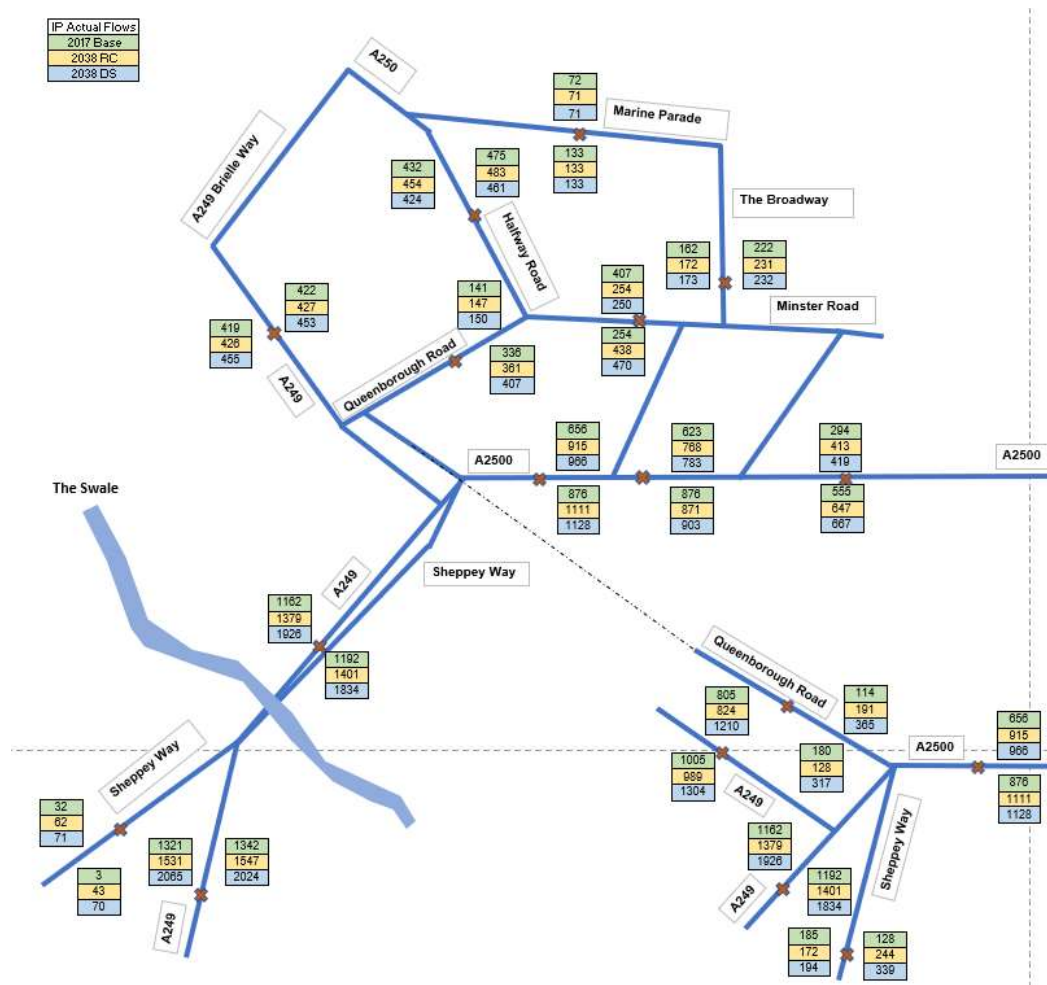


Figure 7-14 Flows on key roads in Sittingbourne PM

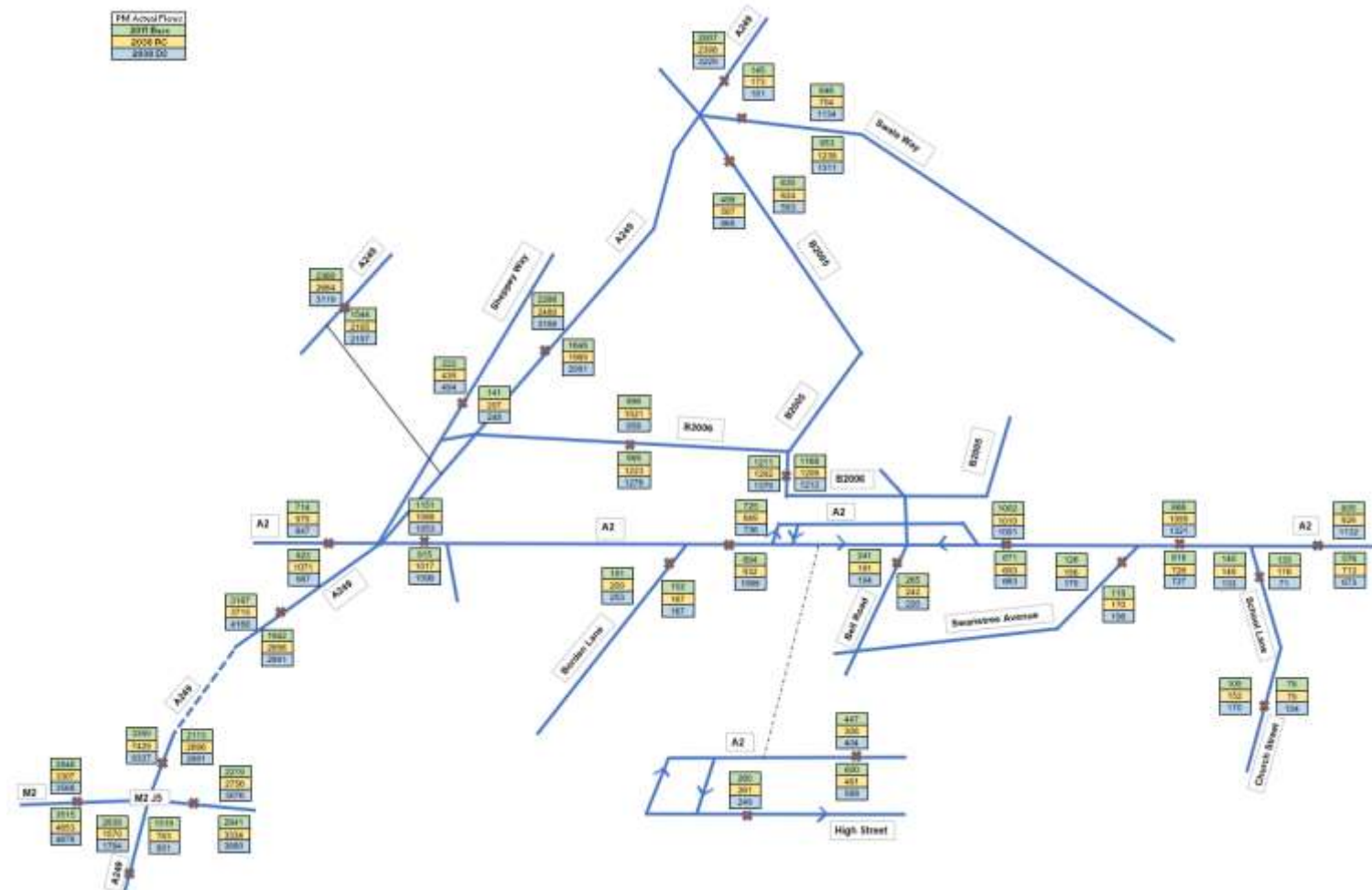


Figure 7-15 Flows on key roads in Faversham PM

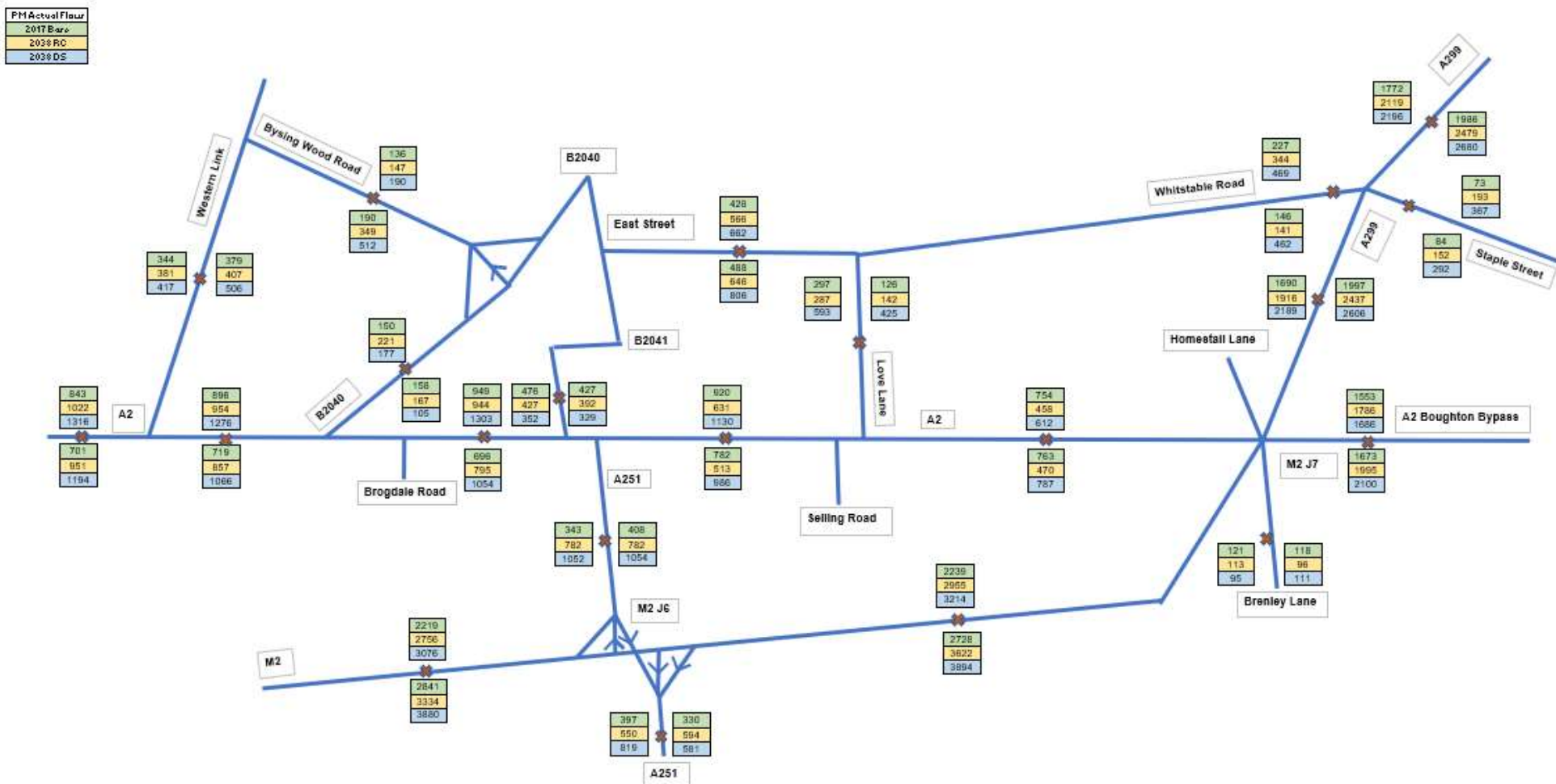
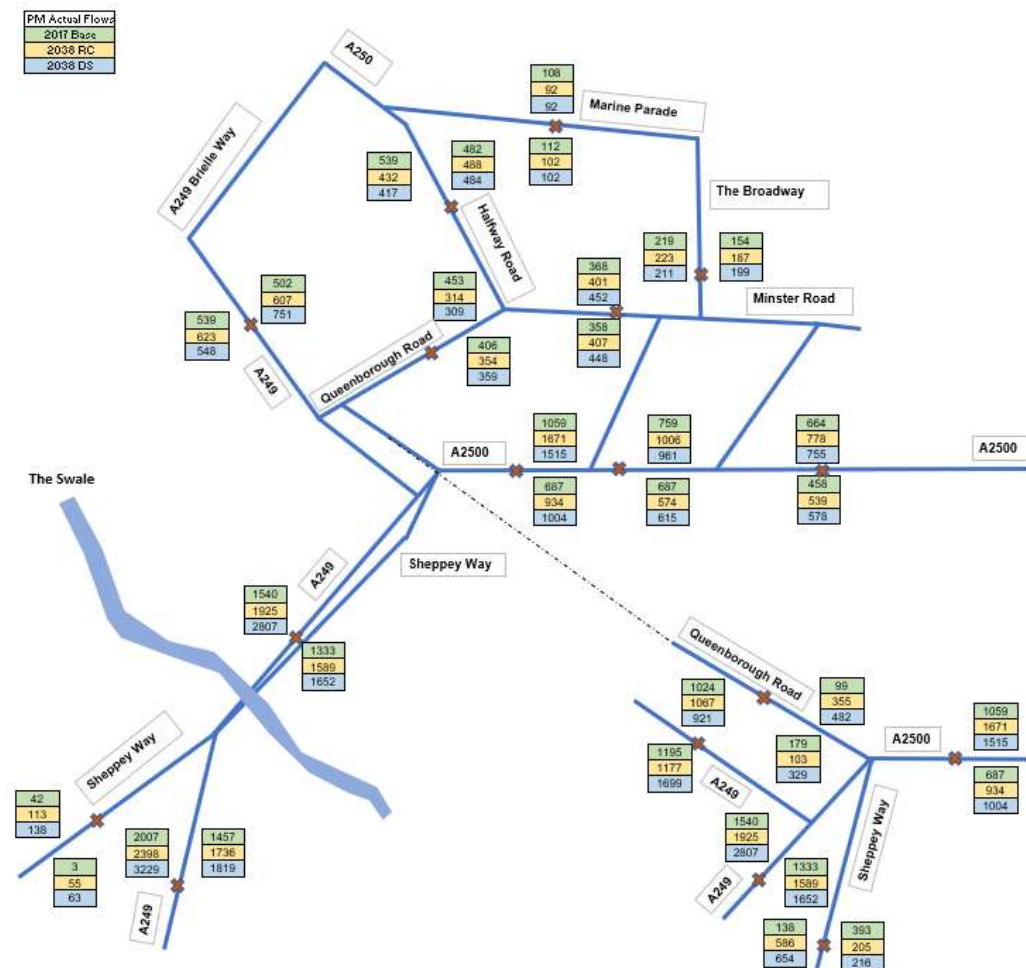


Figure 7-16 Flows on key roads in Isle of Sheppey PM



7.3 Network Delays and Congestions

Volume over Capacity ratio (V/C, also known as Degree of Saturation) can provide a useful indication of network delays and congestions at key junctions and links. Figure 7-17 below shows the locations of the 85 junctions with the V/C analysis.

Figure 7-17 Junctions within the model for V/C analysis

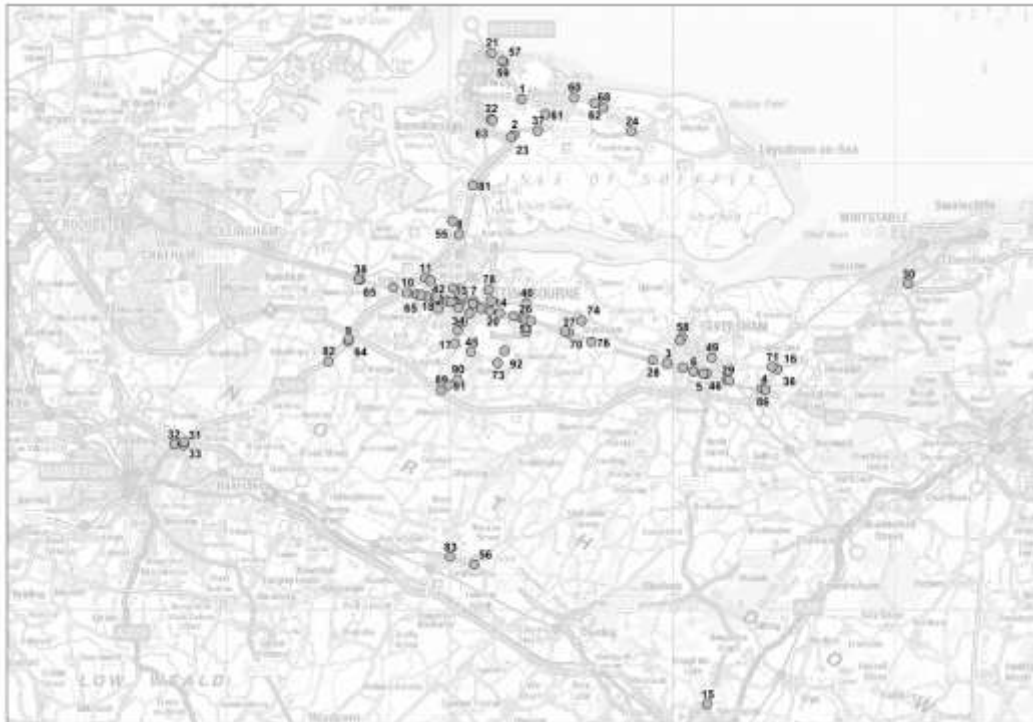


Table 7-4 and Table 7-5 show a summary of the congestion (weighted V/C% and highest V/C% respectively) comparisons in the AM and PM peak across the scenarios in a tabular form with different colours representing degree of congestions as defined below:

- Overloaded (>100%)
- Above practical capacity (95-100%)
- At practical capacity (90-95%)
- Exceeding capacity threshold (85-90%)
- Approaching capacity threshold (80-85%)
- Below 80% capacity.

A review of the results found that a few junctions (most of them along the A2 corridor between A249 and M2 J7) in the DS scenarios in the AM and PM peak in 2038 show heavy delays mainly due to the significant demand growth from the LTP developments in the area.

The heat diagrams in **Appendix F** show the degree of saturations for the 85 key junctions in Swale in the base year 2017, the forecast 2027 and 2038 in the AM and PM peak hours.

