



## Maidstone Local Plan Extended Forecast Modelling Report

March 2022

Kent County Council

KCC

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## Maidstone Local Plan

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## Limitation Statement

The sole purpose of this technical report is to describe the processes by which the 2037 and 2050 Maidstone Local Plan demand forecasts have been carried out using the Maidstone Local Transport Model. This report should be read in full with no excerpts out of context deemed to be representative of the report and its findings as a whole. This report has been prepared exclusively for Jacobs and Jacobs' end client (Kent County Council) and no liability is accepted for any use or reliance on the report by third parties.

Several of the figures within this report have been generated in the PTV VISUM software using OpenStreetMap® open source data, licensed under the Open Data Commons Open Database License (ODbL) by the OpenStreetMap Foundation (OSMF). The data is available under the ODbL. For more information see:

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# 1. Introduction

## 1.1 Background

Maidstone Borough Council (MBC) and Kent County Council (KCC) are undertaking a Local Plan Review (LPR) for the borough to address the latest Government standard methodology for calculating authorities' future housing numbers and to extend the Plan period to at least 2037.

The current Maidstone Borough Local Plan was adopted in 2017 and provides for the housing, employment and retail development needed for the period 2011-2031. The annual housing requirement will increase from the current Local Plan figure of 883 homes per year to 1,157 homes per year from 2022.

MBC / KCC need to consider, and consult on, reasonable, alternative options for meeting housing and other development needs. The transport modelling outputs developed last year have been included in the consultation on the LPR, which closed on 12 December 2021. As part of this process, MBC / KCC are seeking consultancy support to gather evidence on the transport and air quality implications of the LPR options.

The overall project objectives are to:

1. Assess the quality and capacity of transport infrastructure across the borough and its ability to meet forecast demands.
2. Assess the cumulative impacts of the LPR development options on the borough's transport network.
3. Assess the cumulative air quality impacts of the LPR development options on the Maidstone Air Quality Management Area (AQMA), on any adjacent areas at risk of exceedances, any ecological sites, any areas at risk on National Compliance with the EU Limit values, and on relevant AQMAs, ecological sites and National Compliance issue areas in neighbouring authorities.
4. Set out proposals to avoid or mitigate unacceptable risks from air pollution.

## 1.2 Purpose of this Document

This Report describes the principles, assumptions and methodology employed to develop the additional transport modelling work using the Maidstone Local Transport Model. This work was a follow up to the previous study undertaken for the Maidstone Local Plan which aims to increase the robustness of the conclusions drawn. More information about the Maidstone Local Transport Model development can be found in the accompanying Local Base Model Report<sup>1</sup> and Initial Options Forecast Report<sup>2</sup>.

The scope of work includes the following:

1. Rerunning the 2037 Reference Case to incorporate the removal of Binbury Park Development from all scenarios and removal of the associated proposed scheme at M20 J7. The Binbury Park was removed from the model scenario at the request of MBC. The proposed development was a live planning application at the time of the model being run. Subsequently, MBC has made a decision not to grant the planning permission.
2. Therefore, rerunning 2037 Preferred Option to be on a consistent basis with the Reference Case in its treatment of Binbury Park and M20 J7.
3. Developing the 2050 Reference Case and Preferred Option scenarios to incorporate inputs from full build out of the garden settlements.

<sup>1</sup> Stage 2 Maidstone LP - Local Model Validation Report v1.docx

<sup>2</sup> Stage 2 Maidstone LP – Initial Options Forecast Report.docx

### 1.3 Document Structure

Following this introduction, the structure of this report is as follows:

- **Chapter 2** – provides an overview of the forecast model development
- **Chapter 3** – presents the forecast results for the 2037 Reference Case and Preferred Option scenarios
- **Chapter 4** – presents the forecast results for the 2050 Reference Case and Preferred Option scenarios
- **Chapter 5** – provides a summary and conclusions

## 2. Forecast Model Development

### 2.1 Highway Schemes

The 2037 Maidstone Local Transport Model Reference Case and Preferred Option, developed during the previous stages of work, were used as a starting point in updating the models. The updates to the network are the following:

- Removal of the proposed improvements at M20 J7 in relation to the removal of Binbury Park development.
- Access to Lidsing Garden Settlement – based on the information provided by the developer and received during the time of modelling via, *19-062-013 - Access Proposal A - (For Modelling).pdf*, a new link road is proposed to provide access to Lidsing Garden Settlement. This link road will provide connectivity between M2 J4, Hempstead Road, Lidsing Road, Westfield Sole Road and North Dane Way Road. It should be noted that recent update to the concept design was made to consider partial signalisation of the M2 J4 Eastbound slip road. This update was not incorporated in the model; however, this can be included as sensitivity test or detailed junction modelling if required.

For 2050, the same network was used as the 2037 model.

More information regarding the highway schemes can be found in Appendix A.

### 2.2 Local Plan Developments

The procedure developed for future matrix development during the previous stages of work was adapted in updating the demand matrices for the 2037 and 2050 Reference Case and Preferred Option. More information on the matrix development procedure can be found in *Stage 2 Maidstone LP – Initial Options Forecast Report.docx*.

#### 2.2.1 2037 Developments

The assumptions for the 2037 Reference Case are summarised in Figure 2-1 and Table 2-1. As discussed earlier, the key update to this version of the model is the removal of the Binbury Park development.