Table 7-4 Summary of the congestions (weighted V/C%)



Junction ID	Description	Weighted Junction V/C									
		Base Year		2027RC		2027DS		2038RC		2038DS	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	Minster Road/ A250 Halfway Road	80.9	77.2	82.9	84.3	84.0	85.0	89.5	87.1	102.5	86.5
2	A250 Lower Road/Sheppey Way	68.2	48.6	74.6	73.6	77.2	78.1	80.5	86.3	88.4	101.4
3	A2 London Road/Western Link	51.0	54.5	57.5	65.3	64.6	73.9	58.4	66.2	84.5	91.4
4*	M2 J7	68.4	74.2	63.4	66.0	66.5	65.3	67.4	65.6	78.4	73.3
5	A2/A251 Ashford Road	45.0	40.6	66.0	64.3	79.3	77.1	68.5	65.7	92.7	91.7
6	A2/Brogdale Road	45.3	46.3	44.3	48.9	51.5	55.9	45.2	49.6	71.6	70.7
7	B2006 Eurolink Way/Crown Quay Lane	58.2	61.6	61.2	67.1	67.0	70.3	63.0	67.6	74.2	75.2
8*	Grovehurst/ Swale Way/B2005	62.6	66.6	28.9	33.2	31.8	37.3	34.6	37.7	43.6	47.4
9*	M2 J5	81.6	91.8	32.7	41.8	37.9	48.0	37.2	49.9	54.6	74.7
10*	A2 Key Street/A249	59.0	72.3	64.5	70.7	67.8	72.5	73.3	78.7	83.6	80.1
11*	A249/B2006	49.6	58.6	59.4	72.2	68.1	77.2	50.9	60.1	62.2	67.1
12	A2 Canterbury Road/Murston Road/Rectory Road	68.4	72.8	74.8	69.5	78.4	73.0	71.1	79.0	78.4	85.2
13	A2 Dover Street/Milton Road	45.5	51.8	71.3	76.1	74.0	77.9	72.7	76.4	83.4	83.9
14	A2 Canterbury Road/Swanstree Avenue	67.5	63.3	64.5	60.8	68.4	64.7	69.0	62.5	76.4	71.5
15	A2042 Faversham Road/Trinity Road	79.2	68.5	92.1	77.6	93.1	78.3	102.1	86.3	103.3	88.7
16	A299 Thanet Way/Staple St	47.6	55.6	49.8	61.7	51.0	63.7	56.6	67.1	59.0	72.0
17	Tunstall Rd/Woodstock Rd	50.0	32.4	64.3	54.6	65.3	57.6	66.1	57.2	72.6	70.2
18	A2 London Road/Wises Lane	54.2	54.5	61.5	54.6	62.9	55.1	65.3	56.0	67.2	57.7
19	B2006/ B2005	68.0	81.1	74.1	83.4	75.3	84.7	75.7	86.1	80.6	88.7
20	A2 St Michael's Road/East Street	52.1	56.3	54.3	58.5	57.6	62.4	56.0	56.0	65.7	59.8
21	A250 Millenium Way/High Street	70.9	69.9	73.3	79.2	73.6	80.7	74.0	84.5	74.7	87.5
22	A249 Brielle Way /B2007	33.6	47.4	39.3	46.1	40.2	46.5	41.4	48.2	42.5	51.3
23	A249/A2500	69.0	62.9	63.5	78.5	69.9	80.3	66.8	84.0	90.8	98.9
24	Lower Road/East Church Road	39.2	49.2	44.7	51.3	45.8	51.8	50.2	50.5	55.9	49.6
25	B2006 Staplehurst Road/Chalkwell Road	49.9	62.0	59.1	68.7	60.1	70.0	60.0	73.0	58.5	73.4
26	A2 London Road/Hempstead Lane	56.5	55.6	77.3	67.8	76.7	75.9	77.3	74.4	80.2	79.2
27	A2 London Road/Station Road (Teynham)	34.7	33.4	41.3	41.1	48.3	54.5	41.6	42.9	71.6	77.9
28	A2 London Road/Faversham Road	37.4	40.3	47.0	51.4	51.8	58.0	47.5	52.6	61.3	68.1
29	A2 Canterbury Road/Selling Road	33.6	44.2	21.4	29.6	37.6	42.5	23.8	30.5	63.3	64.9
30	A299 Thanet Way/Clapham Hill	4.0	4.1	4.5	4.8	4.9	4.9	4.7	5.2	5.7	5.9
31*	M20 J7	95.0	99.7	92.4	95.7	92.7	96.1	93.4	99.3	97.3	101.8
32	M20J7 Onslip WB	82.0	63.2	60.5	57.6	60.6	57.8	64.6	58.2	64.9	58.0
33	M20J7 Offslip EB	58.3	82.9	65.4	89.7	65.3	90.1	70.8	90.8	71.0	91.2
34	Gore Court Road/Bell Road/Park Avenue	45.7	35.2	53.2	42.6	54.8	44.1	55.0	45.4	62.7	57.2
35	Bell Road/Capel Road/Brenchley Road	46.2	37.8	52.4	41.2	53.8	42.7	53.1	42.6	57.7	47.8
36	A299 Thanet Way/Whitstable Road	49.3	51.8	42.3	50.6	45.6	51.9	47.2	50.3	62.3	58.5
37	A2500 Lower Road/Barton Hill Drive	82.3	79.9	68.0	76.3	68.9	76.7	69.0	81.7	69.9	74.6
38	A2 High Street/Church Lane (Newington)	35.6	38.0	41.5	67.8	44.3	69.4	46.1	67.7	54.7	65.8
39	B2006 Mill Way/ExitCarpark	69.9	83.2	74.4	85.4	76.5	85.7	76.8	85.9	85.7	88.0
40	Church Road/Lomas Road	26.1	52.9	30.3	60.9	38.0	67.1	32.5	59.9	60.0	68.5
41	Bell Road/Stanhope Avenue	78.9	69.6	77.1	69.2	79.1	72.4	78.0	70.4	80.6	75.8
42	A2 London Road/Adelaide Drive	47.9	43.6	52.3	41.8	55.2	42.7	55.4	43.4	66.9	47.0
43	B2006/Sonora Way	57.3	66.6	68.5	75.7	70.7	76.9	75.7	82.6	80.6	87.0
44	Borden Lane/Homewood Avenue	61.0	57.6	63.1	54.1	64.0	55.7	47.3	44.8	50.9	52.8
45	Cromer Road/Highsted Road	43.7	31.6	46.0	44.8	51.3	51.2	47.9	49.3	71.0	74.6
46	A2 Canterbury Road/B2041	58.0	55.5	49.9	51.8	59.4	58.9	51.2	53.8	76.4	72.9
47	A2 St Michael's Road/Crown Quay Lane	73.8	73.4	68.0	62.7	73.9	64.3	69.4	63.4	81.4	69.6
48	A2 London Road/Hawthorn Road	68.6	56.6	60.2	49.6	62.6	50.6	62.3	51.0	70.9	55.5
49	East Street/B2040 (Faversham)	59.4	59.6	70.2	81.9	80.5	87.2	77.2	85.8	88.4	97.7
50	A2/Westlands Avenue	45.3	49.5	50.0	49.5	50.2	49.6	51.1	50.4	50.4	51.7
51	A2/Chalkwell Road	45.9	39.5	55.1	40.4	57.1	42.4	56.9	42.7	62.9	52.6
52	A2/Burley Road	57.9	51.1	69.7	50.0	72.6	52.9	70.7	53.3	73.7	64.9
53	A2/School Lane	42.2	51.2	47.0	54.5	49.9	59.8	49.8	54.9	56.6	60.6
54	A2/B2040 South Road	47.2	52.6	51.8	57.9	58.1	63.6	52.3	58.6	75.0	73.0
55	Sheppey Way/Grovehurst Road	22.7	20.1	19.7	13.2	21.3	13.7	25.3	17.8	28.5	17.2
56	A20 Ashford Road/Hubbards Hill	33.0	30.9	35.8	34.4	36.2	35.3	38.6	37.4	40.2	39.4
57	Invicta Road/Cavour Rd Sheppey	13.2	25.3	12.9	27.7	12.8	27.6	12.8	27.6	13.4	25.8
58	Western Link Road/Bysing Wood Road	29.0	29.5	26.6	27.1	26.5	27.4	26.7	26.2	38.5	31.3
59	Cavour Road/Alma Road Sheppey	15.1	21.3	6.4	24.2	6.3	23.7	6.1	24.0	6.1	20.9
60	Minster Road/Back Lane Sheppey	25.9	16.0	38.6	21.0	41.3	21.3	47.2	23.6	53.5	23.4
61	Barton Hill Drive/Plover Road	33.7	25.3	43.7	39.2	44.0	39.1	37.1	39.1	35.5	37.5

Junction ID	Description	Weighted Junction V/C									
		Base Year		2027RC		2027DS		2038RC		2038DS	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
62	Chequers Road/Elm Lane	20.0	16.5	27.5	20.7	27.5	21.3	30.9	23.7	36.7	22.7
63	A250/Queenborough Road	26.5	23.5	32.1	36.0	28.5	37.4	36.2	32.6	52.2	41.7
64	M2J5 on-slip NB	58.2	72.5	68.4	75.0	66.4	74.9	73.0	74.8	68.4	75.5
65	A2/Sandford Road	54.0	58.8	58.8	58.7	58.9	58.9	60.0	59.0	59.9	59.7
66	A2/Staplehurst Road	46.2	45.1	50.9	43.6	51.6	43.7	52.3	44.9	58.2	47.7
67	Staplehurst Road/Gadby Road	15.0	10.1	14.4	9.9	15.1	9.7	14.6	10.1	18.7	11.2
68	Chequers Road/East Church Road	20.1	17.1	27.7	21.5	27.6	22.1	31.0	24.7	36.7	23.6
69	A2/Panteny Road	32.6	30.7	40.1	37.5	45.1	40.7	42.1	38.4	51.5	45.6
70	A2/Lynsted Lane	38.9	38.7	42.8	43.8	44.3	46.1	42.8	46.3	47.6	54.1
71	Whitstable Road/Head Hill	48.0	30.7	50.8	36.8	60.2	43.8	53.0	41.5	91.3	73.6
72	A2/Love Lane	30.7	41.8	41.9	49.2	51.8	57.9	42.2	52.3	73.9	82.5
73	Church Street/Connecting Road	19.0	15.8	22.0	22.0	23.9	26.1	23.0	25.1	34.3	51.2
74	The Crescent/Conyer Road	8.3	8.5	7.0	8.9	9.2	9.1	7.3	9.0	17.1	13.2
75	Western Link/Bysing Wood Road W	17.3	16.3	16.6	15.6	17.1	16.9	16.4	15.9	21.1	21.6
76	A2/Lewson Street	33.2	35.5	41.0	45.1	46.1	52.1	42.2	46.8	52.9	61.7
77	Tonge Road/Church Road	38.0	36.6	47.1	43.8	54.5	48.2	50.1	48.4	60.6	61.0
78	Castle Road/Dolphin Road	42.8	48.5	53.5	56.4	63.5	62.0	57.9	61.6	80.3	69.9
79	Eurolink Way/Milton Road	70.9	66.8	71.5	73.0	73.1	73.8	72.4	73.8	77.6	76.0
80	Park Road/Albany Road	53.0	47.6	61.2	56.9	66.0	61.3	66.2	58.3	77.8	67.7
81	Sheppey Way/Old Ferry Road	18.1	29.2	21.5	33.8	23.4	35.0	23.3	36.2	31.7	37.5
82	A249/S Green	51.0	61.2	51.3	71.6	51.5	72.8	54.2	73.4	54.8	74.0
83	A20 Ashford Road/ Faversham Road	58.6	57.9	69.4	67.2	69.9	68.3	77.2	76.0	82.4	81.4
84	A2/Rook Lane	36.7	43.2	40.7	53.8	42.3	55.1	44.3	55.2	49.0	50.0
85	A2/Bull Lane	36.5	38.4	36.7	41.8	38.5	43.0	41.1	43.9	49.2	51.1

* Junction was coded as exploded roundabout in SATURN model. Junction V/C was calculated based on the traffic data of all approaching arms.

Table 7-5 Summary of the congestions (highest V/C%)



JunctionID	Description	Highest Junction V/C									
		Base Year		2027RC		2027DS		2038RC		2038DS	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	Minster Road/ A250 Halfway Road	104.7	94.2	104.3	99.8	104.5	100.2	103.9	107.1	104.4	104.4
2	A250 Lower Road/Sheppey Way	93.5	56.9	103.2	89.8	104.6	95.2	109.8	106.2	118.4	119.6
3	A2 London Road/Western Link	57.2	62.8	66.3	72.9	71.2	83.4	66.7	74.9	95.8	99.1
4*	M2 Junction 7	101.3	103.0	97.7	105.3	96.3	105.1	91.3	103.8	107.7	110.5
5	A2/A251 Ashford Road	77.1	48.2	68.7	66.5	81.0	85.4	73.2	70.3	104.4	107.5
6	A2/Brogdale Road	49.2	51.8	48.8	49.8	54.5	61.9	50.1	52.1	108.7	111.5
7	B2006 Eurolink Way/Crown Quay Lane	73.0	73.0	77.5	74.6	79.5	79.9	78.4	74.8	87.9	91.1
8*	Grovehurst/ Swale Way/B2005	86.4	90.0	34.2	40.1	34.9	48.6	43.5	44.3	49.9	59.3
9*	M2 Junction 5	110.6	103.2	45.3	48.1	50.2	52.4	49.4	61.5	67.8	89.2
10*	A2 Key Street/A249	68.2	103.7	69.0	89.0	76.2	94.6	82.9	98.2	101.3	107.3
11*	A249/B2006	61.5	61.5	68.8	75.2	81.8	81.8	59.1	70.6	75.0	95.4
12	A2 Canterbury Road/Murston Road/Rectory Road	96.4	95.2	102.5	101.1	105.0	102.6	101.0	98.8	109.9	105.7
13	A2 Dover Street/Milton Road	49.2	68.3	95.9	91.4	96.5	92.4	95.3	89.2	99.8	96.5
14	A2 Canterbury Road/Swanstree Avenue	84.8	71.8	87.0	82.3	87.9	87.4	86.9	88.4	92.1	101.0
15	A2042 Faversham Road/Trinity Road	106.3	93.8	122.1	100.2	122.0	100.3	136.6	110.3	136.5	111.4
16	A299 Thanet Way/Staple St	47.7	55.6	53.4	64.1	55.0	66.5	60.7	70.1	62.6	76.7
17	Tunstall Rd/Woodstock Rd	66.3	37.6	91.6	68.0	93.4	73.7	95.1	70.9	101.6	85.5
18	A2 London Road/Wises Lane	81.9	68.2	71.1	67.0	70.3	62.6	74.0	70.4	75.3	65.6
19	B2006/ B2005	91.9	90.6	97.3	94.5	97.8	95.1	98.3	97.2	99.0	99.0
20	A2 St Michael's Road/East Street	57.9	65.6	64.2	68.3	65.7	74.7	66.6	63.2	76.8	71.8
21	A250 Millenium Way/High Street	90.4	80.6	95.2	92.4	95.5	93.4	95.8	99.9	95.5	97.6
22	A249 Brielle Way /B2007	38.6	89.5	47.4	77.3	47.4	75.2	47.7	80.0	48.2	81.9
23	A249/A2500	94.9	77.2	86.1	102.7	89.5	103.5	87.9	110.5	103.6	114.0
24	Lower Road/East Church Road	66.9	74.3	80.3	65.1	82.4	68.9	91.2	66.6	96.2	67.5
25	B2006 Staplehurst Road/Chalkwell Road	65.9	70.5	73.6	73.7	75.7	74.2	74.4	78.5	72.3	87.2
26	A2 London Road/Hempstead Lane	73.7	78.7	100.6	96.0	101.1	100.4	100.4	97.9	109.6	101.9
27	A2 London Road/Station Road (Teynham)	46.1	36.1	49.9	49.5	77.5	71.5	50.7	45.4	101.7	100.3
28	A2 London Road/Faversham Road	39.7	50.2	53.4	65.9	63.7	89.6	53.3	67.8	95.1	104.3
29	A2 Canterbury Road/Selling Road	37.4	47.1	23.7	30.5	55.5	64.2	31.2	35.1	108.1	107.2
30	A299 Thanet Way/Clapham Hill	14.4	15.1	16.2	17.4	17.2	17.9	17.1	19.0	20.0	20.7
31*	M20 Junction 7	111.1	112.5	120.0	120.0	121.0	119.9	121.1	120.2	124.7	120.7
32	M20J7 Onslip WB	86.5	69.2	65.5	58.1	65.5	58.6	68.0	61.5	68.2	61.7
33	M20J7 Offslip EB	70.4	97.1	78.7	99.8	78.6	100.0	85.3	100.0	85.5	100.0
34	Gore Court Road/Bell Road/Park Avenue	52.5	39.0	62.1	49.2	65.5	52.3	64.9	52.3	74.7	67.2
35	Bell Road/Capel Road/Brenchley Road	54.6	43.3	66.4	49.7	69.9	52.4	66.8	50.5	79.3	57.3
36	A299 Thanet Way/Whitstable Road	81.7	81.5	45.5	54.7	48.6	56.4	51.0	54.1	67.8	63.7
37	A2500 Lower Road/Barton Hill Drive	91.6	101.3	83.2	97.0	82.4	97.4	82.4	103.5	78.2	93.9
38	A2 High Street/Church Lane (Newington)	42.4	43.8	51.9	92.8	55.3	95.1	55.8	90.9	78.8	88.2
39	B2006 Mill Way/ExitCarpark	83.7	96.1	82.7	98.1	84.8	98.5	85.7	99.1	93.2	102.1
40	Church Road/Lomas Road	42.5	77.5	48.5	89.1	62.9	101.6	53.2	90.1	100.3	112.1
41	Bell Road/Stanhope Avenue	93.8	90.5	93.4	94.0	94.9	94.7	94.3	95.4	100.3	99.4
42	A2 London Road/Adelaide Drive	62.4	53.2	70.8	55.6	77.3	59.3	73.2	60.7	86.7	76.7
43	B2006/Sonora Way	65.4	78.4	76.0	88.7	77.2	88.4	88.6	92.3	93.3	100.2
44	Borden Lane/Homewood Avenue	75.4	67.9	78.6	67.3	80.4	70.6	56.5	52.5	62.9	68.4
45	Cromer Road/Highsted Road	56.3	40.5	59.8	56.6	65.3	64.3	63.2	62.5	83.9	99.4
46	A2 Canterbury Road/B2041	102.1	85.1	65.7	57.5	83.3	66.5	67.2	64.7	111.6	95.3
47	A2 St Michael's Road/Crown Quay Lane	89.0	83.1	90.5	77.8	92.6	77.6	92.3	80.1	94.0	82.3
48	A2 London Road/Hawthorn Road	94.0	67.1	65.3	60.2	70.1	60.4	68.1	62.0	79.7	63.9
49	East Street/B2040 (Faversham)	71.1	72.2	79.9	92.9	91.1	100.4	88.0	96.4	100.6	119.1
50	A2/Westlands Avenue	46.4	53.0	61.6	51.9	59.4	52.0	63.6	51.1	53.3	53.9
51	A2/Chalkwell Road	68.8	40.4	90.8	43.2	95.4	45.1	91.9	45.2	101.5	57.8
52	A2/Burley Road	70.1	63.3	88.0	57.7	92.6	62.9	89.7	59.7	92.5	71.2
53	A2/School Lane	50.5	66.9	73.8	70.2	75.3	74.5	77.7	69.8	90.3	104.2
54	A2/B2040 South Road	58.4	76.0	95.9	98.2	92.6	95.1	95.3	97.4	102.9	90.3
55	Sheppey Way/Grovehurst Road	28.4	21.8	25.2	15.3	27.4	16.0	32.1	20.7	36.7	18.9
56	A20 Ashford Road/Hubbards Hill	37.1	35.9	39.7	40.2	40.3	40.7	43.0	43.0	45.7	44.7

57	Invicta Road/Cavour Rd Sheppey	17.1	27.3	17.0	29.9	17.0	29.8	17.0	29.8	17.8	27.9
58	Western Link Road/Bysing Wood Road	32.3	33.0	41.6	41.8	40.4	41.9	41.7	40.7	58.1	44.6
59	Cavour Road/Alma Road Sheppey	15.9	28.9	7.1	33.0	7.3	32.3	7.1	32.5	7.8	27.2
60	Minster Road/Back Lane Sheppey	34.9	17.7	50.7	23.0	54.0	23.2	60.0	26.7	66.2	25.4
61	Barton Hill Drive/Plover Road	44.5	29.1	53.9	51.3	53.7	51.1	42.2	48.3	37.7	43.6
62	Chequers Road/Elm Lane	23.8	19.6	33.6	25.3	33.4	26.0	37.4	29.1	43.7	27.7
63	A250/Queenborough Road	32.8	31.4	38.0	44.8	35.0	46.3	42.0	42.7	65.7	48.6
64	M2J5 on-slip NB	75.1	93.5	78.0	86.9	77.1	89.0	83.4	89.2	82.5	91.2
65	A2/Sandford Road	54.2	64.8	59.2	63.2	59.4	63.2	61.2	61.3	63.8	61.0
66	A2/Staplehurst Road	60.8	45.6	74.3	45.4	76.0	45.4	74.3	47.3	96.9	60.9
67	Staplehurst Road/Gadby Road	27.9	12.5	26.5	12.4	28.0	12.1	26.8	12.6	33.7	13.6
68	Chequers Road/East Church Road	23.7	20.1	33.4	25.9	33.3	26.6	37.3	29.8	43.6	28.4
69	A2/Panteny Road	37.4	39.0	52.7	77.7	71.1	86.7	59.5	84.8	100.7	106.9
70	A2/Lynsted Lane	43.2	46.2	45.5	40.3	45.3	51.8	44.5	52.0	71.8	99.8
71	Whitstable Road/Head Hill	78.2	48.0	77.1	60.5	101.0	70.6	83.6	62.8	175.0	118.1
72	A2/Love Lane	35.9	51.1	62.2	54.3	63.5	59.4	58.1	61.8	96.0	99.8
73	Church Street/Connecting Road	30.8	21.3	33.1	28.5	33.7	32.2	34.4	31.3	44.0	66.7
74	The Crescent/Conyer Road	10.4	9.5	10.7	10.3	13.7	11.4	10.8	11.1	19.5	15.2
75	Western Link/Bysing Wood Road W	21.5	19.7	18.5	18.6	17.2	18.6	18.6	17.7	69.7	22.0
76	A2/Lewson Street	34.2	37.5	44.4	58.8	56.8	86.4	46.5	67.3	79.0	108.3
77	Tonge Road/Church Road	58.9	40.3	84.9	45.8	100.3	51.0	90.3	52.1	101.2	91.1
78	Castle Road/Dolphin Road	50.3	69.6	66.8	83.7	83.0	91.9	71.8	92.0	104.6	102.6
79	Eurolink Way/Milton Road	90.8	83.9	88.9	87.9	89.7	87.8	88.8	86.8	94.7	88.9
80	Park Road/Albany Road	54.4	57.3	70.7	63.1	78.8	65.3	78.9	65.6	80.5	76.1
81	Sheppey Way/Old Ferry Road	19.1	35.4	23.2	39.1	26.3	39.8	26.4	48.0	39.4	50.8
82	A249/S Green	89.5	72.7	57.9	86.0	58.0	87.6	62.2	88.4	62.5	89.1
83	A20 Ashford Road/ Faversham Road	68.1	72.7	98.0	78.8	95.9	80.7	98.8	91.7	103.6	99.9
84	A2/Rook Lane	42.4	44.2	42.1	55.1	44.9	55.7	47.5	57.4	54.8	52.9
85	A2/Bull Lane	41.3	40.7	40.0	52.6	42.7	56.5	45.0	58.1	53.1	61.3

* Junction was coded as exploded roundabout in SATURN model. Junction V/C was calculated based on the traffic data of all approaching arms.