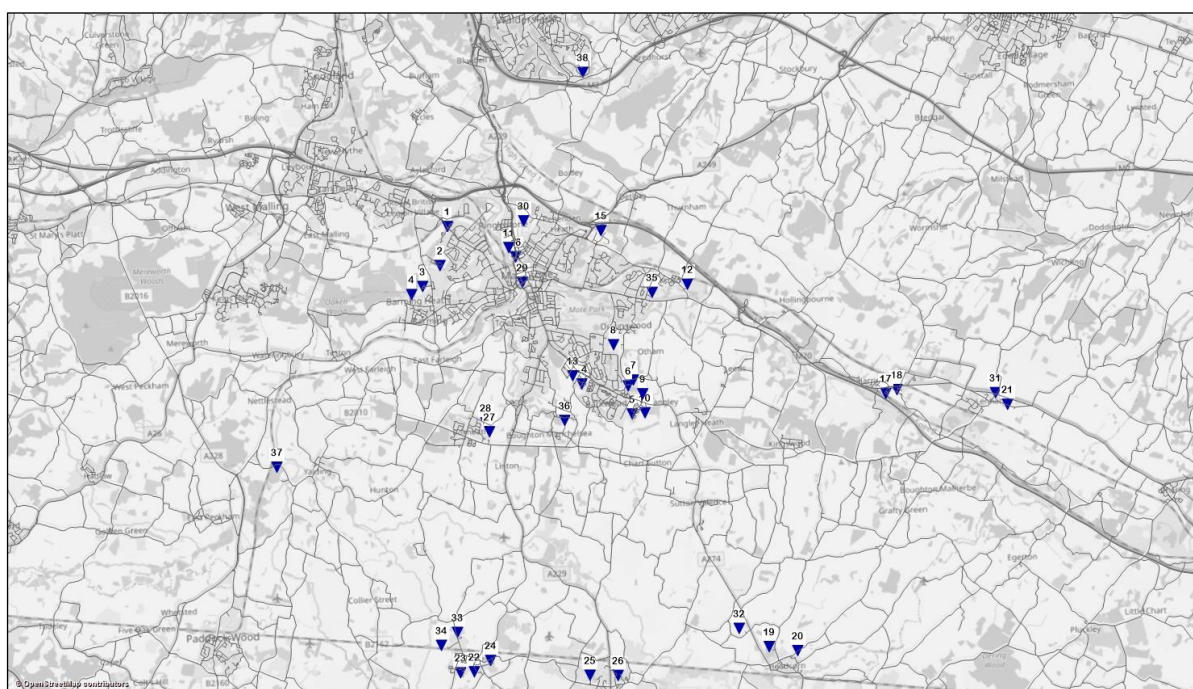


Figure 2-1: Reference Case (Committed) Development Locations

ID	Development Description	Residential Units	Employment, Floorspace, sqm
1	H1(1) - Bridge Nursery, London Road, Maidstone	140	0
2	H1(2) - East of Hermitage Lane, Maidstone	500	0
3	H1(3) - West of Hermitage Lane, Maidstone	330	0
4	H1(4) - Oakapple Lane, Barming	187	0
5	H1(5) - Langley Park, Sutton Road, Boughton Monchelsea	600	0
6	H1(6) - North of Sutton Road, Otham	286	0
7	H1(7) - North of Bicknor Wood, Gore Court Road, Otham	250	0
8	H1(8) - West of Church Road, Otham	440	0
9	H1(9) - Bicknor Farm, Sutton Road, Otham	302	0
10	H1(10) - South of Sutton Road, Langley	750	0
11	H1(11) - Springfield, Royal Engineers Road and Mill Lane, Maidstone	400	0
12	H1(21) - Barty Farm, Roundwell, Thurnham	100	0
13	H1(27) - Kent Police HQ, Sutton Road, Maidstone	112	0
14	H1(28) - Kent Police training school, Sutton Road, Maidstone	90	0
15	RMX1(1) - Newnham Park, Bearsted Road, Maidstone	0	100,000
16	RMX1(2) - Maidstone East and Sorting Office, Sandling Road, Maidstone	210	14,000
17	H1(32) - South of Ashford Road, Harrietsham	113	0
18	H1(34) - Church Road, Harrietsham	80	0
19	H1(36) - Ulcombe Road and Mill Bank, Headcorn	220	0
20	H1(37) - Grigg Lane and Lenham Road, Headcorn	86	0
21	H1(41) - Tanyard Farm, Old Ashford Road, Lenham	145	0
22	H1(44) - Stanley Farm, Plain Road, Marden	85	0
23	H1(45) - The Parsonage, Goudhurst Road, Marden	144	0
24	H1(46) - Marden Cricket and Hockey Club, Stanley Road, Marden	124	0
25	H1(48) - Hen and Duckhurst Farm, Marden Road, Staplehurst	250	0
26	H1(49) - Fishers Farm, Fishers Road, Staplehurst	400	0
27	H1(57) - Heathfield, Heath Road, Coxheath	110	0
28	H1(58) - Forstal Lane, Coxheath	210	0
29	H2(1) - Maidstone town centre	940	0
30	H2(2) - Invicta Park barracks	1,300	0
31	H2(3) - Lenham	1,000	0
32	EMP1(1) - West of Barradale Farm, Maidstone Road, Headcorn	0	5,500
33	EMP1(2) - South of Claygate, Pattenden Lane, Marden	0	6,800
34	EMP1(3) - West of Wheelbarrow Industrial Estate, Pattenden Lane, Marden	0	14,500
35	EMP1(4) - Woodcut Farm, Ashford Road, Bearsted	0	49,000
36	Lyewood Farm, Boughton Monchelsea - H1(54)	85	0
37	Sygenta, Yalding	0	46,000
38	Gleaming Wood Drive, Lordswood	115	0

Table 2-1: Reference Case (Committed) Developments (Updated January 2022)



The Local Plan Preferred Option scenario was then updated to ensure that the baseline figures are consistent with the Reference Case and to include the additional housing and employment developments presented in Figure 2-2 and Table 2-2. It should be noted that for the development PP 2021/22, Maidstone Borough, limited information was available during the time of modelling. Hence, general assumptions were used to allocate the trips around the borough.



Figure 2-2: Preferred Option (Local Plan) Development Locations

ID	Development Description	Residential Units	Employment, Floorspace, sqm
1	Mote Road, Town Centre	172	1,169
2	Ashford Road, Lenham, Lenham	0	2,500
3	Lidsing, Garden Settlement	1,300	44,100
4	Heathlands, Garden Settlement	1,400	19,110
5	The Mall, Town Centre	400	0
6	Office to Resi, Town Centre	247	0
7	Maidstone Riverside, Town Centre	650	0
8	Len House, Town Centre	159	0
9	Gala Bingo, Town Centre	40	0
10	Maidstone West, Town Centre	130	0
11	Residual from the 700, Town Centre	215	0
12	PP 2021/22, Maidstone Borough	603	0
13	Windfall Small, Maidstone Borough	1,380	0
14	Windfall Large, Maidstone Borough	1,358	0
15	High St/ Medway St (Additional), Town Centre	10	0
16	Maidstone East (Additional), Town Centre	80	0
17	Springfield Tower, Urban Area	150	0
18	Royal British Legion, Urban Area	8	0
19	EIS Oxford Rd, Urban Area	20	0
20	Ware St, Urban Area (N)	67	0
21	Abbey Gate Farm, Urban Area (SW)	250	0
22	Pested Bars, Urban Area (S)	196	0
23	Police HQ Land (Additional), Urban Area (SE)	135	0
24	Land at Sutton Rd, Urban Area (SE)	75	0
25	Moat Rd, Headcorn	110	0
26	Copper Ln & Albion Rd, Marden	113	0
27	Lodge Rd, Staplehurst	78	0
28	Home Farm, Staplehurst	49	0
29	Land S of A20, Harrietsham	53	0
30	Keilen Manor, Harrietsham	47	0
31	Eyhorne St, Hollingbourne	9	0
32	Kenward Rd, Yalding	100	0
33	Haven Farm et al, Sutton Valence	100	0
34	Land N of Heath Rd (Guy's site), Coxheath	85	0
35	Kent Ambulance HQ, Coxheath	10	0
36	Land at Heath Rd, Coxheath	5	0
37	Campfield Farm, Boughton Mon	30	0
38	Broad Location, East Farleigh	50	0
39	Broad Location, Ulcombe	35	0
40	Broad Location, Laddingford	35	0

ID	Development Description	Residential Units	Employment, Floorspace, sqm
41	Broad Location, Kingswood	35	0
42	Broad Location, Teston	35	0
43	Broad Location, Boxley	25	0
44	Broad Location, Chart Sutton	25	0
45	Broad Location, Detling	25	0
46	Broad Location, Grafty Green	25	0
47	Broad Location, Hunton	25	0
48	Broad Location, Platts Heath	25	0
49	Broad Location, Stockbury	25	0
40	Mote Road, Town Centre	172	1,169

Table 2-2: Preferred Option (Local Plan) Development List (Updated January 2022)

### 2.2.2 2050 Developments

For 2050, no changes to the committed and Local Plan developments were assumed except for further build out to the completion of the two strategic garden settlements. The table below shows the final number of dwellings and employment sites assumed for the garden settlements.

Development Description	Residential Units	Employment, Floorspace (sqm)
Heathlands	5,000	125,000
Lidsing	2,000	140,000

Table 2-3: 2050 Garden Settlements Development Assumptions

## 2.3 Garden Settlement Sustainability and Internalisation Assumptions

### 2.3.1 Lidsing Garden Settlement

In the document *19-062-005 Rev A - Inputs to Strategic Modelling.pdf* received in July 2021, new information regarding the development access points, sustainability and trip internalisation assumptions were provided.

For sustainable transport, the document highlighted the proposed improvements in the cycling and walking facilities around the area together with new and extended bus connections to Hempstead, Lordswood and Chatham. A new service from the development via North Dane Way and Chatham Town Centre was also proposed. A 5% reduction of car trips was estimated for modal shift in relation to the improvements mentioned above.

In terms of internalisation, Section 3.6 of the document discussed that 5% of the residents are expected to work on site therefore these journeys have been removed from both residential and employment components of the wider model.

Considering both sustainability and internalisation assumptions, a 10% reduction in car trips from Lidsing Garden Settlement has been applied to the transport model.

The distribution of trips to and from the development for the AM and PM peak periods were also provided by the developer, details were also presented in *19-062-E-003 Rev A - Trip distributions to all Kent Medway MSOAs.xlsx*. These have been incorporated for both time periods in the model. For the interpeak period, the trip distribution developed for Option 1 was used since no information for this period was provided.

### 2.3.2 Heathlands Garden Settlement

As agreed with KCC, and based on an evaluation of the information provided by the developer, *Heathlands Garden Community\_(Transport Assessment)\_DRAFT V2.2.pdf* and *24n Heathlands Transport Vision (002).pdf*, it is estimated that 5% of the trips will be made by sustainable transport and 5% of the residents are expected to work on site. In terms of sustainable transport, the plan includes new footway /cycleway along the southern side of the A20, new and extended bus services, bus shuttle to provide direct connection to/from Lenham and Charing and potential new rail station near the development. These percentages were then used to reduce the car trips to and from Heathlands Garden Settlement in the transport model.

## 3. 2037 Forecast Results

### 3.1 Overview

This section describes the forecast results for the updated 2037 Reference Case and Preferred Option Scenarios. A forecast year of 2037 has been modelled with the use of combined TEMPro growth assumptions in the neighbouring districts and trip rates from TRICs agreed with National Highway to create the following assignment scenarios:

- Reference Case – includes committed schemes and developments to be incorporated on the transport network between the 2019 base year and 2037 forecast year;
- Preferred Option – includes the Reference Case assumptions plus local plan developments to be included on the transport network between the 2019 base year and 2037.

A set of output plots has been produced to show the flow difference, node level of service and change in travel time in order to help identify key areas of constraint arising from additional development in the Preferred Option scenario, compared to the Reference Case.

#### 3.1.1 Flow Difference Plots

Flow difference plots have been produced to show the difference in actual flows between Preferred Option and the Reference Case and will help aid analysis of the development allocations, network restrictions and sufficiency for local transport needs.

#### 3.1.2 Level of Service Plots

Level of service (LOS) plots provide a qualitative measure of how good the present traffic situation is on a given junction, from the driver's perspective. As actual flow will vary for different days and different times in a day, LOS relates the traffic service quality to a given flow rate of traffic. VISUM defines the LOS based on the mean delay experienced by each vehicle. VISUM has the capability to calculate LOS for all types of junctions (priority, roundabouts, and signalised junctions). Table 3-1 defines the LOS by six levels ranging from level A to level F.

A	Level A represents the best quality of traffic where the driver has the freedom to drive with free flow speed.
B	Level B represents good traffic quality where driver can reasonably maintain free flow speed and maneuverability within the traffic stream is slightly restricted.
C	Level C represents stable traffic flows, at or near free flow. Ability to manoeuvre through lanes is noticeably restricted and requires awareness.
D	Level D represents almost unstable traffic flows. Speeds slightly decrease as traffic volume slightly increase. On this level driver comfort decreases.
E	Level E represents unstable traffic flows, operating at capacity. Driver's level of comfort becomes poor.
F	Level F represents the worst traffic quality with forced or breakdown traffic flows. Travel time cannot be predicted, with generally more demand than capacity.

Table 3-1: Level of Service Description

### 3.2 2037 Reference Case

The 2037 Reference Case network was used to compare the 2037 LPR Preferred Option Scenario. The overview of flows in the 2037 Reference Case are shown in Figure 3-1 to Figure 3-3 and Table 3-2 shows the predicted flows in vehicles along the key corridors in the AM, IP and PM peak periods. The node level of service is also presented in Figure 3-4 to Figure 3-6.

In the AM, the largest traffic flows are on the four major corridors along M20, M2, A229 (between Old Chatham Road and Tyland Lane) and A249 Sittingbourne Road. In Maidstone Town Centre, high traffic flows accumulate on A229 Royal Engineer's Road, A20 London Road, A20 Ashford Road, A249 Sittingbourne Road and B2246 Hermitage Lane. The same traffic patterns are predicted in other time periods with the inter-peak around 18% lower and PM peak 9% higher when compared to the AM peak. These are average percentages and were only provided to compare the AM peak values for the section of the roads selected below. It should be noted that the other areas or roads in the network might show different traffic profiles. Also, the table below compares the total for two-way traffic. Detailed comparison (i.e., per direction) could show that AM is higher in one direction as people travel to work and in the opposite direction in the PM as they make their journey back home.

Comparing the 2037 Reference Case to 2019 Base, the main roads show average increase of around 14% to 20% and the roads in the town centre around 8% to 11%.

Corridor	Road	Total Two-Way Traffic (vehicles)		
		AM	IP	PM
Main Roads	M20 (between J6 and J7)	10,110	8,080	11,050
	M2 (between J3 and J4)	5,810	4,680	6,860
	A229 (between Old Chatham Road and Tyland Lane)	6,770	5,110	7,350
	A249 (between The St and Pilgrims Way)	4,530	3,830	5,570
Roads in the Town Centre	A229 Royal Engineer's Road (between Chatham Road and Waterhouse Avenue)	3,600	3,070	3,700
	A20 London Road (between Queens Avenue and Buckland Lane)	1,670	1,510	1,880
	A20 Ashford Road (between Huntsman Lane and New Cut Road)	1,460	1,160	1,410
	A249 Sittingbourne Road (between Hampton Road and Bearsted Road)	1,480	1,240	1,670
	B2246 Hermitage Lane (between Whitepost Wood Lane and A20 London Road)	1,840	1,440	1,750