8 Conclusions

This report documents how the SHM future year traffic forecasts were developed to produce the forecast of travel demand for the forecast year 2027 and 2038 RC and the DS scenario for the revised local plan proposal. For the forecasting matrices, the future car growth was calculated by spatially allocating development trips from the uncertainty log using trip rates derived from agreed TRICs rates and LGV and HGV growth derived using DfT's Road Traffic Forecast growth and trip rates from TRICS. The traffic demand forecast has been based on unconstrained growth, as agreed with Highways England, KCC and SBC. The forecast networks were developed based on TAG uncertainty log principles, provided by KCC.

In summary, the modelling above was carried out in line with TAG and based on a validated base model. The forecasts described above appear to show sensible results that inform how the reference case and additional LP developments would impact the local highway network and its surrounding area in future years.

The evidence and outputs from the forecast models are deemed suitable and provide a comparison base for evaluating alternative Local Plan, identifying appropriate mitigation packages, and assessing individual development proposals consistently and transparently.

Appendix A

Appendix A- 1 Swale housing development for RC scenario

Type	App	Address	Parish	Proposal	2017-2027	2017-2038
Large application	14/501588	Land at Stones Farm, The Street	Bapchild	O/L for 550-600 houses	480	600
Large application	18/500258	Hill Farm, Bobbing Hill	Bobbing	20 dwellings	20	20
Large application	17/506010	Southlands, Rook Lane	Bobbing	74 Suite (replacement) Care Home	74	74
Large application	18/501428	Land adj. Bull Lane	Boughton	Erection of 16 Dwellings	16	16
Large application	19/505114	R/O 142-146 The Street	Boughton	PN for COU of 2 Agri builds to 5 x dwellings	5	5
Large application	16/504575	Land East of Ham Road	Faversham	O/L for residential (up to 35 Dwellings)	35	35
Large application	16/508709	Former Oil Depot, Abbey Wharf, Standard Quay	Faversham	Erection of 10 dwellings	10	10
Large application	18/506283	Ospringe Brickworks (Southern area), Sumpter Way	Faversham	Res matts of 14/502729 for 123 dwellings	123	123
Large application	16/508627	7 High Street	Minster	Dem build & erect 8 flats	8	8
Large application	15/502694	Elm Tree Inn, Lower Road	Minster	COU for former pub to 10 flats	10	10
Large application	15/507059	Land north of Plover Road	Minster	O/L for Residential Development	97	97
Large application	16/506181	Sheppey Court, Halfway Road	Minster	Renovation of Grade 2 listed building to provide 6 dwellings. Construction of 33 terraced dwellings.	39	39
Large application	16/508117	The Slips, Scocles Road	Minster	O/L for up to 62 dwellings	62	62
Large application	13/1455	Parcels D,E,F&G, Thistle Hill	Minster	O/L pp for up to 431 dwellings	150	431
Large application	18/503855	Land off Plover Road	Minster	O/L for residential development (approx. 25 dwellings)	25	25
Large application	18/503135	Land west of Barton Hill Drive	Minster	O/L Dev of up to 700 dwellings	340	700
Large application	14/502540	The Water Tower, Trinity Road	Sheerness	Convert to 29 flats and maisonettes	29	29
Large application	18/500437	Cadet Centre ATC, Granville Place	Sheerness	Demolition of hall, new 3 storey build of 5 x two bed maisonettes	5	5
Large application	18/503339	Land r/o Telephone Exchange, Wood Street/Milennium Way	Sheerness	16 Special Supported Living Apartments (C3 use)	16	16
Large application	17/506024	25-29 London Road	Sittingbourne	PN for Cou of office building to 22 flats	22	22
Large application	16/505280	East Hall Farm, East Hall Lane	Sittingbourne	Up to 33 dwellings (Outline)	33	33
Large application	14/505440	(Site 3) Spirit of Sittingbourne Site, St Michael's Road	Sittingbourne	65 apartments	0	65
Large application	14/505440	(Site 2) Spirit of Sittingbourne site, St Michael's Road	Sittingbourne	88 flats	0	88
Large application	14/505440	(Site 1) Spirit of Sittingbourne, St Michael's Road	Sittingbourne	62 flats	0	62

Large application	17/504335	Sutton House, 5 London Road	Sittingbourne	Rear extension and change of use to provide 6 residential apartments	6	6
Large application	18/505929	R/O 54-76 Oak Road	Sittingbourne	Erect 6 houses (in two terraces of 3)	6	6
Large application	18/505791	Brenchley House, 75-77 High Street	Sittingbourne	COU of 1st and 2nd flr offices to 7 x resid units	7	7
Large application	19/505180	Economic House, 25-29 London Road	Sittingbourne	PN for COU of office building to 35 flats	35	35
Large application	17/500727	Manor Farm, Key Street	Sittingbourne	O/L for 50 dwellings	50	50
Large application	19/503553	125 London Road	sittingbourne	Dem ex dwell and erect 2 builds consisting of 10 flats (1x4 & 1x6)	10	10
Large application	16/507639	Railway Tavern, Lower Road, Barrow Green	Teynham	OL - dem of property and erect 7 dwells	7	7
Large application	16/503808	The Orchard, Holywell Lane	Upchurch	Residential use of the site by any gypsy or traveller - up to 4 static caravans and up to 2 touring caravans	6	6
Large application	06/1448	Conyer Brickworks	Conyer	24 dwellings	24	24
Large application	16/506316	The Old School, London Road	Dunkirk	3 x two storey terraced, 2 x two storey semi's	5	5
Large application	00/1235	UPPER BRENTS SHIPYARD	Faversham	Rev of app layout unit 1, 18 and 20 to 29 to prov 11 bus uni	5	5
Large application	16/505060	Almshouses, South Road	Faversham	Conversion of existing bedsits & one bed flats to mix of bedsits, flats & maisonettes (loss of numbers)	7	46
Large application	16/505790	23a Preston Street	Faversham	COU from A2 to 6 apartments (NB: Only 4 will be built due to subsequent app). CHECK!	6	6
Large application	16/503847	10-11 Market Street	Faversham	Alterations to 1st flr & new 2nd flr ext to provide 13 flats	13	13
Large application	18/501048	Land at Lady Dane Farm, Love Lane	Faversham	Approval of reserved matters for 196 proposed dwellings	196	196
Large application	17/502604	Ospringe Brickworks (Northern area) Sumpter Way	Faversham	Res Matts for 127 dwellings	127	127
Large application	17/506603	Land at Perry Court, London Road	Faversham	Res Matts for 310 dwellings	310	310
Large application	14/0257	North of Oare Rd & South of Ham Rd	Faversham	375 Dwellings	375	375
Large application	16/508643	Land north of Graveney Road	Faversham	72 houses and 33 flats	105	105
Large application	17/502521	Adj 9 Ashford Road	Faversham	Dem of retail and erect 9 dwellings	9	9
Large application	16/506644	Brogdale Place, Brogdale Road	Faversham	R/M for 63 dwells	63	63
Large application	18/505418	Phase 1, Oare Mineral Works, Ham Road	Faversham	Res Matts of 14/0257 for 113 dwellings	113	113
Large application	19/501612	Standard House, Standard Quay	Faversham	Dem of ind builds & garages, erect 6 dwellings	6	6
Large application	18/500283	Adj Sheppey Academy East, Admirals Walk	Halfway	31 dwellings	31	31
Large application	15/505190	Former Silver Sands Nursery, Staple Street	Hernhill	14 Passivhouse houses	14	14
Large application	06/0750	Phase 3, Land adj Thistle Hill Way	Minster	Res Matts for 31 dwellings	31	31
Large application	13/0909	97-101 Wards Hill Rd	Minster	5 DETACHED DWELLINGS	5	5
Large application	16/505623	117 Chequers Road	Minster	9 dwellings	9	9
Large application	17/506294	Scocles Farm, Scocles Road	Minster	Demolish agricultural buildings, erection of 8, 3 & 4 bed houses	7	7
Large application	05/1197	Boundary Close	Minster	17 Dwellings	17	17

Large application	16/501266	99 High Street and land to the North	Newington	124 new dwellings	124	124
Large application	15/501089	Moons of Selling, Grove Road	Selling	Dem of comm buildings/ erect 5 new dwellings	5	5
Large application	14/0334	Adj 105 Marine Parade	Sheerness	Dem of garages and erect 5 houses & 9 flats	14	14
Large application	16/507853	Victoria Working Men's Club, Broadway	Sheerness	Erection of 8 flats	8	8
Large application	11/0170	Land r/o 51 High Street	Sittingbourne	Construct of 10 flats & 3 houses. Ext of time of 05/0935	13	13
Large application	16/507181	31 London Road	Sittingbourne	Conv Doc Surgery to 5 flats & 5 new to rear	10	10
Large application	16/507877	Land West of Crown Quay Lane	Sittingbourne	405 dwellings	383	383
Large application	18/502555	1-3 High Street	Sittingbourne	PN for COU from office to 7 residential units (flats)	7	7
Large application	18/503615	4 Bell Road	Sittingbourne	COU from retail(with part demolition) with ext to provide 9 flats	9	9
Large application	18/504222	Cookham Shaw, Maidstone Road	Sittingbourne	Var of cond of 11/1493 to allow 5 static & 1 touring caravans	5	5
Large application	15/502912	Milton Pipes, Cooks Lane	Sittingbourne	Dem of ex builds & dev 162 houses & 80 flats	242	242
Large application	19/502164	Land adj. Telephone Exchange, Albany Road	Sittingbourne	Erect 4 storey block of 9 flats	9	9
Large application	01/0623	Lydbrook Close	Sittingbourne	Residential re-development of site (49 dwellings)	49	49
Large application	16/507779	Land at Lower Road	Teynham	Erect 8 x 3bed dwellings	8	8
Large application	18/503697	Land at Station Road	Teynham	Dem of 56 & 58 Station Road and erect 130 dwellings	130	130
Large application	16/505788	Barton Court, New Road	Minster	Alt and Ext to provide 70 bedrooms (C2)	70	70
Large application	19/505675	The Island Res Home, 114 Leysdown Road	Leysdown	6 Additional Care Bedrooms (C2)	6	6
Large application	17/501926	Little Oyster, Seaside Avenue	Minster	RM for 50 bedroom extension to care home (C2)	50	50
Large application	19/501160	Coleshall Farm, Ferry, Road	Iwade	RM for 60 bed care home (C2)	60	60
Large application	18/503057	Land ar Perry Court, Ashford Road	Faversham	66 bed care home (C2)	66	66
Large application	15/510309	Borden Lodge, 2A Borden Lane	Sittingbourne	COU private dwelling to retirement apartments 1x 2 bed unit and 6x 1bed units (C2)	7	7
Large application	16/508519	Hanningfield Retirement Home, 99 London Road	Sittingbourne	Additional bedrooms to retirement home (C2)	7	7
Large application	17/500825	Land adjacent to Crescent House, Gills Terrace	Upchurch	5 x 4 bedroom houses	5	5
Small applications	18/505147	Builders Yard, Woodgate Lane	Borden	PN to COU from B8 to 3 x dwellings	3	3
Small applications	20/500051	Greystone, Bannister Hill	Borden	2 detached dwellings	2	2
Small applications	19/500060	Digswell, Lower Hartlip Road	Hartlip	PN for COU of 2 premises (from B1c) to 4 dwellings	4	4
Small applications	17/501207	Monkshill Farm, Monkshill Road	Hernhill	PN for COU form agric build to 2 dwellings	2	2
Small applications	19/504334	The Vista, Bay View Gardens	Leysdown	O/L for 2no. dwellings	2	2
Small applications	17/500392	177 Wards Hill Road	Minster	2 detached dwellings to replace existing	2	2

Small applications	17/505785	Gespa, Augustine Road, Minster	Minster	Sub division of plot to facilitate the construction of an additional dwelling	1	1
Small applications	18/506585	Land adj. Emdale, Sexburga Drive	Minster	Erection of 2 dwellings	2	2
Small applications	18/504307	R/O 343 Minster Road	Minster	Two detached dwellings	2	2
Small applications	19/500378	Land adj. 1 Western Avenue, Halfway	Minster	2 detached houses to replace workshop/store	2	2
Small applications	18/502932	172 Scarborough Drive	Minster	4 detached dwellings	4	4
Small applications	17/504960	Vicarage Yard, The Street	Newnham	COU of stable to dwelling	1	1
Small applications	19/502706	Land at Karussel, Mutton Lane	Ospringe	O/L for dem of garage & erect 1 dwelling	1	1
Small applications	18/501872	Land adj Napier Hotel, 1 Alma Road	Sheerness	Construction of 2 X 2 bed dwellings	2	2
Small applications	18/502952	30 Alma Road	Sheerness	Part dem vacant shop & flat and erect 3 x resid units	3	3
Small applications	18/503631	Victory Inn, 13 Railway Road	Sheerness	COU from pub to 4 dwellings	4	4
Small applications	18/504976	1-3 Hope Street	Sheerness	3 x Flats (above newly built shop)	3	3
Small applications	19/501871	9-11 Queenborough Road, Halfway	Sheerness	Demolish unit, erect 3 flats	3	3
Small applications	19/505424	33-35 Victoria Street	Sheerness	Dem of ex building and erect 3 terr houses	3	3
Small applications	14/505098	45 - 47 Staplehurst Road	Sittingbourne	Dem of comm builds and erect 2 x semi-det buildings	2	2
Small applications	17/502405	5 Park Avenue	Sittingbourne	New dwelling	1	1
Small applications	18/501124	137 Park Road	Sittingbourne	3 x 1 bed apartments	3	3
Small applications	18/502533	1b Bayford Road	Sittingbourne	Dem of ex building and erect 3 flats	3	3
Small applications	16/507371	88 William Street	Sittingbourne	2 x 3 bed det houses	2	2
Small applications	19/500622	Pembury Court, Pembury Street	Sittingbourne	Creation of 4 additional dwellings (to be part of existing block)	4	4
Small applications	18/501726	Land between 119A and 121A High Street	Sittingbourne	Erection of building with 2 flats on upper floor	2	2
Small applications	18/503616	2 Arthur Street	Sittingbourne	Convert ex. dwelling into 3 dwellings	3	3
Small applications	19/502978	2 Charlotte Street	Sittingbourne	Demolish outbuilding construct 2x1 bed flats	2	2
Small applications	19/502867	Brenchley House, 75-77 High Street	Sittingbourne	COU of GF offices to 2 x resid units	2	2
Small applications	17/504179	152-154 Station Road	Teynham	New build of 2 retail units & 3 flats over	3	3
Small applications	20/500404	Tunstall CoE Primary, Tunstall Road	Tunstall	Conversion of school to 1 dwelling (check only 1 on site!)	1	1
Small applications	16/506986	116 Oak Lane	Upchurch	Dem dwell erect 2x3bed & 1x4bed dwells	3	3
BFs with Planning Permission	MU1 (ST4)	Land at North West Sittingbourne	Sittingbourne		380	1500
BFs with Planning Permission	MU13(ST4)	SW Sittingbourne	Sittingbourne		176	540
BFs with Planning Permission	MU13(ST4)	SW Sittingbourne	Sittingbourne		22	68
BFs with Planning Permission	MU13(ST4)	SW Sittingbourne	Sittingbourne		22	68

BFs with Planning Permission	A9 (ST4)	Crown Quay Lane, Sittingbourne (Phase II)	Sittingbourne		205	267
BFs with Planning Permission	A13 (ST4)	Belgrave Road	Minster/Halfway		140	140
BFs with Planning Permission	A16 (ST4)	Preston Fields, Salters Lane	Faversham		140	250
BFs with Planning Permission	MU4 (ST4)	Land at Frognal Lane, Teynham	Teynham		250	300
BFs with Planning Permission	A17 (ST4)	Land east of Iwade	Iwade		190	440
BFs with Planning Permission	A17 (ST4)	Land south east of Iwade (Pond Farm)	Iwade		70	70
Total					6163	9225

Appendix A- 2 Swale housing development for DS scenario (in addition to RC)

Type	App	Address	Parish	2017-2027	2017-2038
BFs withOUT Planning Permission	A21.1 (ST4)	Land north of Key Street	Sittingbourne	30	30
BFs withOUT Planning Permission	MU2 (ST4)	Land at North East Sittingbourne	Sittingbourne	106	106
BFs withOUT Planning Permission	A20.2 (ST4)	152 Staplehurst Road	Sittingbourne	0	75
BFs withOUT Planning Permission	A20.4 (ST4)	35 High Street, Milton Regis	Sittingbourne	0	10
BFs withOUT Planning Permission	A20.1 (ST4)	Orbital, Staplehurst Road	Sittingbourne	60	60
BFs withOUT Planning Permission	Regen 1 (ST4)	Land at The Bell Centre, Bell Road	Sittingbourne	120	120
BFs withOUT Planning Permission	A20.11 (ST4)	The Foundry, Rushenden Road	Queenborough	15	37
BFs withOUT Planning Permission	A21.6 (ST4)	Nil Desperandum, Alsager Avenue	Queenborough	22	22
BFs withOUT Planning Permission	A20.10 (ST4)	Manor Road	Queenborough	0	6
BFs withOUT Planning Permission	Regen 2 (ST4)	West Street, Queenborough	Queenborough	0	80
BFs withOUT Planning Permission	Regen 2 (ST4)	South of Queenborough Creek	Queenborough	80	380
BFs withOUT Planning Permission	Regen 2 (ST4)	West of Rushenden Road	Queenborough	160	379
BFs withOUT Planning Permission	Regen 2 (ST4)	Former Istil Mill Site	Queenborough	180	240
BFs withOUT Planning Permission	A20.9 (ST4)	Halfway Houses Primary School	Minster/Halfway	0	60
BFs withOUT Planning Permission	A20.8 (ST4)	Preston Skreens, Minster Road	Minster/Halfway	12	12
BFs withOUT Planning Permission	SW/034	Weston Works Brent Hill	Faversham	40	40
BFs withOUT Planning Permission	A20.7 (ST4)	Faversham Police Station	Faversham	12	12
BFs withOUT Planning Permission	SSPP02	Ordnance Wharf, Flood Lane	Faversham	11	11

BFs withOUT Planning Permission	SSPP08/10	Standard Quay / Fentimans Yard	Faversham	7	7
BFs withOUT Planning Permission	A20.6 (ST4)	Bysingwood Primary School	Faversham	0	15
BFs withOUT Planning Permission	MU6	Land at Lady Dane Farm Phase II	Faversham	60	60
BFs withOUT Planning Permission	SSPP06	South East Coast Oil Services	Faversham	16	16
BFs withOUT Planning Permission	SSPP09	Standard House	Faversham	5	5
BFs withOUT Planning Permission	SSPP05/04	Swan Quay/Frank and Whittome Belvedere Road	Faversham	10	10
BFs withOUT Planning Permission	A21.11 (ST4)	Land off Colonels Lane	Boughton	15	15
BFs withOUT Planning Permission	A21.12 (ST4)	Land south of Colonels Lane	Boughton	6	6
BFs withOUT Planning Permission	A21.14 (ST4)	Land adj Mayfield, London Road	Teynham	13	13
BFs withOUT Planning Permission	A21.15 (ST4)	Land at Barrow Green Farm	Teynham	30	30
BFs withOUT Planning Permission	A21.10 (ST4)	North of High Street, Eastchurch	Eastchurch	15	15
BFs withOUT Planning Permission	A20.13 (ST4)	Iwade Fruit and Produce	Iwade	21	21
BFs withOUT Planning Permission	A17 (ST4)	North of Iwade village	Iwade	62	62
LPR allocation		South East Faversham	Faversham	133	1,645
LPR allocation		South East Faversham	Faversham	57	705
LPR allocation		Land at Lady Dane Farm	Faversham	150	600
LPR allocation		Land at Graveney Road, East of Faversham	Faversham	210	240
LPR allocation		Preston Fields, Canterbury Road, Faversham	Faversham	70	70
LPR allocation		Land at The Port of Sheerness, Rushenden Road	Rushenden	0	680
LPR allocation		Land at The Port of Sheerness, Rushenden Road	Rushenden	0	170
LPR allocation		Land East of Selling Road (2)	Selling	90	90
LPR allocation		Sittingbourne Town Centre _S1	Sittingbourne	38	130
LPR allocation		Sittingbourne Town Centre _S2	Sittingbourne	29	98
LPR allocation		Sittingbourne Town Centre _S3	Sittingbourne	45	151
LPR allocation		Sittingbourne Town Centre _S4	Sittingbourne	20	66
LPR allocation		Sittingbourne Town Centre _S5	Sittingbourne	28	96
LPR allocation		Sittingbourne Town Centre _S6	Sittingbourne	16	53
LPR allocation		Sittingbourne Town Centre _S7	Sittingbourne	27	90
LPR allocation		Sittingbourne Town Centre _S8	Sittingbourne	13	43
LPR allocation		Sittingbourne Town Centre _S9	Sittingbourne	16	53
LPR allocation		Sittingbourne Town Centre _between s1 and s2	Sittingbourne	9	32
LPR allocation		Sittingbourne Town Centre _between s7 and s8	Sittingbourne	11	37
LPR allocation		Land at Barrow Green Farm, Lower Road (A21.15)	Teynham	2	26
LPR allocation		Land at Barrow Green Farm, London Road	Teynham	6	87
LPR allocation		Land West of Frogal Lane	Teynham	35	549

LPR allocation		Land adj. Mayfield, London Road (A21.14)	Teynham	1	11
LPR allocation		Land at Cellar Hill	Lynsted with Kingsdown	1	10
LPR allocation		Land at Claxfield Road (Site 1)	Lynsted with Kingsdown	10	157
LPR allocation		Land at Claxfield Road (Site 2)	Lynsted with Kingsdown	1	13
LPR allocation		Land south of Dover Castle Inn, A2 London Road/Cellar Hill	Lynsted with Kingsdown	3	44
LPR allocation		Land South of London Road/West of Lynsted Lane	Lynsted with Kingsdown	3	52
LPR allocation		Former Garden Hotel	Boughton under Blean	16	16
Windfall					2200
Fav NP+Park homes					445
Total				2144	10616

Appendix B

Appendix B - 1 Network performance for base, RC and DS in the AM peak hour in year 2027 and 2038

Metrics	Area	2017	2027				2038			
		Base	RC	% diff	DS	% diff	RC	% diff	DS	% diff
Transient queues (PCU hours)	Simulation	909.5	1098.8	20.8%	1244.8	36.9%	1250.5	37.5%	1845.4	102.9%
	Buffer	47.3	64.6	36.6%	73.3	55.0%	95	100.8%	133.3	181.8%
	Total	956.8	1163.5	21.6%	1318.1	37.8%	1345.5	40.6%	1978.7	106.8%
Over-capacity queues (PCU hours)	Simulation	255.1	387.1	51.7%	431.3	69.1%	578.7	126.9%	1558	510.7%
	Buffer	0	0	N/A	0	N/A	0	N/A	0	N/A
	Total	255.1	387.1	51.7%	431.3	69.1%	578.7	126.9%	1558	510.7%
Link cruise time (PCU hours)	Simulation	8328.6	9746.9	17.0%	10175.7	22.2%	10688.4	28.3%	12280.5	47.4%
	Buffer	41103.6	46530.9	13.2%	46622.1	13.4%	50214	22.2%	50494.6	22.8%
	Buffer centroid conn	705.9	780.1	10.5%	780.7	10.6%	845.5	19.8%	847.4	20.0%
	Total	50138.1	57057.9	13.8%	57578.6	14.8%	61747.8	23.2%	63622.5	26.9%
Total travel time (PCU hours)	Simulation	9493.2	11232.8	18.3%	11851.8	24.8%	12517.6	31.9%	15683.9	65.2%
	Buffer	41150.9	46595.6	13.2%	46695.4	13.5%	50309	22.3%	50627.9	23.0%
	Total	51350	58608.5	14.1%	59328	15.5%	63672	24.0%	67159.2	30.8%
Travel distance (PCU KM)	Simulation	632270.4	714642	13.0%	738518.5	16.8%	772432.6	22.2%	855886	35.4%
	Buffer	2639620	2883895	9.3%	2890548.3	9.5%	3126529.5	18.4%	3145827	19.2%
	Buffer centroid conn	31896	35254.7	10.5%	35281	10.6%	38205.6	19.8%	38291.6	20.1%
	Total	3303786.5	3633791.5	10.0%	3664347.8	10.9%	3937167.5	19.2%	4040004.5	22.3%
Average Speed (kph)	Simulation	66.6	63.6	-4.5%	62.3	-6.5%	61.7	-7.4%	54.6	-18.0%
	Buffer	64.1	61.9	-3.4%	61.9	-3.4%	62.1	-3.1%	62.1	-3.1%
	Buffer centroid conn	45.2	45.2	0.0%	45.2	0.0%	45.2	0.0%	45.2	0.0%
	Total	64.3	62	-3.6%	61.8	-3.9%	61.8	-3.9%	60.2	-6.4%
Total trips loaded (PCUs)		204291.6	225727.6	10.5%	227349.5	11.3%	244263.4	19.6%	249585.6	22.2%

Appendix B - 2 Network performance for base, RC and DS in the Inter peak hour in year 2027 and 2038

Metrics	Area	2017	2027				2038			
		Base	RC	% diff	DS	% diff	RC	% diff	DS	% diff
Transient queues (PCU hours)	Simulation	514.6	566.6	10.1%	603.9	17.4%	614.1	19.3%	776	50.8%
	Buffer	14	12.9	-7.9%	13.8	-1.4%	19.6	40.0%	23.5	67.9%
	Total	528.6	579.5	9.6%	617.6	16.8%	633.6	19.9%	799.5	51.2%
Over-capacity queues (PCU hours)	Simulation	0	105.9	N/A	118.7	N/A	153.6	N/A	226.6	N/A
	Buffer	0	0	N/A	0	N/A	0	N/A	0	N/A
	Total	0	105.9	N/A	118.7	N/A	153.6	N/A	226.6	N/A
Link cruise time (PCU hours)	Simulation	5891.2	6595	11.9%	6808.5	15.6%	7211.3	22.4%	7900	34.1%
	Buffer	31160	34975.7	12.2%	35012.1	12.4%	38277.5	22.8%	38401.6	23.2%
	Buffer centroid conn	559.8	629.8	12.5%	629.9	12.5%	695.2	24.2%	695.2	24.2%
	Total	37611	42200.6	12.2%	42450.5	12.9%	46184.1	22.8%	46996.7	25.0%
Total travel time (PCU hours)	Simulation	6405.8	7267.5	13.5%	7531.1	17.6%	7979.1	24.6%	8902.6	39.0%
	Buffer	31174	34988.6	12.2%	35025.8	12.4%	38297.1	22.8%	38425.1	23.3%
	Total	38139.6	42886	12.4%	43186.8	13.2%	46971.4	23.2%	48022.9	25.9%
Travel distance (PCU KM)	Simulation	463202.4	523434.7	13.0%	537610.9	16.1%	567490.4	22.5%	612368.2	32.2%
	Buffer	2023045.5	2228742	10.2%	2231933.5	10.3%	2446879.3	21.0%	2457488.5	21.5%
	Buffer centroid conn	25289.5	28458.2	12.5%	28458.7	12.5%	31410	24.2%	31409.2	24.2%
	Total	2511537.3	2780634.8	10.7%	2798003.3	11.4%	3045779.8	21.3%	3101266	23.5%
Average Speed (kph)	Simulation	72.3	72	-0.4%	71.4	-1.2%	71.1	-1.7%	68.8	-4.8%
	Buffer	64.9	63.7	-1.8%	63.7	-1.8%	63.9	-1.5%	64	-1.4%
	Buffer centroid conn	45.2	45.2	0.0%	45.2	0.0%	45.2	0.0%	45.2	0.0%
	Total	65.9	64.8	-1.7%	64.8	-1.7%	64.8	-1.7%	64.6	-2.0%
Total trips loaded (PCUs)		162136.8	181188.6	11.8%	182055	12.3%	198798.4	22.6%	201335.7	24.2%

Appendix B - 3 Network performance for base, RC and DS in the PM peak hour in year 2027 and 2038

Metrics	Area	2017		2027			2038			
		Base	RC	% diff	DS	% diff	RC	% diff	DS	% diff
Transient queues (PCU hours)	Simulation	923.5	1114.7	20.7%	1244	34.7%	1292.9	40.0%	1933.2	109.3%
	Buffer	65	64.4	-0.9%	70.1	7.8%	96.3	48.2%	118.8	82.8%
	Total	988.6	1179.2	19.3%	1314	32.9%	1389.2	40.5%	2052.1	107.6%
Over-capacity queues (PCU hours)	Simulation	191.6	277.9	45.0%	337.3	76.0%	533	178.2%	1537.3	702.3%
	Buffer	0	0	N/A	0	N/A	0	N/A	0	N/A
	Total	191.6	277.9	45.0%	337.3	76.0%	533	178.2%	1537.3	702.3%
Link cruise time (PCU hours)	Simulation	8159.2	9556.8	17.1%	10014.1	22.7%	10544.8	29.2%	12262.2	50.3%
	Buffer	41546.3	46889.4	12.9%	47006.9	13.1%	50569.5	21.7%	50960.7	22.7%
	Buffer centroid conn	683	754	10.4%	754.6	10.5%	816.9	19.6%	818.5	19.8%
	Total	50388.6	57200.2	13.5%	57775.5	14.7%	61931.2	22.9%	64041.3	27.1%
Total travel time (PCU hours)	Simulation	9274.4	10949.4	18.1%	11595.4	25.0%	12370.7	33.4%	15732.7	69.6%
	Buffer	41611.4	46953.8	12.8%	47076.9	13.1%	50665.8	21.8%	51079.5	22.8%
	Buffer centroid conn	683	754	10.4%	754.6	10.5%	816.9	19.6%	818.5	19.8%
	Total	51568.7	58657.2	13.7%	59426.9	15.2%	63853.3	23.8%	67630.7	31.1%
Travel distance (PCU KM)	Simulation	619285.9	704685.2	13.8%	729281.6	17.8%	760862.4	22.9%	849684.9	37.2%
	Buffer	2635892	2871273	8.9%	2879592.5	9.2%	3108856.5	17.9%	3137542.8	19.0%
	Buffer centroid conn	30854.6	34068	10.4%	34095.4	10.5%	36908.6	19.6%	36980.4	19.9%
	Total	3286032.5	3610026	9.9%	3642969.8	10.9%	3906627.5	18.9%	4024208	22.5%
Average Speed (kph)	Simulation	66.8	64.4	-3.6%	62.9	-5.8%	61.5	-7.9%	54	-19.2%
	Buffer	63.3	61.2	-3.3%	61.2	-3.3%	61.4	-3.0%	61.4	-3.0%
	Buffer centroid conn	45.2	45.2	0.0%	45.2	0.0%	45.2	0.0%	45.2	0.0%
	Total	63.7	61.5	-3.5%	61.3	-3.8%	61.2	-3.9%	59.5	-6.6%
Total trips loaded (PCUs)		202190.1	222950.5	10.3%	224488.4	11.0%	241000.3	19.2%	246053.4	21.7%

Appendix C

Appendix C- 1 Journey time (seconds) comparison in the AM Peak

Map	Route	Route Name	2017	2027RC	%Diff (2027RC- 2017)	2027DS	%Diff (2027RC- 2017)	2038RC	%Diff (2038RC- 2017)	2038DS	%Diff (2038DS- 2017)
1	R1	A2_EB	1112	1148	3%	1158	4%	1166	5%	1195	8%
1	R2	A2_WB	1040	1068	3%	1070	3%	1083	4%	1108	7%
2	R3	M2_EB	1373	1442	5%	1465	7%	1498	9%	1605	17%
2	R4	M2_WB	1391	1524	10%	1551	12%	1597	15%	1682	21%
3	R5	Swale Way NB	414	425	3%	431	4%	427	3%	458	11%
3	R6	Swale Way SB	435	444	2%	457	5%	457	5%	512	18%
4	R7	B2006 EB	431	489	13%	509	18%	511	19%	590	37%
4	R8	B2006 WB	306	318	4%	322	5%	326	6%	340	11%
5	R9	A249 NB	1107	1069	-3%	1074	-3%	1085	-2%	1105	0%
5	R10	A249 SB	1652	1485	-10%	1515	-8%	1514	-8%	1758	6%
6	R11	Sheppey Way NB	327	315	-4%	316	-4%	317	-3%	319	-3%
6	R12	Sheppey Way SB	348	350	1%	351	1%	359	3%	404	16%
7	R13	Borden Lane NB	504	533	6%	548	9%	566	12%	612	21%
7	R14	Borden Lane SB	489	490	0%	491	0%	491	1%	495	1%
8	R15	Church Street NB	1255	1257	0%	1264	1%	1269	1%	1393	11%
8	R16	Church Street SB	1247	1214	-3%	1215	-3%	1216	-2%	1263	1%
9	R17	M20 EB	1149	1287	12%	1293	12%	1353	18%	1377	20%
9	R18	M20 WB	1152	1326	15%	1324	15%	1334	16%	1337	16%
10	R19	A251 AM NB	1363	1547	13%	1557	14%	1648	21%	1687	24%
10	R20	A251 AM SB	1350	1333	-1%	1351	0%	1351	0%	1652	22%
11	R21	A20 EB	1631	1671	2%	1673	3%	1697	4%	1717	5%
11	R22	A20 WB	1743	1801	3%	1802	3%	1820	4%	1835	5%
12	R23	A28 NB	1578	1592	1%	1592	1%	1595	1%	1597	1%
12	R24	A28 SB	1550	1566	1%	1565	1%	1566	1%	1566	1%
13	R25	A252 EB	747	756	1%	757	1%	762	2%	763	2%
13	R26	A252 WB	803	814	1%	818	2%	824	3%	832	4%
14	R27	B2040 EB	498	501	1%	517	4%	511	3%	583	17%
14	R28	B2040 WB	512	565	10%	588	15%	568	11%	794	55%
15	R29	Faversham Road NB	966	898	-7%	927	-4%	918	-5%	1094	13%
15	R30	Faversham Road SB	997	941	-6%	921	-8%	957	-4%	1031	3%
16	R31	Selling Road NB	231	247	7%	255	10%	250	8%	442	91%
16	R32	Selling Road SB	224	249	11%	258	15%	249	11%	305	36%
17	R33	A2500 EB	716	705	-2%	709	-1%	713	0%	728	2%
17	R34	A2500 WB	767	852	11%	879	15%	981	28%	1134	48%
18	R35	Minster Road EB	1036	1044	1%	1050	1%	1046	1%	1036	0%
18	R36	Minster Road WB	925	960	4%	967	5%	999	8%	1141	23%
19	R37	Queenborough Road EB	419	447	7%	457	9%	454	8%	511	22%
19	R38	Queenborough Road WB	362	364	1%	366	1%	376	4%	385	6%
21	R41	B2004 EB	525	525	0%	525	0%	525	0%	525	0%
21	R42	B2004 WB	525	525	0%	525	0%	525	0%	526	0%
22	R43	Grovehurst SB	406	430	6%	431	6%	433	7%	436	8%
22	R44	Grovehurst NB	388	386	-1%	387	0%	388	0%	392	1%
1a	R1a	A2_EB(Eastern Part)	1940	2086	8%	2167	12%	2141	10%	2581	33%
1a	R2a	A2_WB(Eastern Part)	1861	2040	10%	2108	13%	2073	11%	2360	27%
23	R51	Sheppey to M2 J7 via M2 EB	1791	1584	-12%	1617	-10%	1634	-9%	1904	6%
23	R52	Sheppey to M2 J7 via M2 WB	1504	1523	1%	1541	2%	1562	4%	1641	9%
24	R53	Sheppey to M2 J7 via A2 EB	2101	2164	3%	2266	8%	2158	3%	2685	28%
24	R54	Sheppey to M2 J7 via A2 WB	2071	2230	8%	2272	10%	2227	8%	2673	29%
25	R55	Sheppey to M20/A249 SB	1652	1485	-10%	1515	-8%	1514	-8%	1758	6%
25	R56	Sheppey to M20/A249 NB	1101	1064	-3%	1068	-3%	1079	-2%	1099	0%
26	R57	Faversham to A2/A2050 EB	669	756	13%	789	18%	781	17%	1146	71%
26	R58	Faversham to A2/A2050 WB	510	669	31%	721	41%	732	44%	935	83%

Appendix C- 2 Journey time (seconds) comparison in the Inter Peak

Map	Route	Route Name	2017	2027RC	%Diff (2027RC-2017)	2027DS	%Diff (2027RC-2017)	2038RC	%Diff (2038RC-2017)	2038DS	%Diff (2038DS-2017)
1	R1	A2_EB	1061	1083	2%	1083	2%	1086	2%	1088	3%
1	R2	A2_WB	1028	1040	1%	1040	1%	1044	2%	1045	2%
2	R3	M2_EB	1333	1357	2%	1363	2%	1376	3%	1393	5%
2	R4	M2_WB	1367	1405	3%	1412	3%	1439	5%	1489	9%
3	R5	Swale Way NB	408	412	1%	416	2%	413	1%	420	3%
3	R6	Swale Way SB	409	413	1%	416	2%	414	1%	420	3%
4	R7	B2006 EB	370	421	14%	427	15%	425	15%	444	20%
4	R8	B2006 WB	311	319	3%	318	2%	325	4%	324	4%
5	R9	A249 NB	1068	1036	-3%	1043	-2%	1046	-2%	1079	1%
5	R10	A249 SB	1277	1333	4%	1366	7%	1364	7%	1481	16%
6	R11	Sheppey Way NB	326	313	-4%	313	-4%	314	-4%	314	-4%
6	R12	Sheppey Way SB	334	333	0%	333	0%	335	0%	336	1%
7	R13	Borden Lane NB	488	505	3%	505	3%	508	4%	509	4%
7	R14	Borden Lane SB	481	484	1%	484	1%	486	1%	487	1%
8	R15	Church Street NB	1244	1214	-2%	1215	-2%	1215	-2%	1217	-2%
8	R16	Church Street SB	1242	1208	-3%	1208	-3%	1208	-3%	1208	-3%
9	R17	M20 EB	1148	1152	0%	1153	0%	1153	0%	1167	2%
9	R18	M20 WB	1149	1167	2%	1169	2%	1221	6%	1221	6%
10	R19	A251 AM NB	1212	1309	8%	1310	8%	1463	21%	1468	21%
10	R20	A251 AM SB	1247	1287	3%	1289	3%	1290	3%	1301	4%
11	R21	A20 EB	1592	1613	1%	1614	1%	1630	2%	1631	2%
11	R22	A20 WB	1653	1692	2%	1694	2%	1709	3%	1708	3%
12	R23	A28 NB	1569	1573	0%	1573	0%	1574	0%	1574	0%
12	R24	A28 SB	1548	1555	0%	1555	0%	1555	1%	1555	1%
13	R25	A252 EB	734	737	0%	738	0%	741	1%	741	1%
13	R26	A252 WB	761	770	1%	770	1%	776	2%	778	2%
14	R27	B2040 EB	444	482	8%	482	9%	482	8%	484	9%
14	R28	B2040 WB	473	547	16%	572	21%	553	17%	710	50%
15	R29	Faversham Road NB	951	870	-9%	874	-8%	872	-8%	890	-6%
15	R30	Faversham Road SB	981	840	-14%	841	-14%	845	-14%	845	-14%
16	R31	Selling Road NB	227	243	7%	245	8%	243	7%	249	10%
16	R32	Selling Road SB	223	255	14%	262	17%	256	14%	270	21%
17	R33	A2500 EB	703	698	-1%	698	-1%	704	0%	706	0%
17	R34	A2500 WB	720	734	2%	736	2%	743	3%	748	4%
18	R35	Minster Road EB	892	888	0%	891	0%	892	0%	892	0%
18	R36	Minster Road WB	867	877	1%	874	1%	879	1%	877	1%
19	R37	Queenborough Road EB	402	446	11%	448	12%	445	11%	449	12%
19	R38	Queenborough Road WB	361	371	3%	371	3%	371	3%	372	3%
21	R41	B2004 EB	525	525	0%	525	0%	525	0%	525	0%
21	R42	B2004 WB	525	525	0%	525	0%	525	0%	525	0%
22	R43	Grovehurst SB	391	426	9%	426	9%	426	9%	428	10%
22	R44	Grovehurst NB	387	379	-2%	379	-2%	379	-2%	380	-2%
1a	R1a	A2_EB(Eastern Part)	1842	1875	2%	1893	3%	1881	2%	2053	12%
1a	R2a	A2_WB(Eastern Part)	1739	1791	3%	1799	3%	1805	4%	1841	6%
23	R51	Sheppey to M2 J7 via M2 EB	1638	1498	-9%	1509	-8%	1517	-7%	1623	-1%
23	R52	Sheppey to M2 J7 via M2 WB	1455	1460	0%	1470	1%	1481	2%	1550	7%
24	R53	Sheppey to M2 J7 via A2 EB	1969	1964	0%	1976	0%	1955	-1%	2084	6%
24	R54	Sheppey to M2 J7 via A2 WB	1961	1991	2%	2012	3%	1997	2%	2192	12%
25	R55	Sheppey to M20/A249 SB	1277	1333	4%	1366	7%	1364	7%	1481	16%
25	R56	Sheppey to M20/A249 NB	1063	1030	-3%	1037	-2%	1040	-2%	1073	1%
26	R57	Faversham to A2/A2050 EB	505	578	14%	581	15%	582	15%	595	18%
26	R58	Faversham to A2/A2050 WB	506	611	21%	620	22%	618	22%	715	41%