Table 3-2: Total Two-Way Flows – 2037 Reference Case



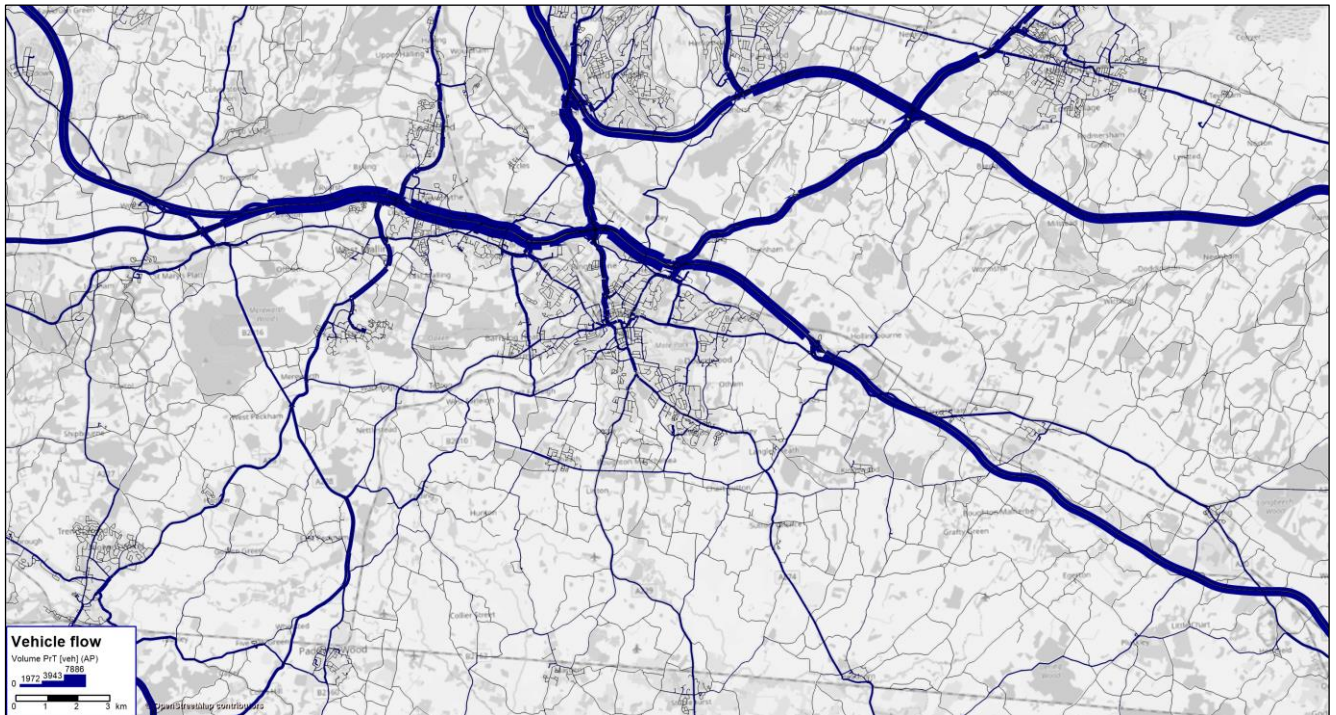


Figure 3-1: 2037 Reference Case AM Flows

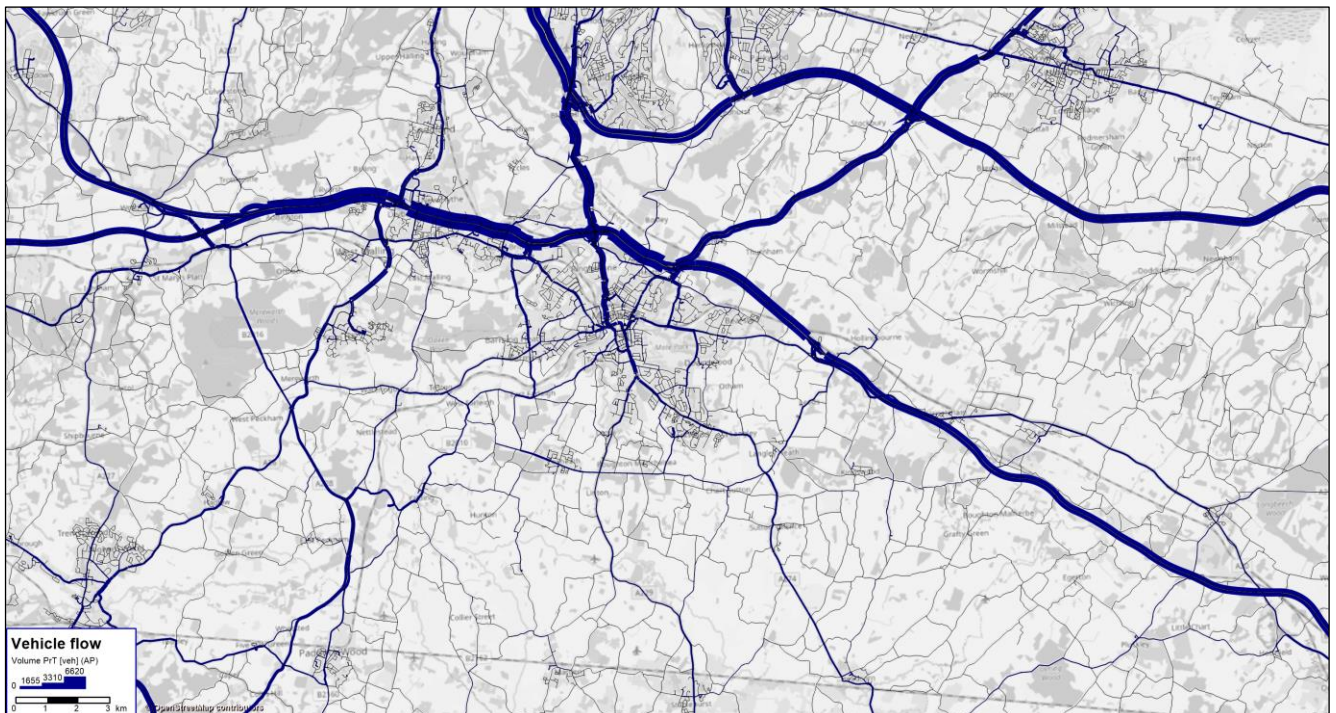


Figure 3-2: 2037 Reference Case IP Flows



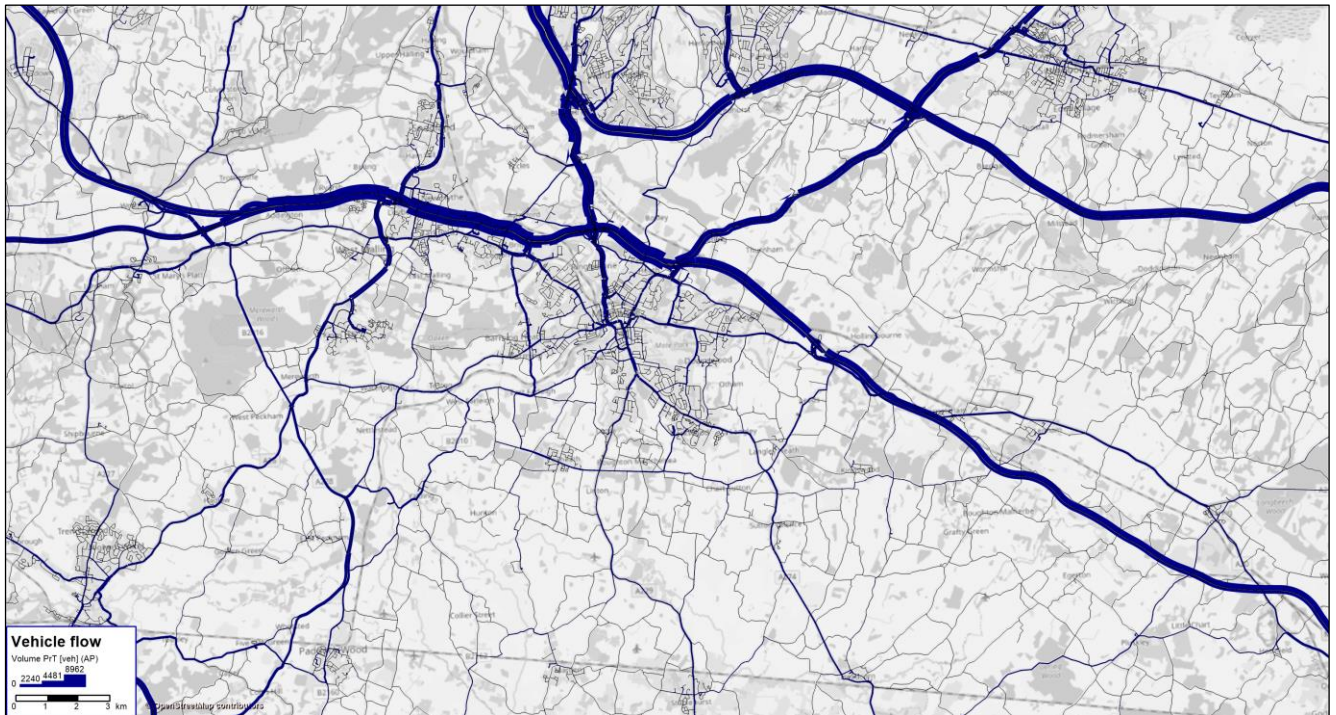


Figure 3-3: 2037 Reference Case PM Flows

Figure 3-4, Figure 3-5 and Figure 3-6 show the junction level of service in 2037 Reference Case for the AM, IP and PM peak periods. In the AM, majority of the key junctions around Maidstone Town Centre, displayed little to moderate levels of delay (LOS B to D) except for A26 Tonbridge Rd/ Red Hill and A20 London Road / Station Road junctions where severe level of delay (LOS E and F) are predicted. These junctions have also already indicated severe levels of delays in the base model. In the IP, the LOS is generally better in comparison to the AM and PM peak periods as expected with some junctions around the town centre which exhibit LOS D and E. The level of service in the PM shows a similar pattern to the AM peak, with Willington Street / Madginford Road junction showing LOS E. Further investigation is recommended for these junctions alongside a review of the any potential mitigations that can be considered.