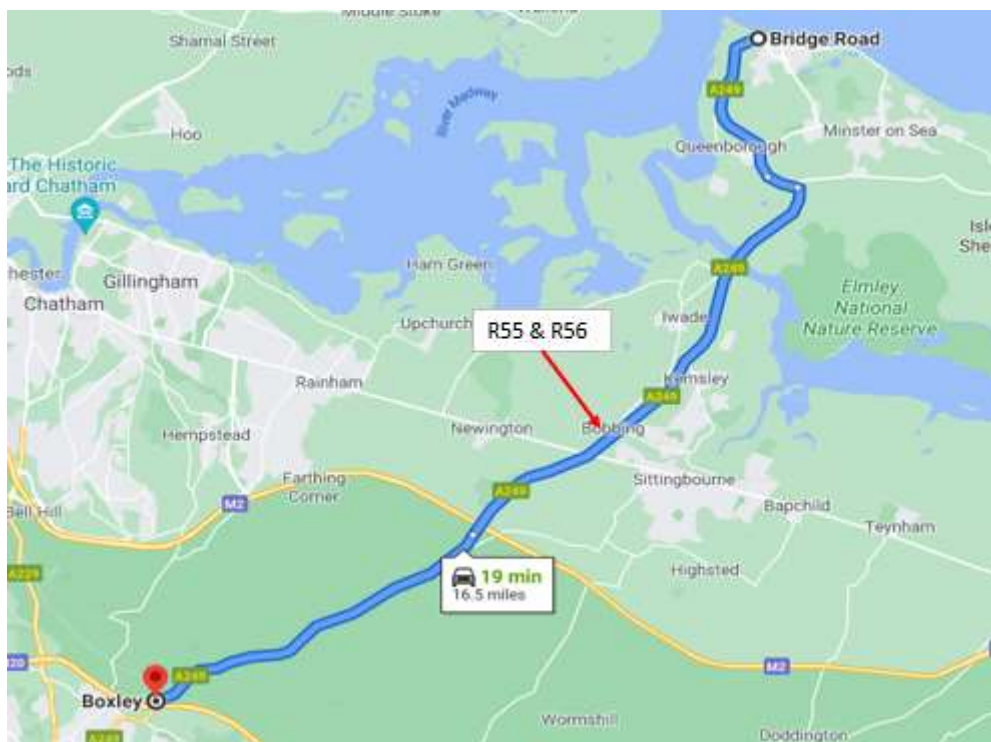
Appendix C- 3 Journey time (seconds) comparison in the PM Peak

Map	Route	Route Name	2017	2027RC	%Diff (2027RC-2017)	2027DS	%Diff (2027RC-2017)	2038RC	%Diff (2038RC-2017)	2038DS	%Diff (2038DS-2017)
1	R1	A2_EB	1091	1151	5%	1160	6%	1166	7%	1177	8%
1	R2	A2_WB	1198	1119	-7%	1132	-6%	1138	-5%	1304	9%
2	R3	M2_EB	1397	1459	4%	1471	5%	1498	7%	1662	19%
2	R4	M2_WB	1479	1661	12%	1708	15%	1775	20%	1968	33%
3	R5	Swale Way NB	432	447	4%	463	7%	467	8%	560	30%
3	R6	Swale Way SB	412	419	2%	422	2%	423	3%	437	6%
4	R7	B2006 EB	427	467	9%	492	15%	469	10%	568	33%
4	R8	B2006 WB	354	372	5%	377	7%	393	11%	459	30%
5	R9	A249 NB	1216	1159	-5%	1187	-2%	1185	-3%	1695	39%
5	R10	A249 SB	1648	1557	-6%	1575	-4%	1712	4%	1811	10%
6	R11	Sheppey Way NB	329	314	-4%	315	-4%	317	-4%	318	-3%
6	R12	Sheppey Way SB	349	344	-1%	345	-1%	352	1%	364	4%
7	R13	Borden Lane NB	500	519	4%	522	4%	528	6%	560	12%
7	R14	Borden Lane SB	525	488	-7%	489	-7%	490	-7%	498	-5%
8	R15	Church Street NB	1249	1224	-2%	1236	-1%	1227	-2%	1455	16%
8	R16	Church Street SB	1244	1212	-3%	1212	-3%	1212	-3%	1217	-2%
9	R17	M20 EB	1152	1196	4%	1205	5%	1264	10%	1329	15%
9	R18	M20 WB	1147	1260	10%	1268	11%	1292	13%	1286	12%
10	R19	A251 AM NB	1364	1554	14%	1564	15%	1670	22%	1715	26%
10	R20	A251 AM SB	1258	1296	3%	1305	4%	1313	4%	1375	9%
11	R21	A20 EB	1627	1720	6%	1722	6%	1746	7%	1758	8%
11	R22	A20 WB	1681	1734	3%	1737	3%	1754	4%	1767	5%
12	R23	A28 NB	1530	1549	1%	1549	1%	1550	1%	1550	1%
12	R24	A28 SB	1467	1486	1%	1486	1%	1487	1%	1487	1%
13	R25	A252 EB	766	774	1%	777	1%	781	2%	787	3%
13	R26	A252 WB	768	778	1%	783	2%	792	3%	808	5%
14	R27	B2040 EB	497	506	2%	519	4%	521	5%	569	14%
14	R28	B2040 WB	532	626	18%	686	29%	640	20%	1055	98%
15	R29	Faversham Road NB	974	926	-5%	1000	3%	947	-3%	1250	28%
15	R30	Faversham Road SB	988	865	-12%	860	-13%	880	-11%	917	-7%
16	R31	Selling Road NB	237	260	10%	265	12%	259	9%	428	81%
16	R32	Selling Road SB	231	251	8%	258	12%	251	9%	334	44%
17	R33	A2500 EB	825	784	-5%	784	-5%	853	3%	771	-7%
17	R34	A2500 WB	698	707	1%	710	2%	717	3%	725	4%
18	R35	Minster Road EB	967	1064	10%	1080	12%	1219	26%	1156	20%
18	R36	Minster Road WB	859	857	0%	858	0%	854	-1%	863	0%
19	R37	Queenborough Road EB	448	516	15%	528	18%	664	48%	619	38%
19	R38	Queenborough Road WB	365	363	-1%	363	-1%	361	-1%	356	-2%
21	R41	B2004 EB	525	525	0%	525	0%	525	0%	525	0%
21	R42	B2004 WB	525	525	0%	525	0%	525	0%	525	0%
22	R43	Grovehurst SB	400	439	10%	440	10%	441	10%	450	12%
22	R44	Grovehurst NB	393	388	-1%	390	-1%	391	-1%	405	3%
1a	R1a	A2_EB(Eastern Part)	1883	2020	7%	2119	13%	2085	11%	2626	40%
1a	R2a	A2_WB(Eastern Part)	1804	1932	7%	1971	9%	1973	9%	2311	28%
23	R51	Sheppey to M2 J7 via M2 EB	1761	1640	-7%	1667	-5%	1819	3%	1980	12%
23	R52	Sheppey to M2 J7 via M2 WB	1615	1653	2%	1712	6%	1724	7%	2402	49%
24	R53	Sheppey to M2 J7 via A2 EB	2083	2189	5%	2260	8%	2303	11%	2693	29%
24	R54	Sheppey to M2 J7 via A2 WB	2036	2155	6%	2271	12%	2241	10%	3201	57%
25	R55	Sheppey to M20/A249 SB	1648	1557	-6%	1575	-4%	1712	4%	1811	10%
25	R56	Sheppey to M20/A249 NB	1209	1151	-5%	1178	-3%	1176	-3%	1686	39%
26	R57	Faversham to A2/A2050 EB	544	673	24%	680	25%	693	27%	812	49%
26	R58	Faversham to A2/A2050 WB	515	697	35%	728	41%	713	38%	1092	112%

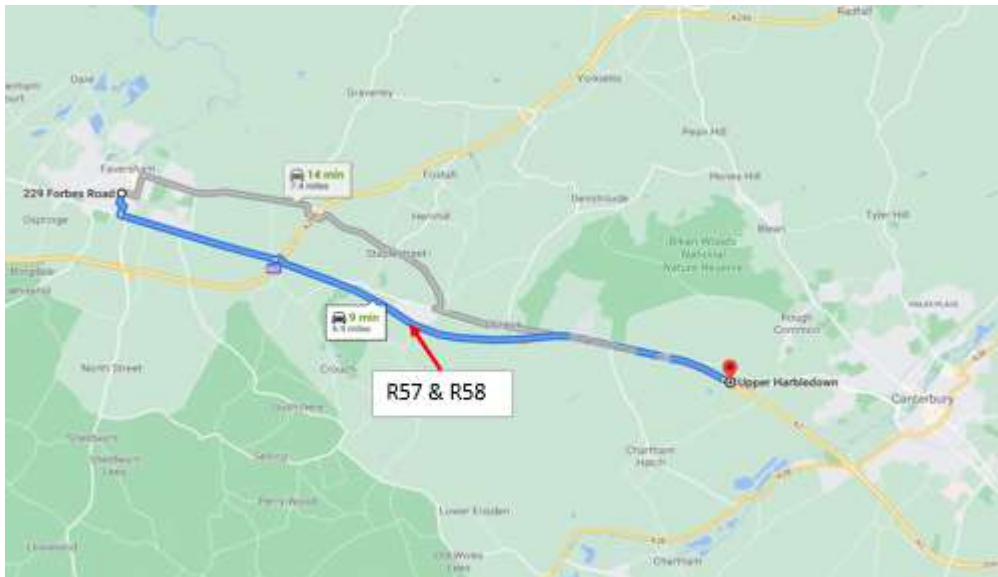
Appendix C- 4 Journey time routes R51-54 between Sheppey and M2 J7



Appendix C- 5 Journey time routes R55-56 between Sheppey and M20/A249

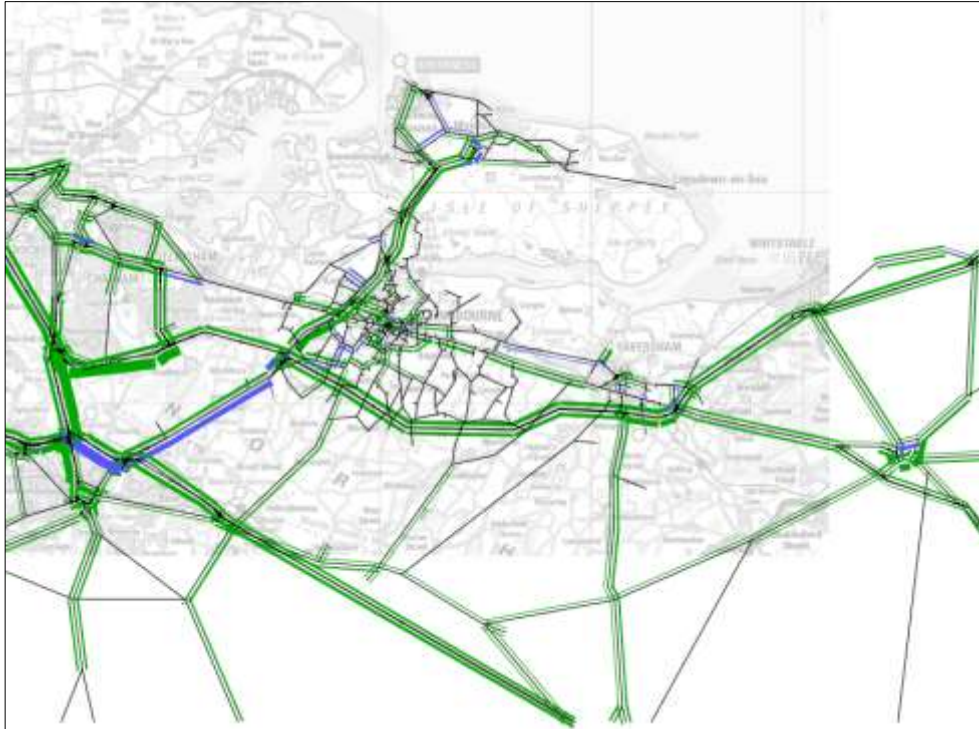


Appendix C- 6 Journey time routes R57-58 between Faversham to A2/A2050

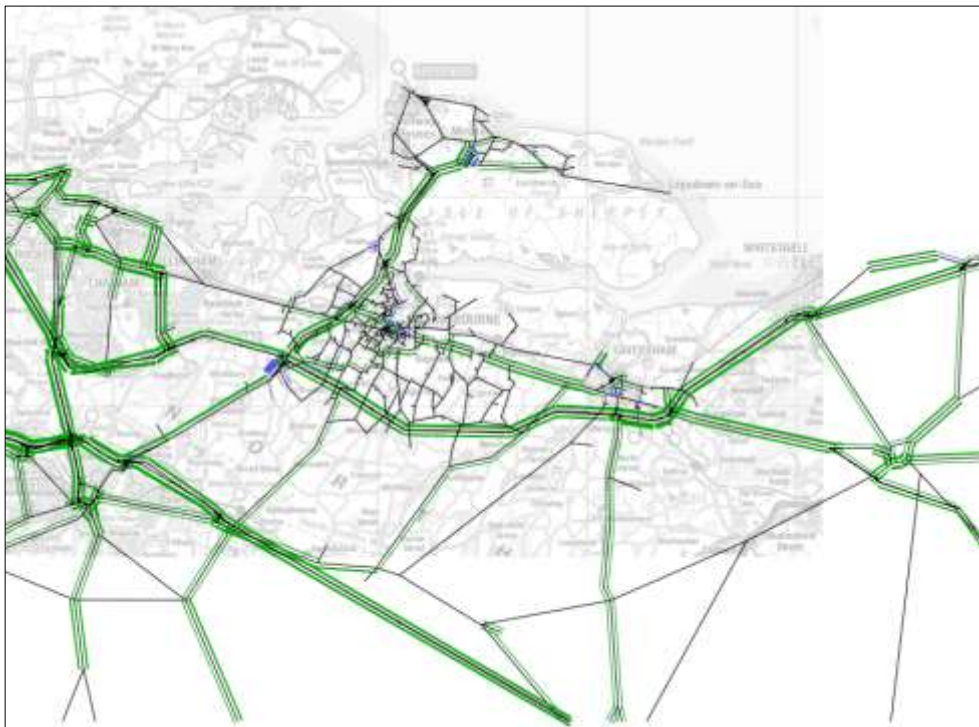


Appendix D

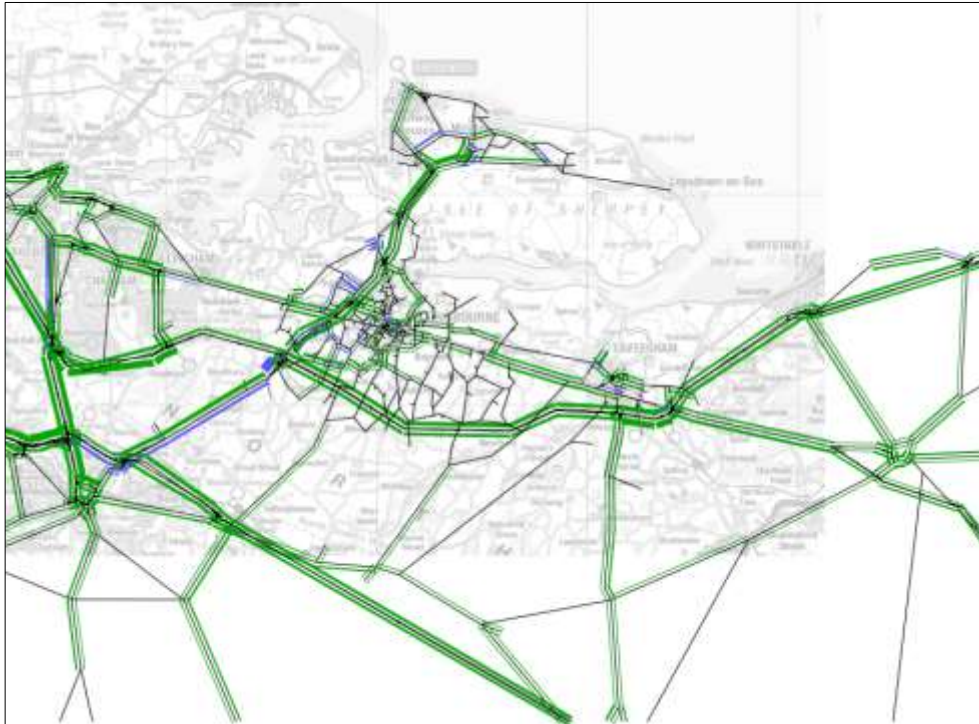
Appendix D- 1 Actual flow (PCUs) comparison between 2027 RC and base year-AM Peak



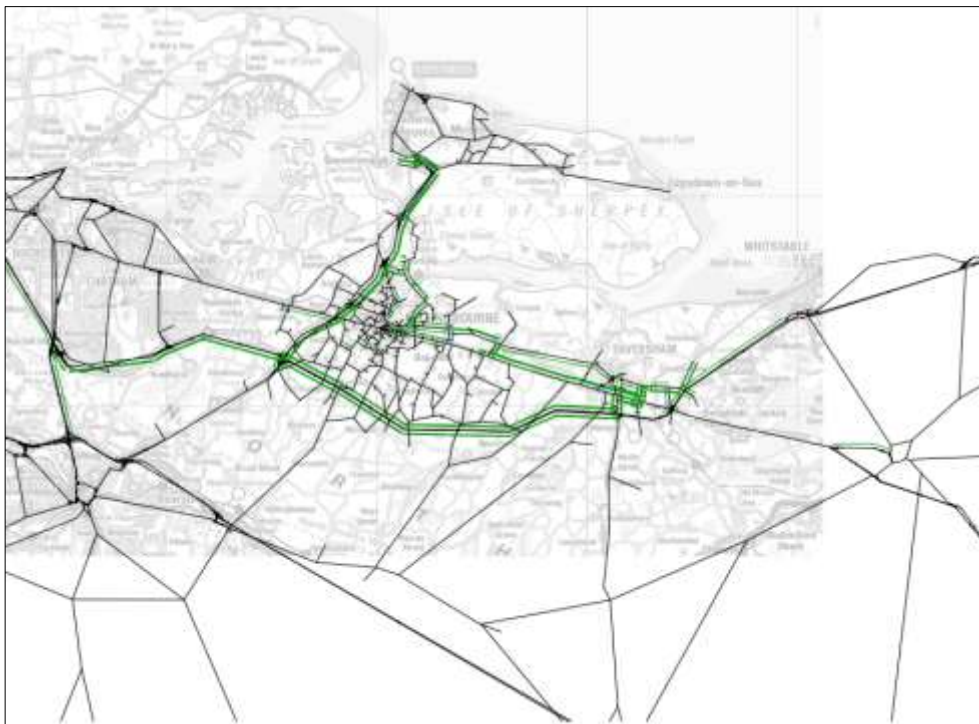
Appendix D- 2 Actual flow (PCUs) comparison between 2027 RC and base year-Inter Peak