Figure 3-4: 2037 Reference Case AM LOS



Figure 3-5: 2037 Reference Case IP LOS





Figure 3-6: 2037 Reference Case PM LOS

### 3.3 2037 Preferred Option

This scenario incorporates the proposed local plan developments in addition to the committed developments included in the Reference Case.

#### 3.3.1 2037 Preferred Option Flow Difference from Reference Case

Figure 3-7, Figure 3-8 and Figure 3-9 below show the flow difference plots for each peak period, comparing the Preferred Option with Reference Case. Detailed comparison of the flows at key sections of the network are also presented at the end of this section.

In the AM Peak, significant increases in traffic are predicted in the road network surrounding the proposed Heathlands and Lidsing Garden Settlements. The predicted reduction of trips around the local roads in Medway is due to the impact of the new link road proposed for the Lidsing Garden Settlement. This new link road diverts the traffic which was previously using local roads. In addition, the direct connection of the new link road to M2 J4 results in more trips using M2 and A229. A microsimulation transport model using AIMSUN software for Lidsing Garden Settlement is currently in progress and the result of this study should be considered to further understand the impacts of the garden settlement and the new link road to the road network in Medway. The new link road also connects to Westfield Sole Road and Lidsing Road in the south providing alternative access to Maidstone Town Centre via the Boxley Road, where additional traffic flows are predicted. Increases in traffic are also observed along A20 Ashford Road, Lenham Heath Road and Bowley Lane as the access points to and from the Heathlands Garden Settlements are directly connected to these roads.

In Maidstone Town Centre, increases in traffic are also predicted in Preferred Option in relation to the proposed housing development around the area. The thick bars around A26 / Fountain Lane Junction do not represent significant traffic flow increase into the junction. These are due to the network coding changes where new links which do not exist in the Reference Case were added to the traffic model in Preferred Option as part of mitigation schemes coding, hence the flow difference shows thicker bars. The total two-way flow difference in that area is around 50 to 160 vehicles per hour. This increase is related to the additional capacity as a result of the proposed improvements in the junction.

Similar trip patterns can be seen in the inter peak and PM peak periods.





Figure 3-7: 2037 AM Flow Comparison: Preferred Option vs Reference Case



Figure 3-8: 2037 Inter Peak Flow Comparison: Preferred Option vs Reference Case





Figure 3-9: 2037 PM Flow Comparison: Preferred Option vs Reference Case

Flow differences at key locations, as shown in Figure 3-10 below, were also analysed and presented in detail in Table 3-3 to Table 3-5. Lenham Forstal Road, A20 Ashford Road (between Pilgrim's Way and Faversham Road) and Lidsing Road have the highest increases in traffic for all time periods which are related to the Garden Settlements located in these areas. These are followed by Boxley Road where additional traffic is predicted due to its connection to the new link road and A26 (between Hermitage Lane and Queen's Road) due to the additional capacity as a result of the junction improvement. For Lenham Forstal Road, the high percentages shown in the tables are due to the figures in the reference case being low. However, in reality these are very small numbers, and no significant impacts are expected.

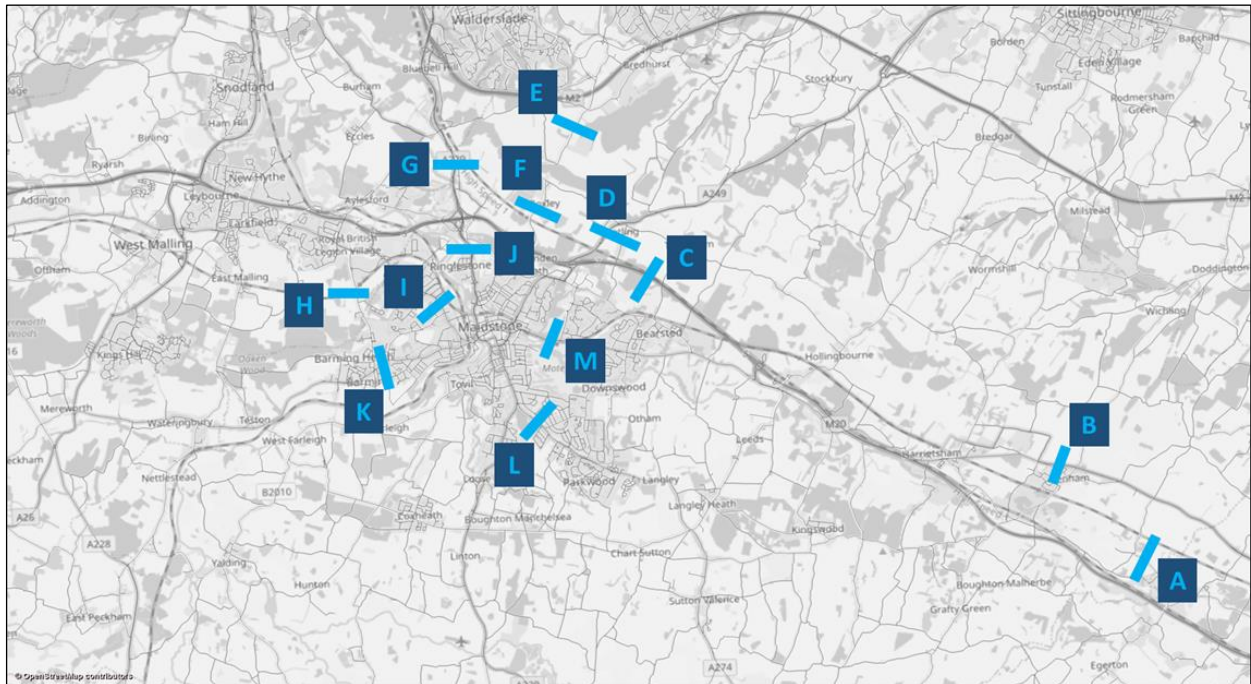


Figure 3-10: Key Location For Total Flow Comparison: Preferred Option vs Reference Case

Point Description		AM Total 2-Way Flows (Vehicles)		AM Actual Flow Difference	AM % Difference
Section	Road Name	2037 Ref Case	2037 Preferred Option	Preferred Option - Ref Case	Preferred Option - Ref Case
A	Lenham Forstal Road	10	80	70	700%
B	A20 Ashford Road (between Pilgrim's Way and Faversham Road)	850	1,040	190	22%
C	M20 (between J7 and J8)	6,540	6,670	130	2%
D	A249 (between The St and Pilgrims Way)	4,530	4,600	70	2%
E	Lidsing Road (Harp Farm Road and Dunn St Road)	780	1,060	280	36%
F	Boxley Road	950	1,040	90	9%
G	A229	6,760	6,880	120	2%
H	Hermitage Lane	1,840	1,860	20	1%
I	A20 London Road	1,680	1,750	70	4%
J	A229 Royal Engineer's Road	3,610	3,680	70	2%
K	A26 (between Hermitage Lane and Queen's Road)	1,150	1,280	130	11%
L	A274 Sutton Road	1,440	1,480	40	3%
M	A20 Ashford Road (between Huntsman Lane and New Cut Road)	1,460	1,540	80	5%