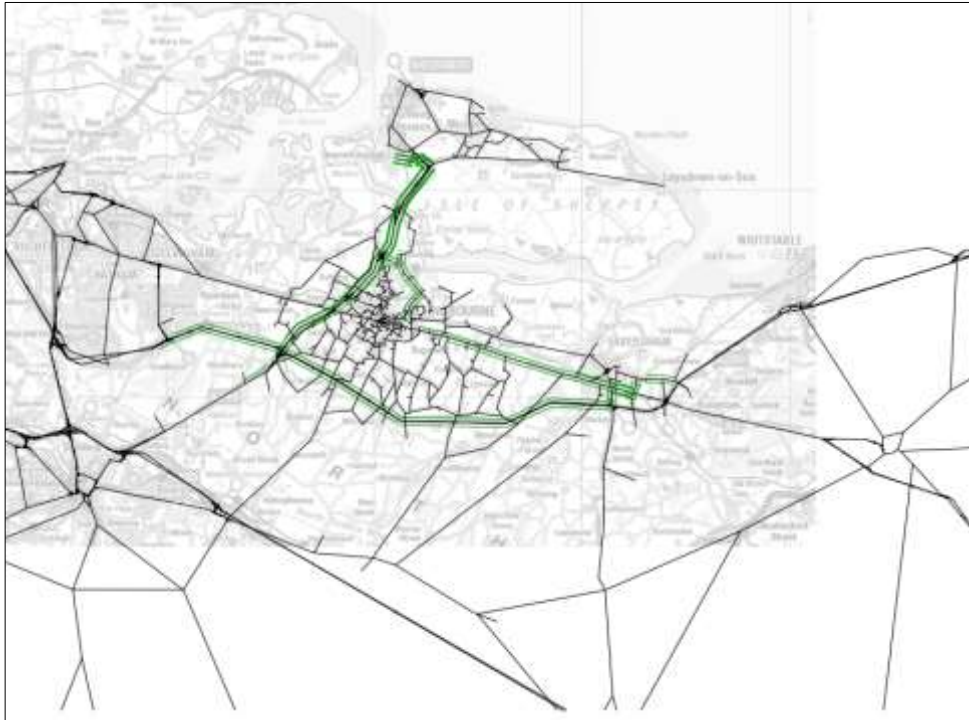
Appendix D- 3 Actual flow (PCUs) comparison between 2027 RC and base year-PM Peak



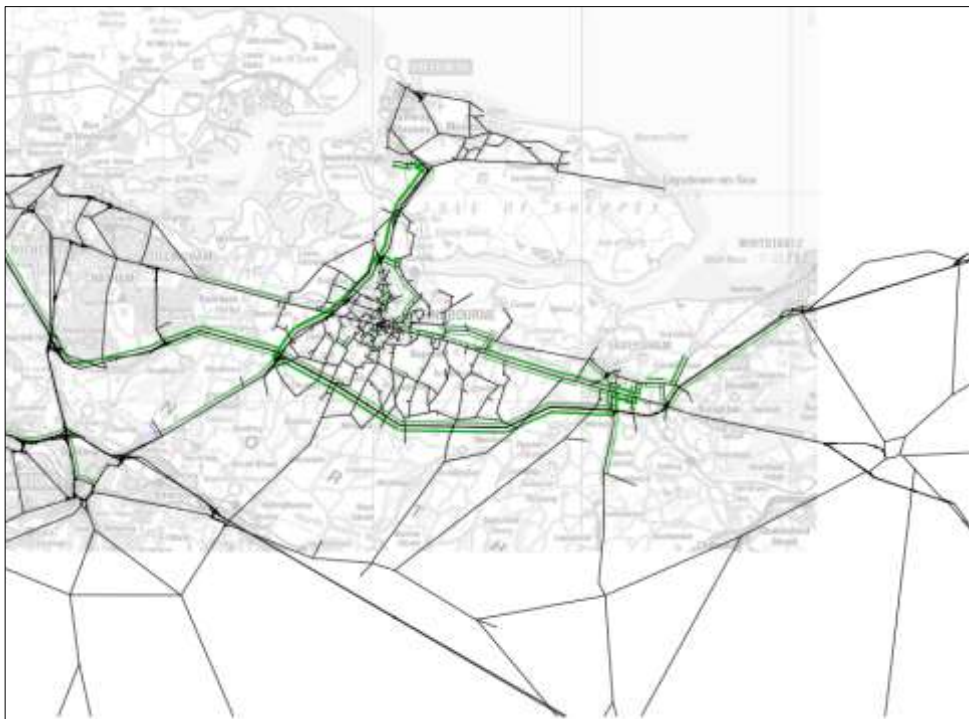
Appendix D- 4 Actual flow (PCUs) comparison between 2027 RC and DS scenario-AM Peak



Appendix D- 5 Actual flow (PCUs) comparison between 2027 RC and DS scenario-Inter Peak

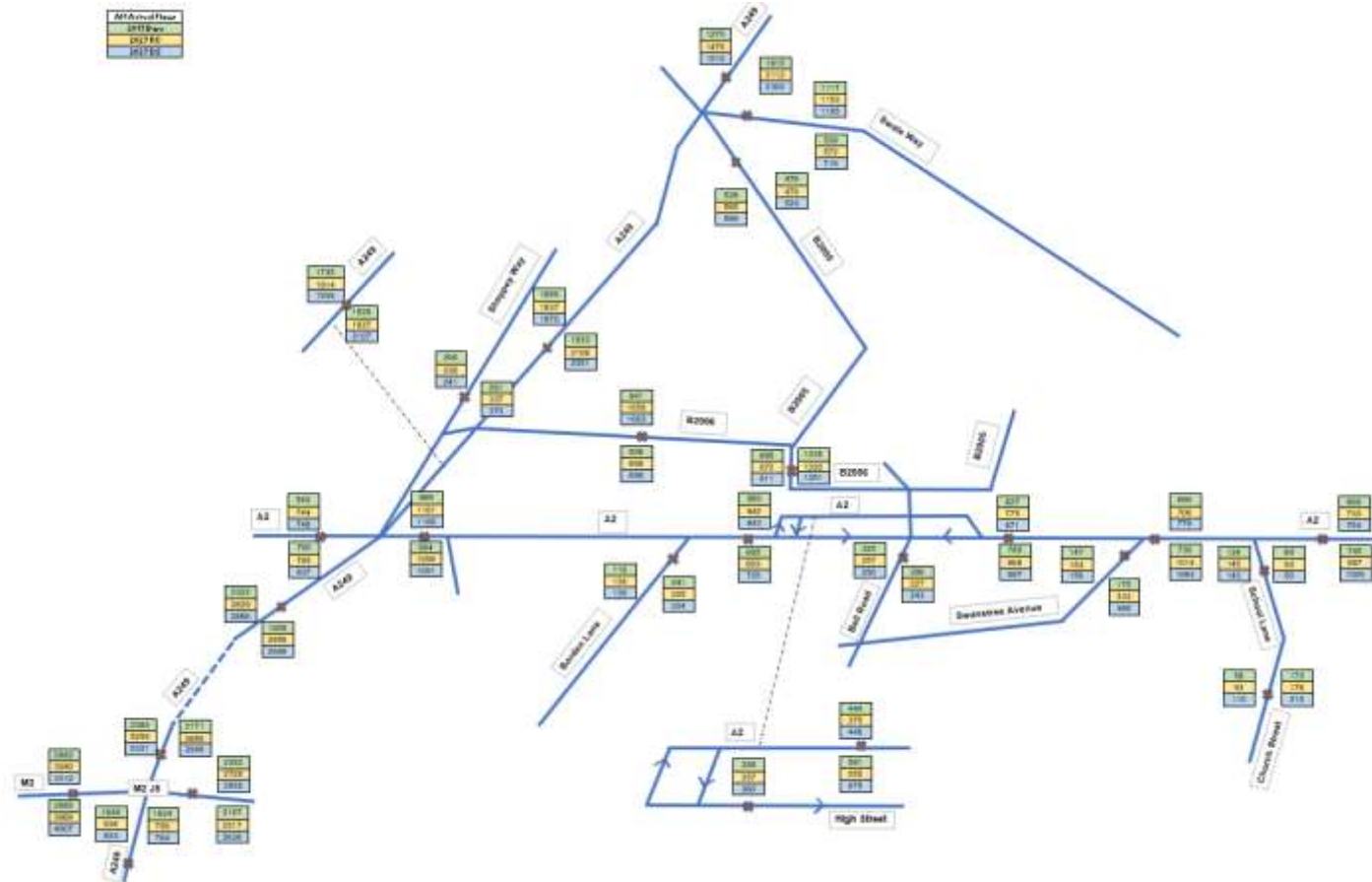


Appendix D- 6 Actual flow (PCUs) comparison between 2027 RC and DS scenario-PM Peak