Table 3-3: AM Total Flow Comparison: Option 2 vs Ref Case

Point Description		IP Total 2-Way Flows (Vehicles)		IP Actual Flow Difference	IP % Difference
Section	Road Name	2037 Ref Case	2037 Preferred Option	Preferred Option - Ref Case	Preferred Option - Ref Case
A	Lenham Forstal Road	10	40	30	300%
B	A20 Ashford Road (between Pilgrim's Way and Faversham Road)	570	670	100	18%
C	M20 (between J7 and J8)	5,250	5,360	110	2%
D	A249 (between The St and Pilgrims Way)	3,830	3,900	70	2%
E	Lidsing Road (Harp Farm Road and Dunn St Road)	420	600	180	43%
F	Boxley Road	470	590	120	26%
G	A229	5,120	5,220	100	2%
H	Hermitage Lane	1,450	1,530	80	6%
I	A20 London Road	1,510	1,550	40	3%
J	A229 Royal Engineer's Road	3,070	3,120	50	2%
K	A26 (between Hermitage Lane and Queen's Road)	970	1,060	90	9%
L	A274 Sutton Road	1,410	1,460	50	4%
M	A20 Ashford Road (between Huntsman Lane and New Cut Road)	1,160	1,210	50	4%

Table 3-4: IP Total Flow Comparison: Option 2 vs Ref Case



Point Description		PM Total 2-Way Flows (Vehicles)		PM Actual Flow Difference	PM % Difference
Section	Road Name	2037 Ref Case	2037 Preferred Option	Preferred Option - Ref Case	Preferred Option - Ref Case
A	Lenham Forstal Road	10	70	60	600%
B	A20 Ashford Road (between Pilgrim's Way and Faversham Road)	930	1,080	150	16%
C	M20 (between J7 and J8)	7,170	7,320	150	2%
D	A249 (between The St and Pilgrims Way)	5,580	5,570	-10	-1%
E	Lidsing Road (Harp Farm Road and Dunn St Road)	860	1,160	300	35%
F	Boxley Road	920	1,040	120	13%
G	A229	7,350	7,400	50	1%
H	Hermitage Lane	1,750	1,780	30	2%
I	A20 London Road	1,870	1,960	90	5%
J	A229 Royal Engineer's Road	3,700	3,780	80	2%
K	A26 (between Hermitage Lane and Queen's Road)	1,300	1,350	50	4%
L	A274 Sutton Road	1,580	1,610	30	2%
M	A20 Ashford Road (between Huntsman Lane and New Cut Road)	1,410	1,390	-20	-1%

Table 3-5: PM Total Flow Comparison: Preferred Option vs Ref Case

### 3.3.2 2037 Preferred Option Level of Service

Figure 3-11, Figure 3-12 and Figure 3-13 show the changes in the level of service and link volume capacity ratio between 2037 Preferred Option and 2037 Reference Case. Some of the junctions around the town centre increase the LOS from LOS B to C which are still within the acceptable range. The list of junctions in which the LOS increases to D, E and F are predicted are presented below.

#### A. AM Peak

- A20 Ashford Road / Willington Street – the LOS increases from D to E due to the predicted traffic increase in A20 Ashford Rd westbound direction. These increases in traffic also triggered the increase in queue length in Willington Street particularly the left turn movement which leads to additional delay in the junction.
- A20 Bearsted Road / Eclipse Park – the LOS increases from C to D due to the overall growth in the town centre.
- A20 London Road / Buckland Hill – the LOS increases from C to D due to the overall growth in the town centre.

#### B. Inter-Peak

- A229 Loose Road / Armstrong Road / Park Way – the LOS increases from C to D due to the overall growth in the town centre. In the AM and PM, no changes in the LOS have been predicted in this junction

since it is already showing LOS D in the Reference Case and Preferred Option scenarios. The delay in the IP is mainly in the A229 Loose Road northern arm.

### C. PM Peak

- Fountain Lane / Heath Road – the LOS increases from C to D due to the increase in traffic along Hermitage Lane approaching Fountain Lane / A26 Tonbridge Road junction. This is likely a result of the proposed junction improvements in Fountain Lane / A26 Tonbridge Road attracting more vehicles to use it and therefore more vehicles passing through the junction next to it. These proposed improvements include additional capacity and converting the junction into a roundabout.
- Teston Lane / B2010 Lower Road – the LOS increases from C to D due to the predicted increase in traffic related to the developments in Yalding.

Further investigation is recommended for these junctions alongside the identification of the any potential mitigations that can be considered.

On the other hand, the proposed improvements that were incorporated in Fountain Lane / A26 Tonbridge Road mentioned above, provide improvement to LOS from D to C. The increase in LOS highlighted in the PM peak at Fountain Lane / Heath Road does not affect the main junction. However, consideration should still be given in reviewing potential mitigations in this junction to ensure that it can accommodate the increases in vehicles to/from Fountain Lane / A26 Tonbridge Road due to the additional capacity as part of its improvements.

In terms of link volume capacity ratio, increases are shown mainly on the roads around the Garden Settlements. Some improvements are also seen around the local roads in Medway due to the addition of the new link road. Detailed analysis of the road network in Medway will be undertaken using the AIMSUN microsimulation model.

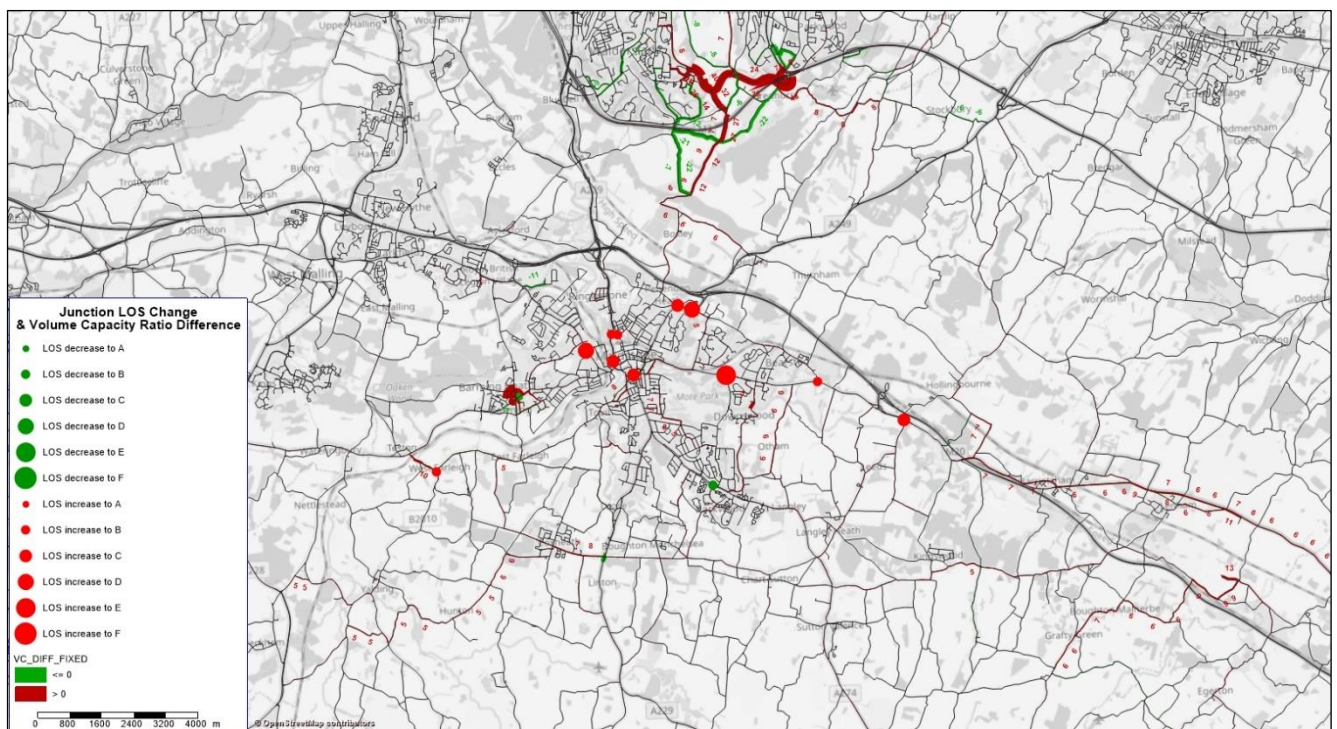


Figure 3-11: 2037 AM LOS Comparison: Preferred Option vs Reference Case





Figure 3-12: 2037 Inter Peak LOS Comparison: Preferred Option vs Reference Case

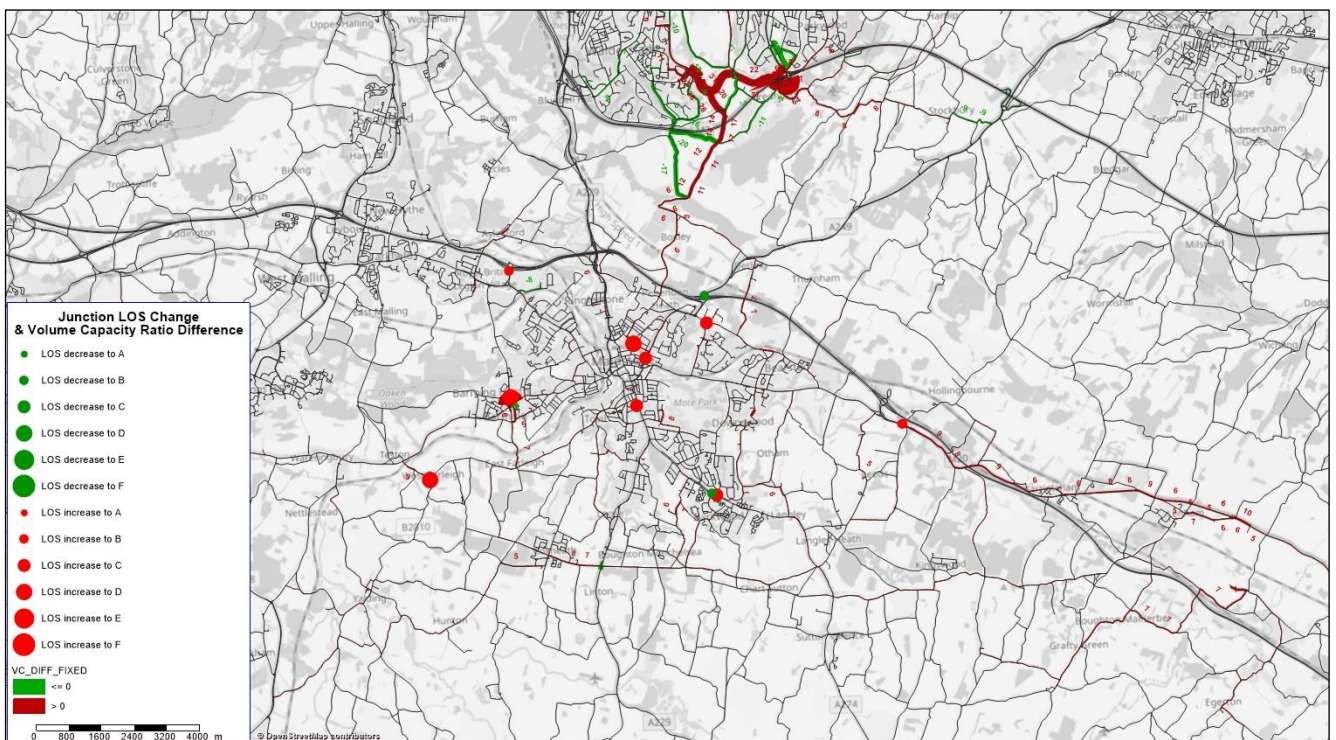


Figure 3-13: 2037 PM LOS Comparison: Preferred Option vs Reference Case



### 3.3.3 2037 Preferred Option Journey Time Comparison

This section focuses on the predicted journey times of local routes in Maidstone between Preferred Option and Reference Case. The routes used for the analysis are shown in Figure 3-14 and the detailed comparisons between the Preferred Option and Reference Case, for each time period, are presented in Table 3-6.

The analysis highlights some routes which exhibit increases in travel time of greater than 5% between the two scenarios being compared. When compared to the Reference Case, Preferred Option AM peak shows 27.3% (~ 2 minutes and 10 seconds) increase in travel time along Route 100 southbound along A249 between A229 Upper Stone St and M20 J7. This is a result of additional trips from Lidsing development and the new link road which result in overall flow increases along Boxley Road (and adjacent local roads) and Penenden Heath Road which are directly connected to A249. In addition, Preferred Option AM peak resulted in 5.3% (~ 50 seconds) increase in journey time along Route 800 northbound along A229 between Loose Road and M20 J6. This is due to the predicted increases in traffic along A229 as a result of the overall growth in the town centre including the developments at Invicta Barracks. These increases in traffic also triggered the increase in queue length in M20 J6 which leads to additional delay in the junction and traffic re-routing to local roads.

In the PM peak, Route 200 eastbound along A20 Ashford Rd between A249 and M2 J8 demonstrates increases in travel time by 11.6% (~ 1 minute and 24 seconds). This is because of the additional delay discussed in Section 3.3.2 and additional traffic from the Heathlands Garden Settlement.

Although the report highlights the routes with a journey time difference of greater than 5%, it should be noted that a low percentage increase can still have impacts in the junction delays, especially on areas where congestion currently exists. For reference, journey time difference above 20 seconds that were not included in the 5% were also highlighted in the table.