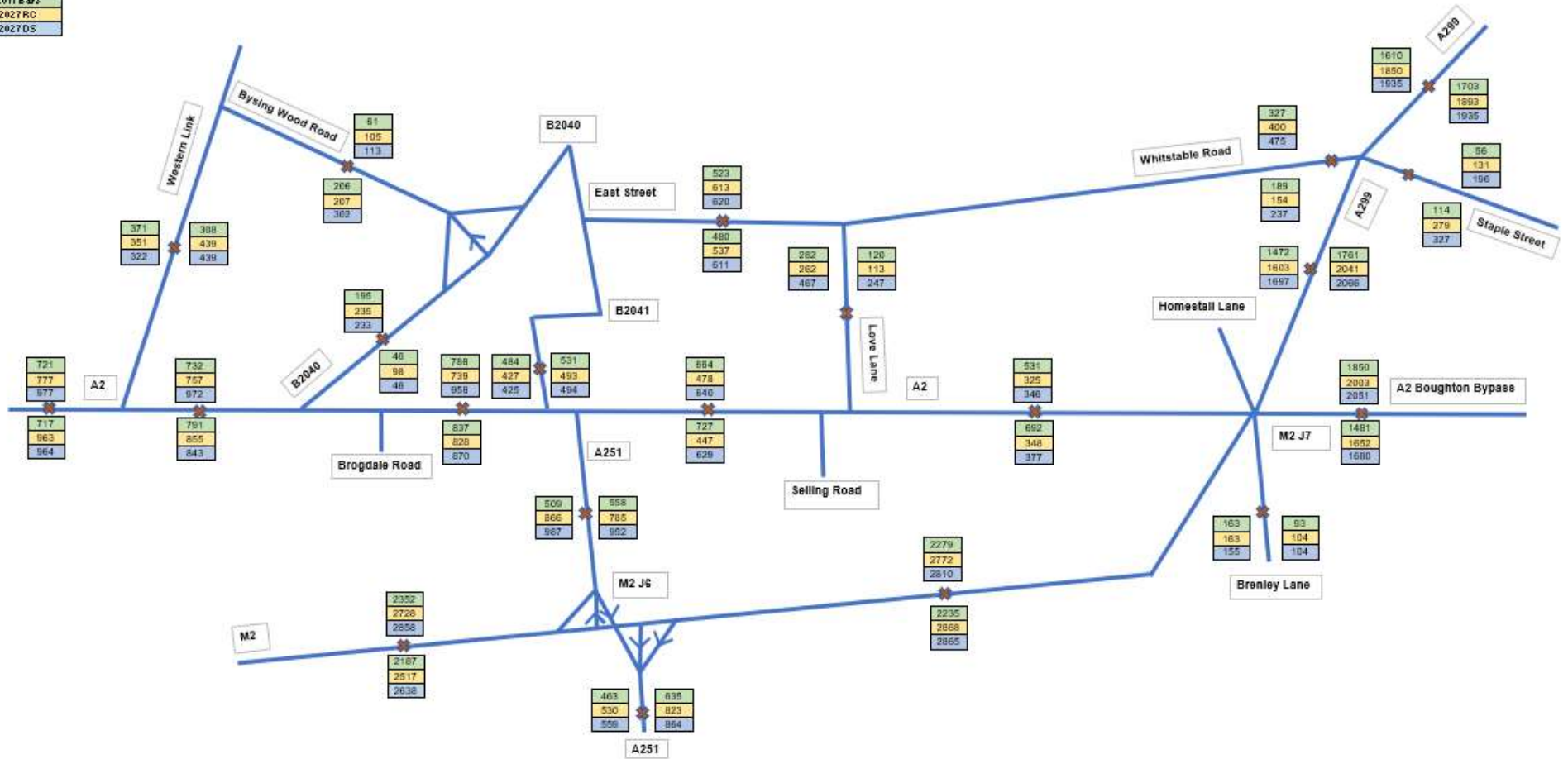
Appendix E

2027 Flows on key roads in Sittingbourne AM

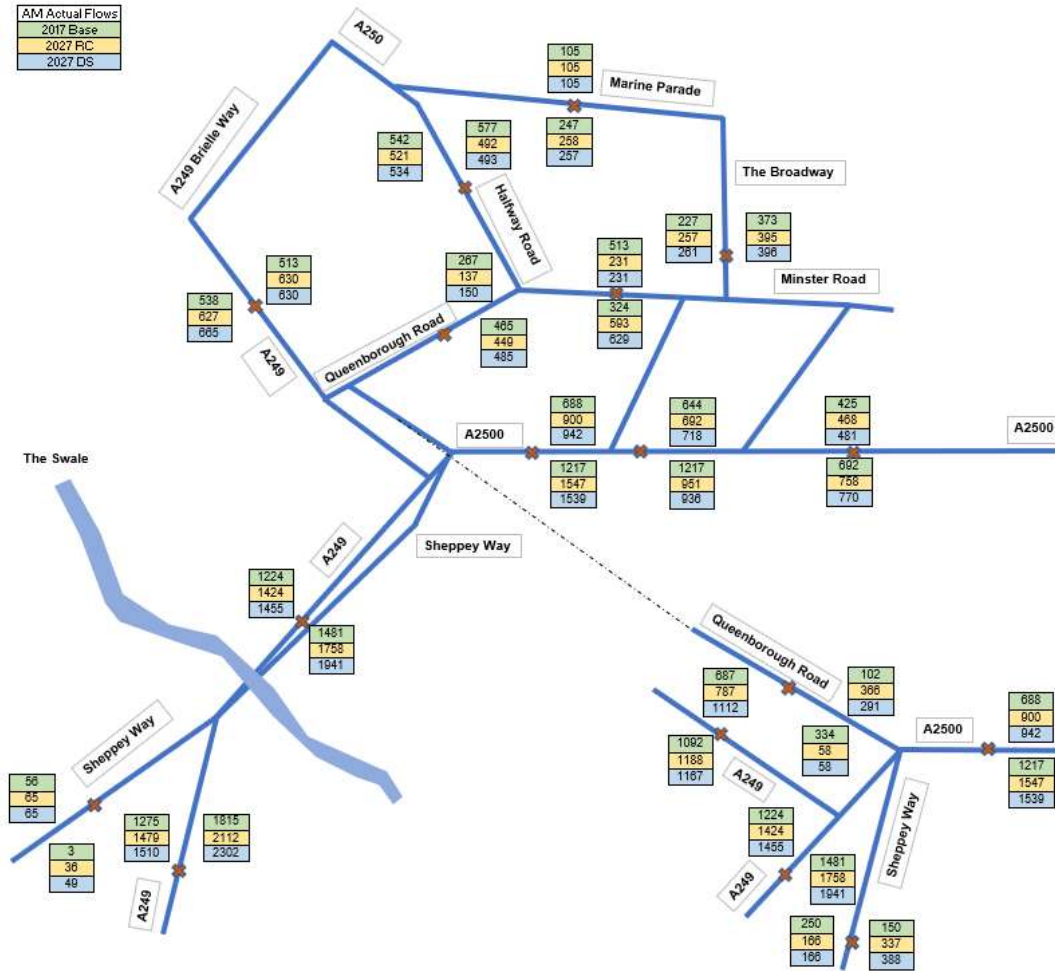


2027 Flows on key roads in Faversham AM

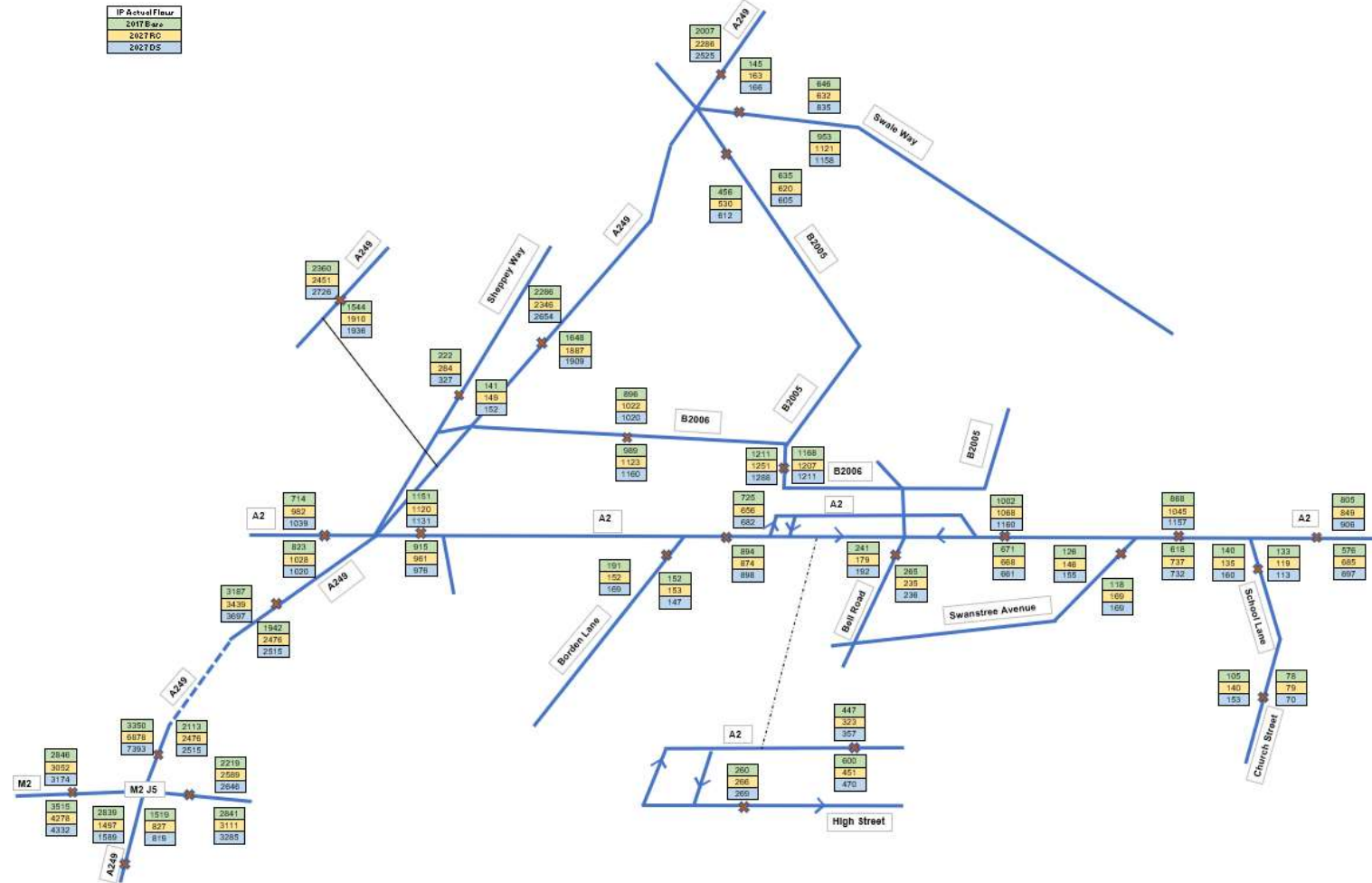
AM Actual Flow
2017 Eaz
2027 RC
2027 DS



2027 Flows on key roads in Isle of Sheppey AM

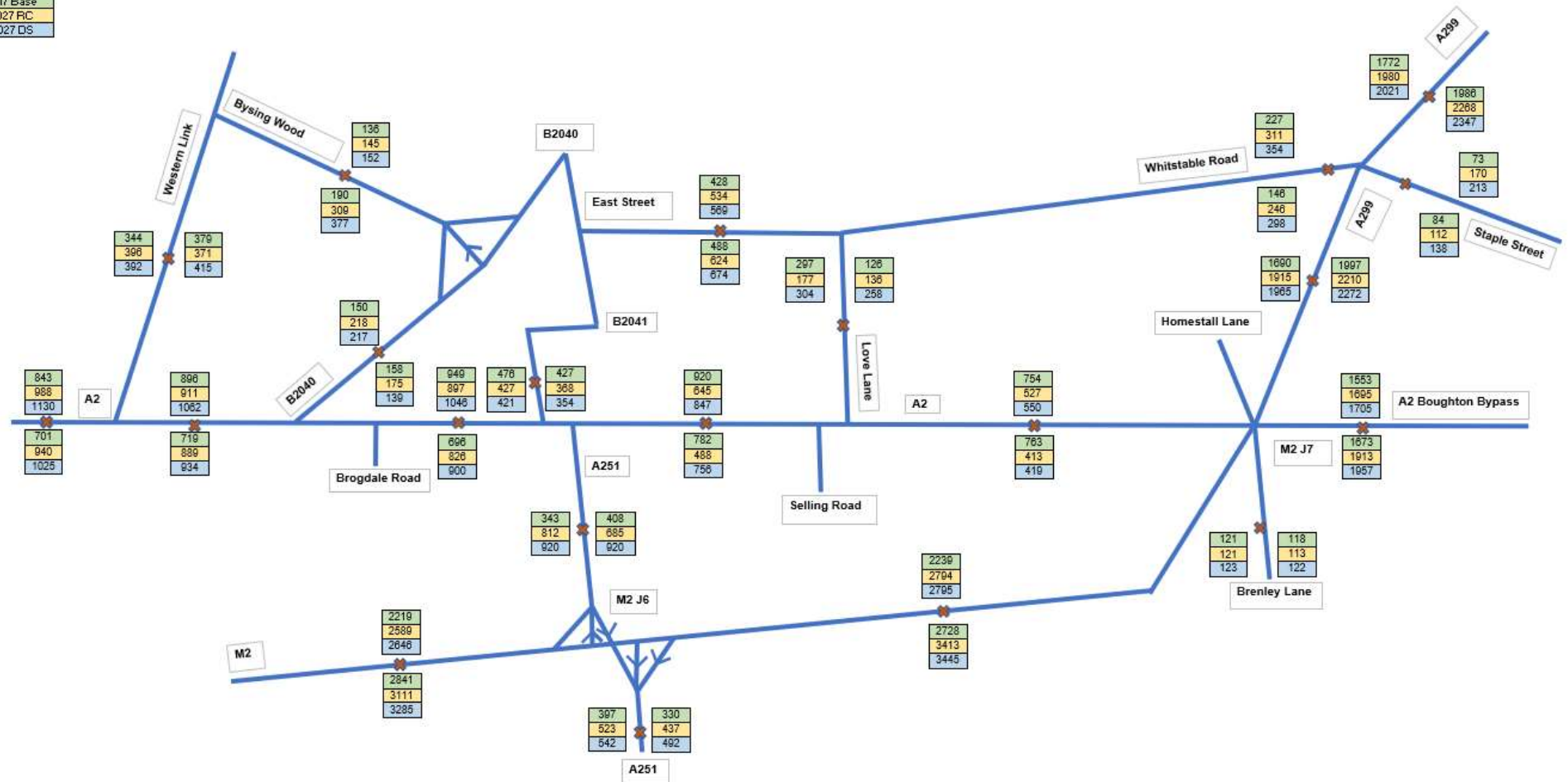


2027 Flows on key roads in Sittingbourne Inter Peak

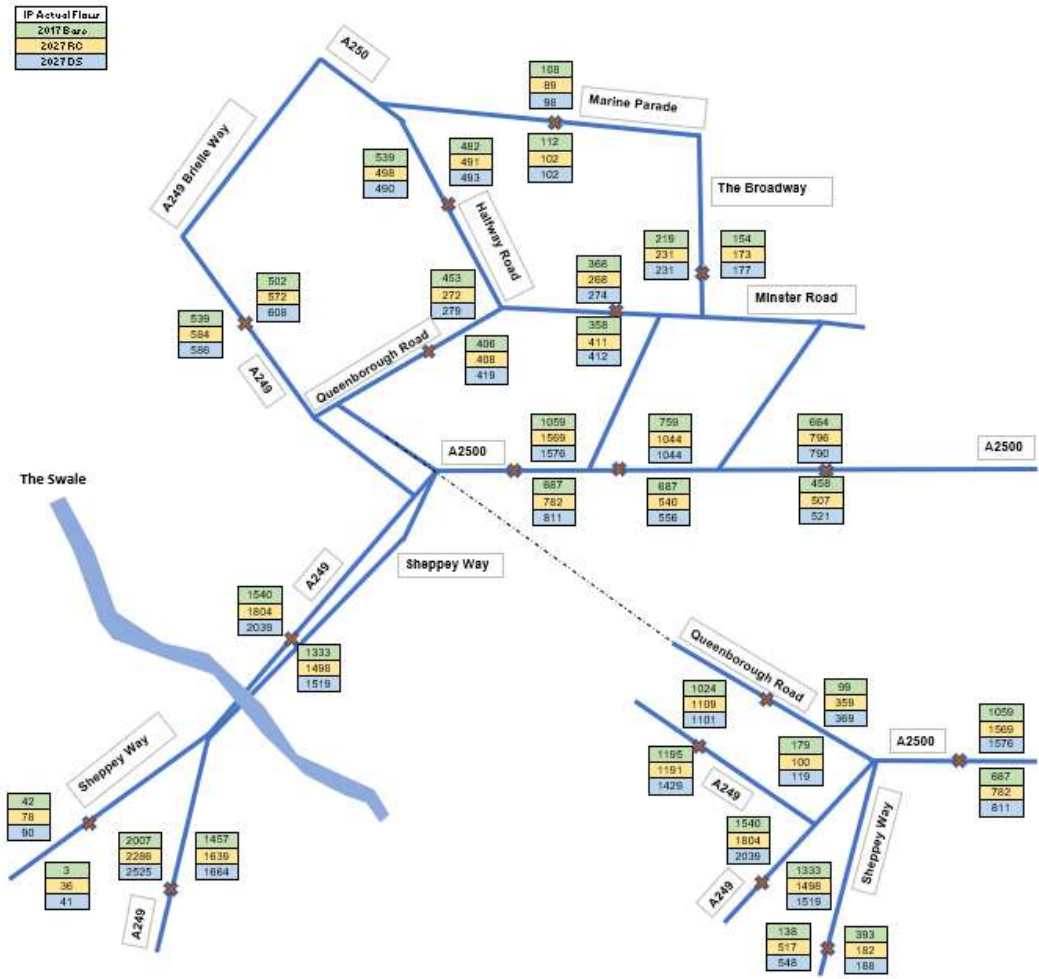


2027 Flows on key roads in Faversham Inter Peak

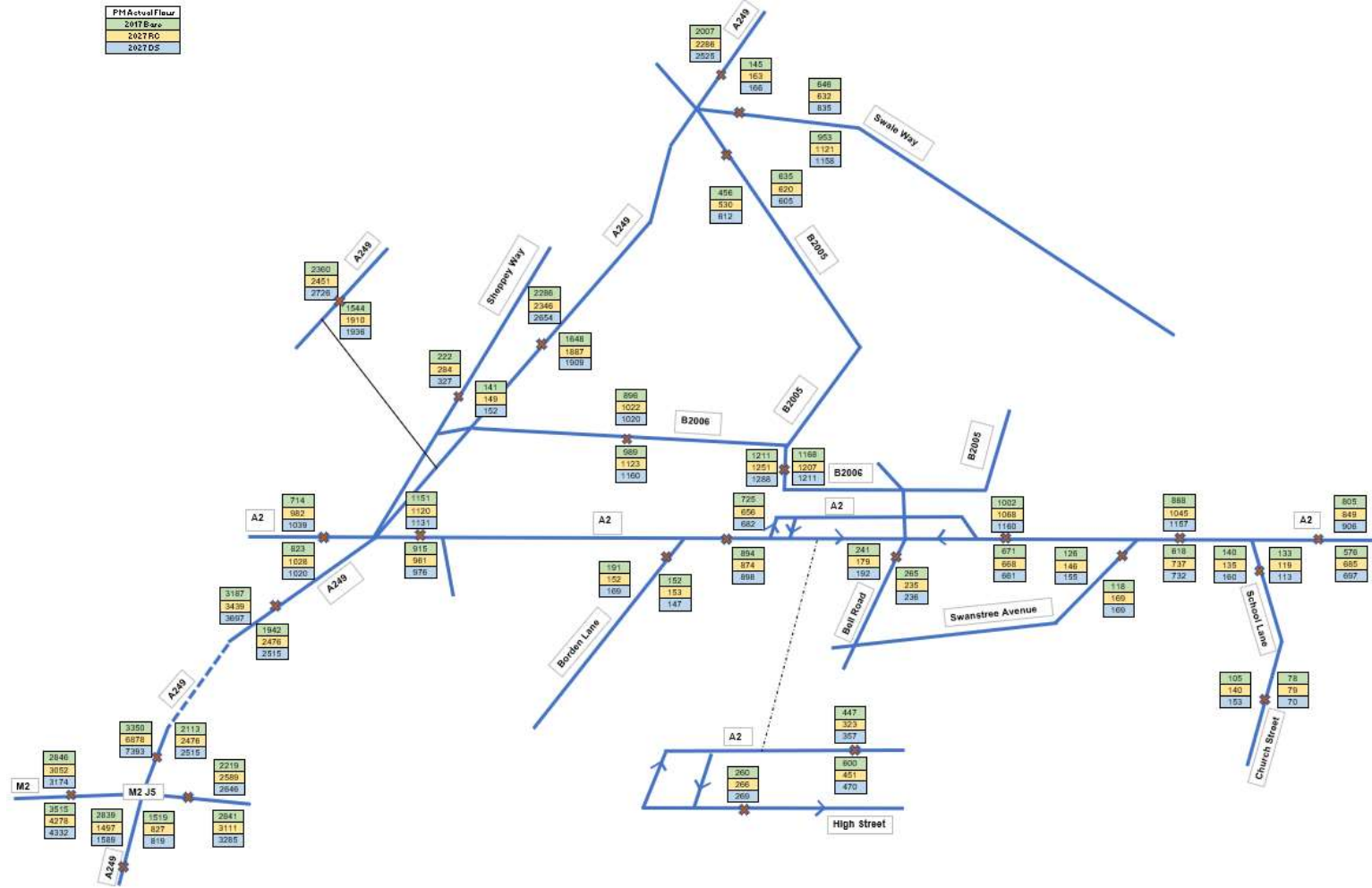
IP Actual Flows
2017 Base
2027 RC
2027 DS



2027 Flows on key roads in Isle of Sheppey Inter Peak

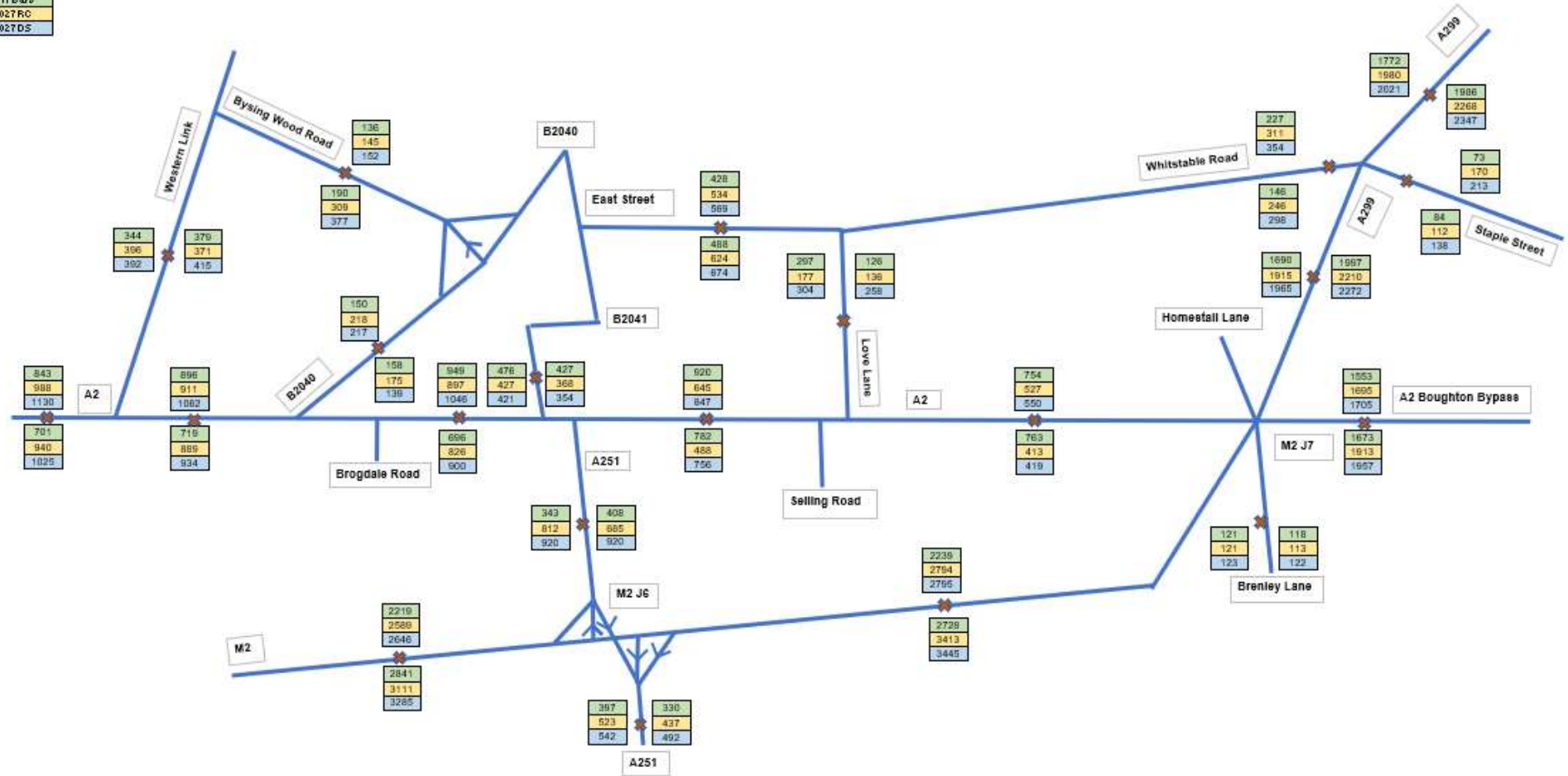


2027 Flows on key roads in Sittingbourne PM

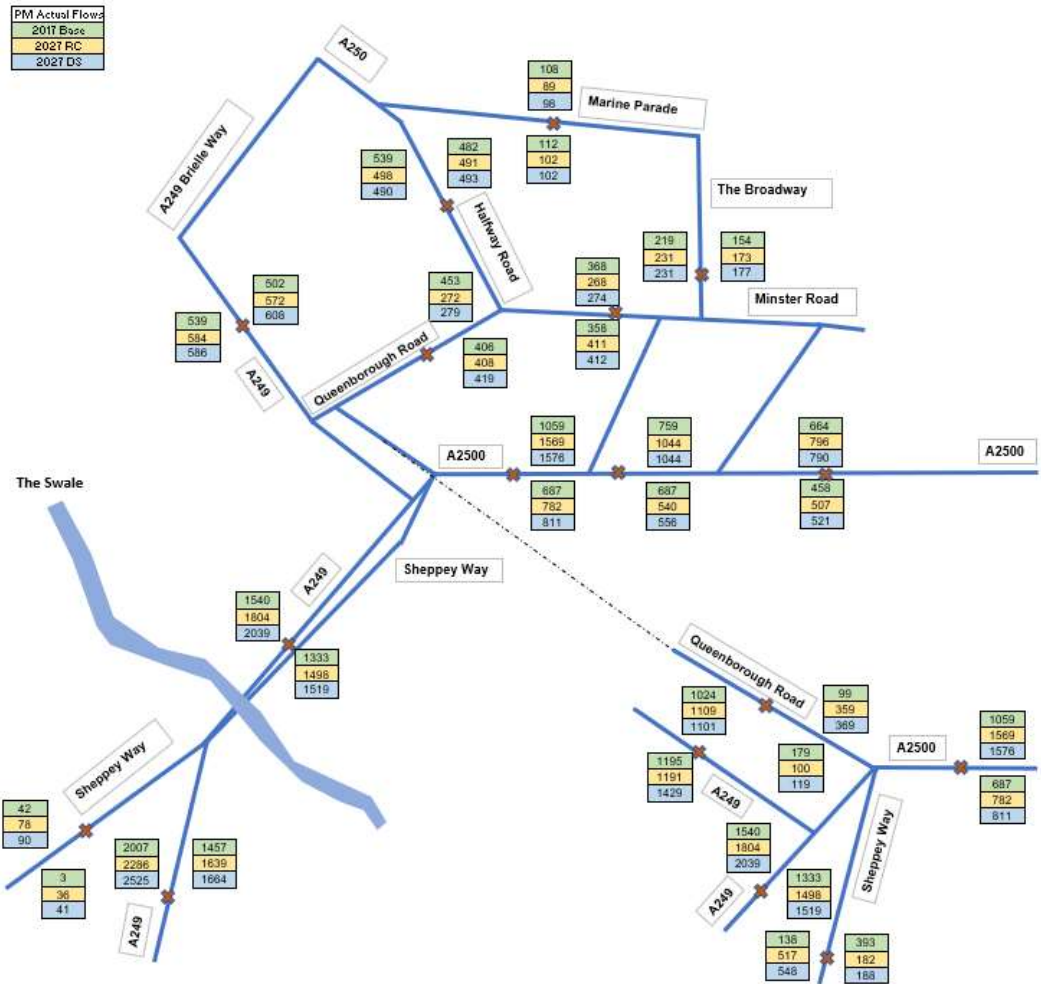


2027 Flows on key roads in Faversham PM

PM Actual Flow
2017 Base
2027 RC
2027 DS

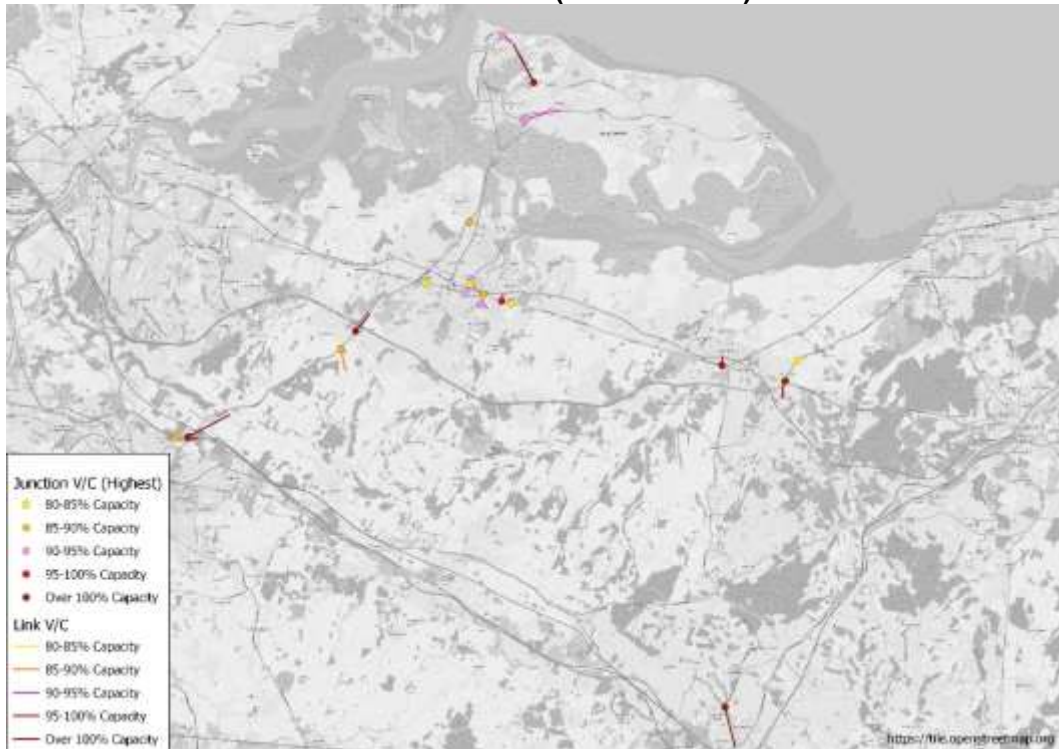


2027 Flows on key roads in Isle of Sheppey PM



Appendix F

AM 2017 Base - Junction and Link V/C Plot (wider network)



AM 2017 Base - Junction and Link V/C Plot (local area)



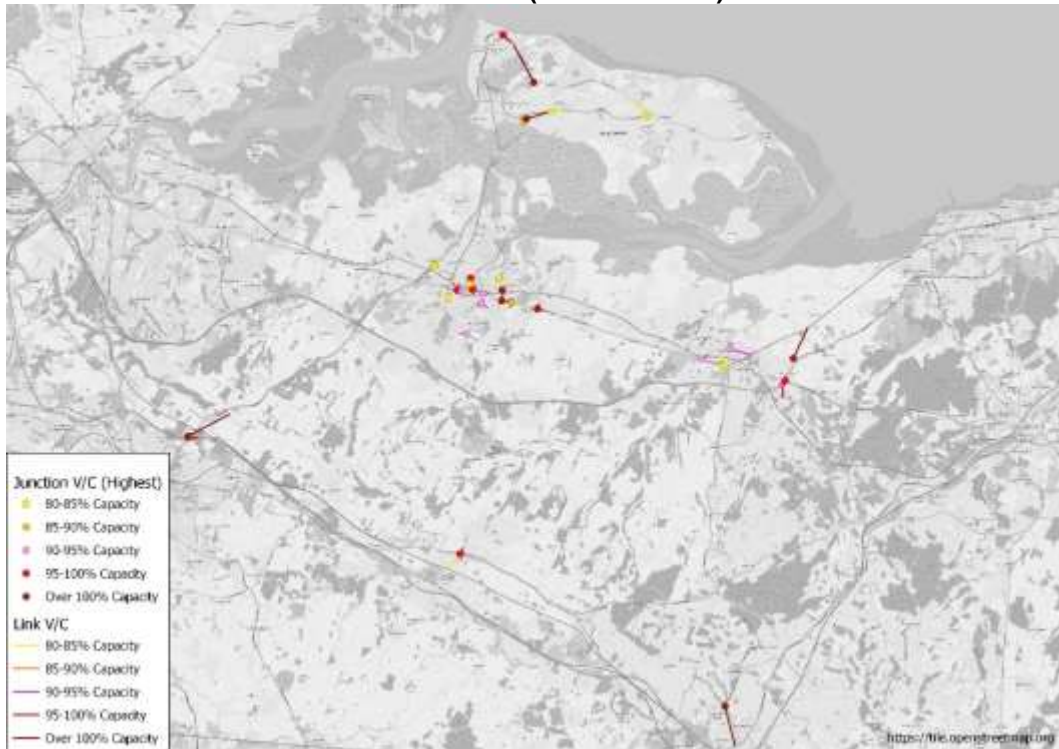
AM 2027 RC - Junction and Link V/C Plot (wider network)



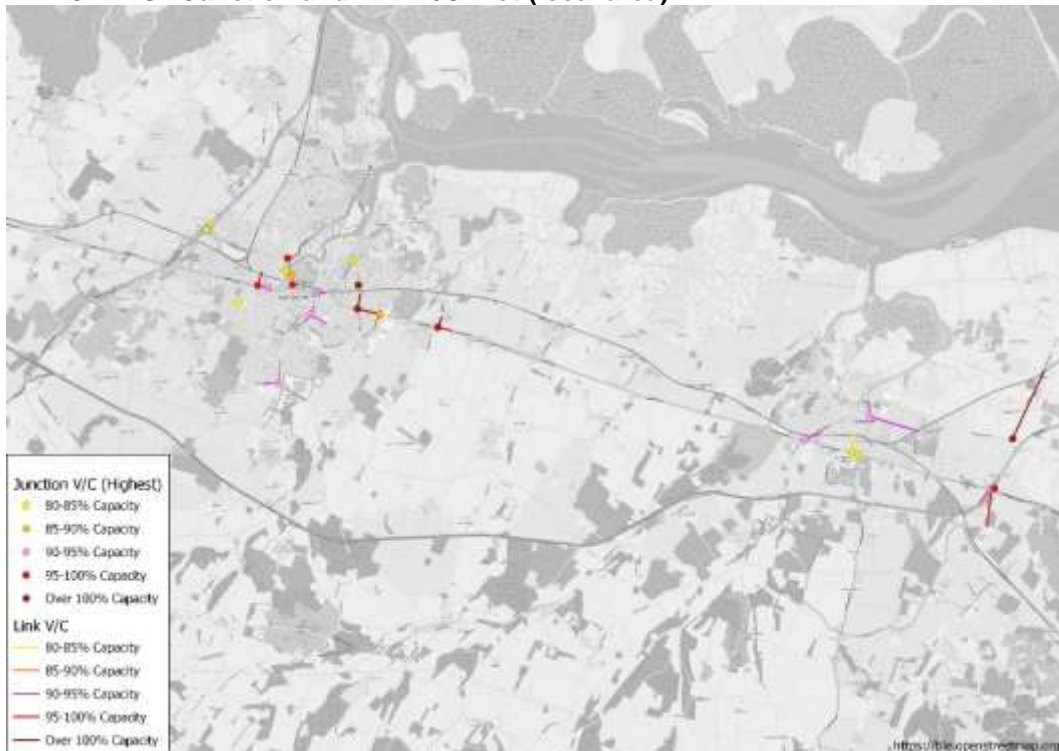
AM 2027 RC - Junction and Link V/C Plot (local area)



AM 2027 DS - Junction and Link V/C Plot (wider network)



AM 2027 DS - Junction and Link V/C Plot (local area)



AM 2038 RC - Junction and Link V/C Plot (wider network)



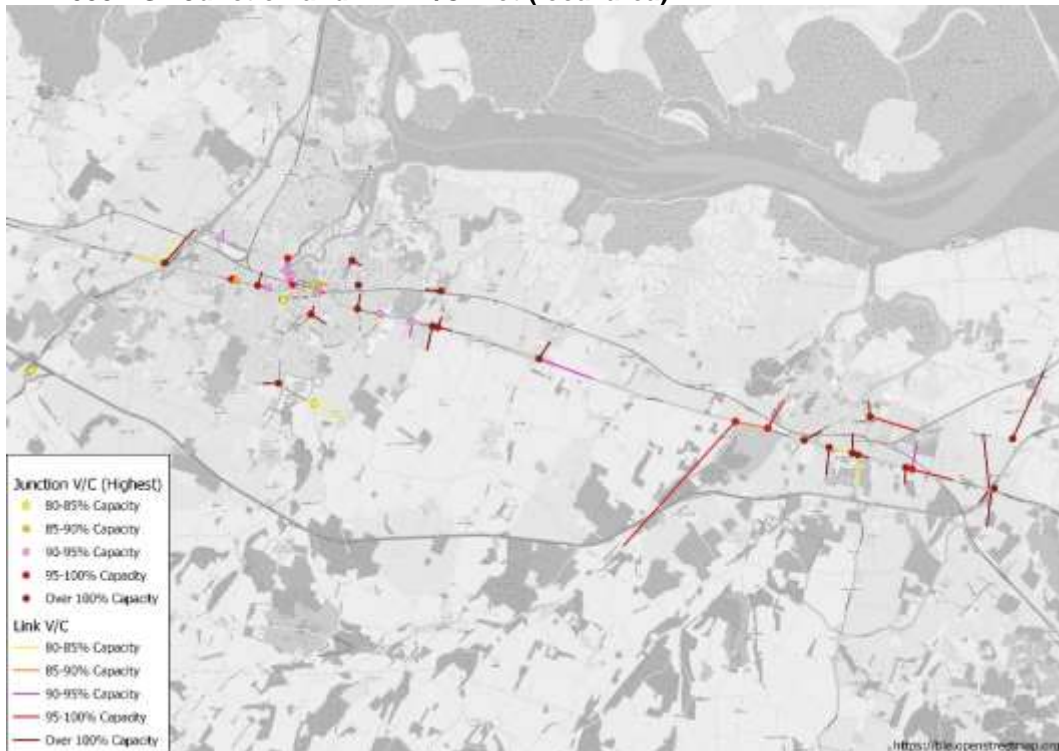
AM 2038 RC - Junction and Link V/C Plot (local area)



AM 2038 DS – Junction and Link V/C Plot (wider network)



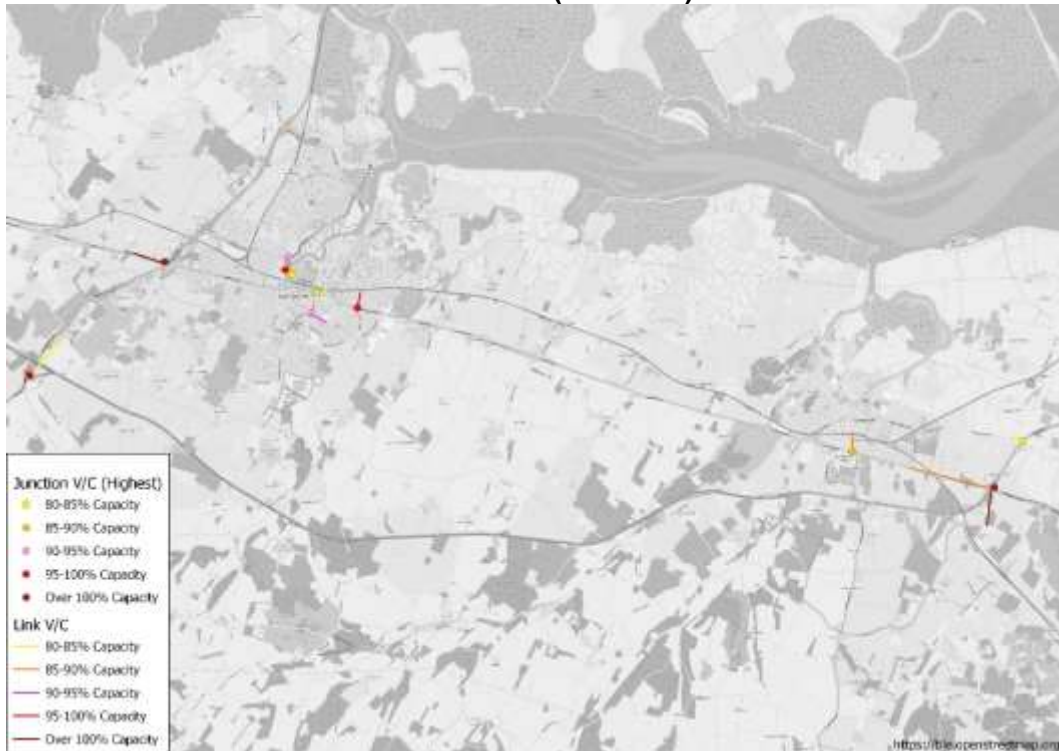
AM 2038 DS - Junction and Link V/C Plot (local area)



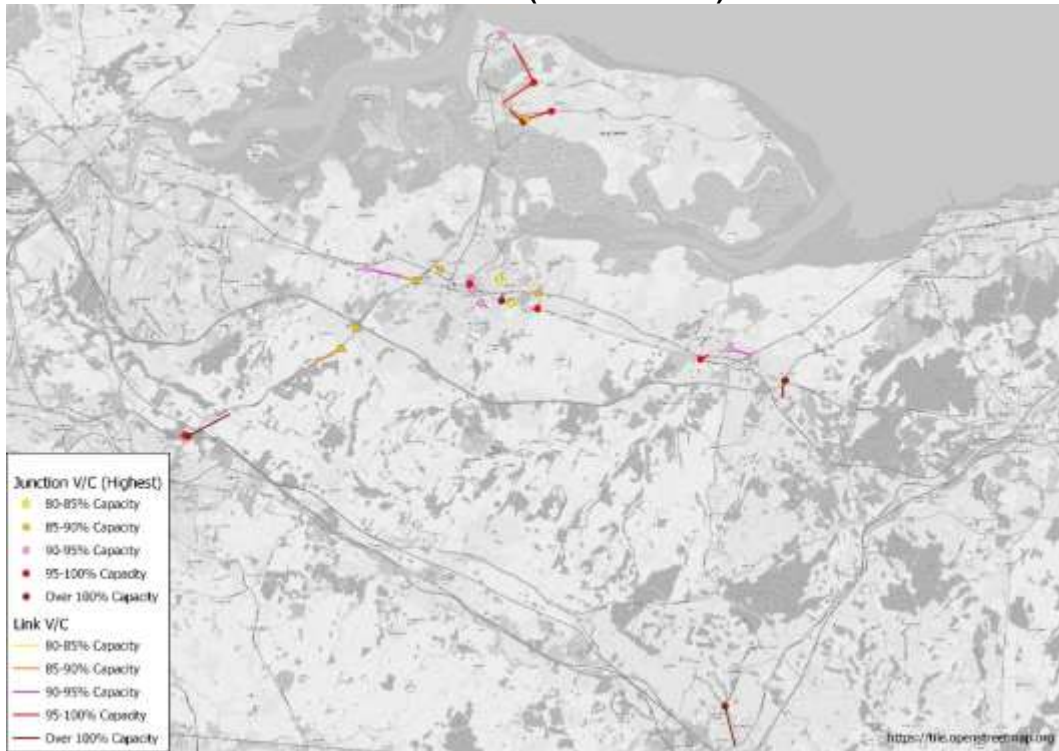
PM 2017 Base - Junction and Link V/C Plot (wider network)



PM 2017 Base - Junction and Link V/C Plot (local area)



PM 2027 RC - Junction and Link V/C Plot (wider network)



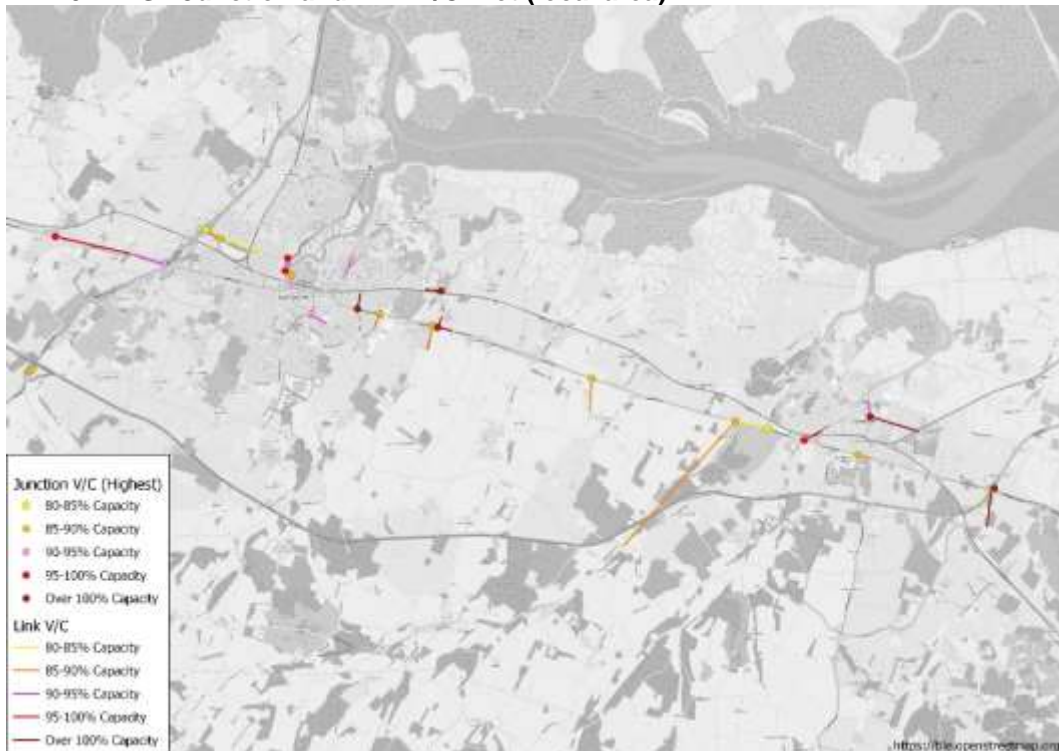
PM 2027 RC - Junction and Link V/C Plot (local area)



PM 2027 DS - Junction and Link V/C Plot (wider network)



PM 2027 DS - Junction and Link V/C Plot (local area)



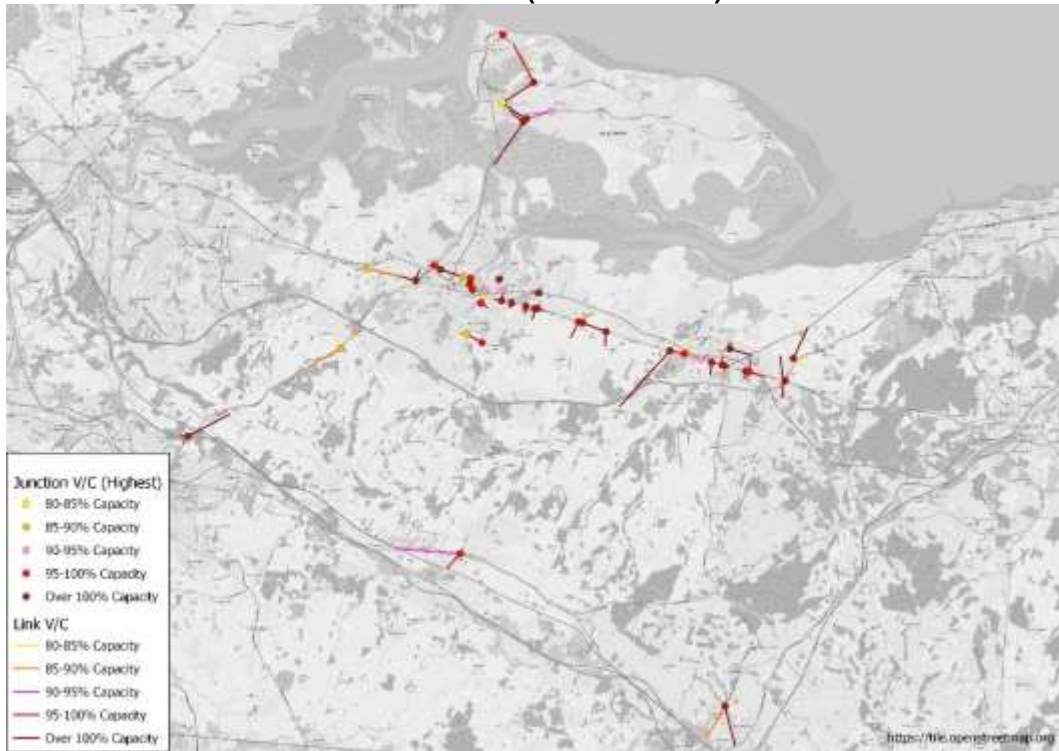
PM 2038 RC - Junction and Link V/C Plot (wider network)



PM 2038 RC - Junction and Link V/C Plot (local area)



PM 2038 DS - Junction and Link V/C Plot (wider network)



PM 2038 DS - Junction and Link V/C Plot (local area)