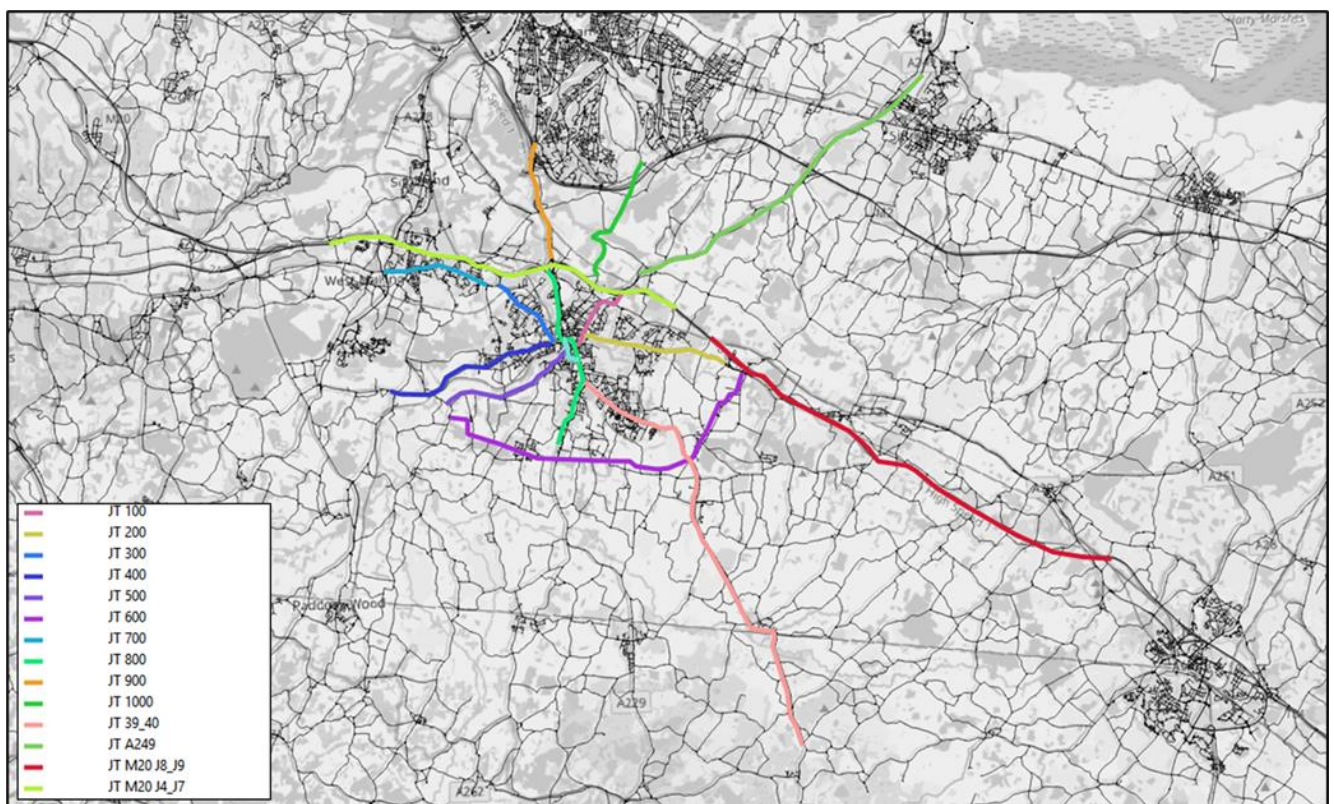


Figure 3-14: Journey Routes Used For Assessment

## Maidstone Local Plan – Extended Forecast Modelling Report

Route Section	Description	Direction	AM (0800-09:00)				IP (10:00-16:00)				PM (17:00-18:00)			
			Forecast Baseline [min:sec]	Preferred Option [min:sec]	Forecast Baseline vs Preferred Option	% Difference	Forecast Baseline [min:sec]	Preferred Option [min:sec]	Forecast Baseline vs Preferred Option	% Difference	Forecast Baseline [min:sec]	Preferred Option [min:sec]	Forecast Baseline vs Preferred Option	% Difference
					[min:sec]				[min:sec]				[min:sec]	
100_NB	A249 between M20 and Upper Stone St.	NB	07:31	07:46	00:15	3.3%	07:03	07:08	00:05	1.2%	08:25	08:44	00:19	3.7%
100_SB	A249 between M20 and Upper Stone St.	SB	07:56	10:06	02:10	27.3%	07:06	07:13	00:07	1.5%	07:56	08:10	00:14	3.0%
200_EB	A20 Ashford Rd	EB	07:20	07:24	00:04	0.8%	07:15	07:23	00:08	1.9%	12:05	13:29	01:24	11.6%
200_WB	A20 Ashford Rd	WB	09:37	09:55	00:18	3.1%	07:38	07:43	00:05	1.2%	08:17	08:31	00:14	2.7%
300_EB	A20 London Rd	EB	07:02	07:09	00:07	1.7%	05:34	05:37	00:03	0.8%	06:21	06:31	00:10	2.5%
300_WB	A20 London Rd	WB	06:56	07:11	00:15	3.5%	05:49	05:54	00:05	1.6%	06:24	06:34	00:10	2.7%
400_EB	A26 Tonbridge Rd	EB	12:43	12:50	00:07	0.9%	11:38	11:36	-00:02	-0.2%	12:46	12:53	00:07	0.8%
400_WB	A26 Tonbridge Rd	WB	12:50	12:59	00:09	1.2%	11:23	11:30	00:07	1.0%	11:50	12:09	00:19	2.6%
500_NB	Lower Rd / B2010	NB	08:21	08:27	00:06	1.2%	08:05	08:08	00:03	0.6%	08:49	08:53	00:04	0.7%
500_SB	Lower Rd / B2010	SB	08:24	08:31	00:07	1.4%	08:08	08:09	00:01	0.1%	08:30	08:37	00:07	1.4%
600_EB	B2163	EB	22:09	22:18	00:09	0.7%	21:10	21:09	-00:01	-0.1%	22:43	22:42	-00:01	-0.1%
600_WB	B2163	WB	22:28	22:48	00:20	1.5%	21:05	21:06	00:01	0.0%	21:59	22:12	00:13	1.0%
700_EB	A20 London Rd between Castle Way and Coldharbour Ln	EB	09:58	09:59	00:01	0.2%	08:33	08:35	00:02	0.5%	09:57	09:59	00:02	0.4%
700_WB	A20 London Rd between Castle Way and Coldharbour Ln	WB	11:31	11:28	-00:03	-0.5%	08:22	08:23	00:01	0.2%	09:23	09:30	00:07	1.2%
39_40_SB	Sutton Rd/Maidstone Rd/ Biddenden Rd	SB	20:30	20:42	00:12	1.0%	20:27	20:42	00:15	1.2%	22:00	22:19	00:19	1.5%

## Maidstone Local Plan – Extended Forecast Modelling Report

Route Section	Description	Direction	AM (0800-09:00)				IP (10:00-16:00)				PM (17:00-18:00)			
			Forecast Baseline [min:sec]	Preferred Option [min:sec]	Forecast Baseline vs Preferred Option		Forecast Baseline [min:sec]	Preferred Option [min:sec]	Forecast Baseline vs Preferred Option		Forecast Baseline [min:sec]	Preferred Option [min:sec]	Forecast Baseline vs Preferred Option	
					Baseline vs Preferred	% Difference			Baseline vs Preferred	% Difference			Baseline vs Preferred	% Difference
39_40_NB	Sutton Rd/Maidstone Rd/ Biddenden Rd	NB	22:20	22:42	00:22	1.6%	20:28	20:36	00:08	0.7%	20:33	20:44	00:11	0.9%
800_SB	A229 Royal Engineer's Rd / A229 Loose Rd	SB	15:26	15:35	00:09	0.9%	14:23	14:38	00:15	1.7%	15:57	16:42	00:45	4.7%
800_NB	A229 Royal Engineer's Rd / A229 Loose Rd	NB	15:38	16:27	00:49	5.3%	14:47	15:04	00:17	1.9%	16:57	17:22	00:25	2.5%
900_NB	A229 between M20-J6 and M2-J3	NB	03:23	03:24	00:01	0.9%	03:15	03:16	00:01	0.3%	03:40	03:39	-00:01	-0.4%
900_SB	A229 between M20-J6 and M2-J3	SB	04:30	04:34	00:04	1.3%	03:06	03:07	00:01	0.6%	03:34	03:42	00:08	3.4%
1000_SB	Lidsing to Boxley	NB	06:16	06:13	-00:03	-0.7%	06:13	06:11	-00:02	-0.5%	06:50	06:52	00:02	0.6%
1000_NB	Lidsing to Boxley	SB	07:08	07:21	00:13	3.0%	06:16	06:17	00:01	0.3%	06:31	06:38	00:07	1.7%
A249_NB	A249	NB	08:27	08:29	00:02	0.3%	07:59	07:59	00:00	0.1%	09:09	09:06	-00:03	-0.5%
A249_SB	A249	SB	08:49	08:46	-00:03	-0.4%	07:59	08:00	00:01	0.1%	08:26	08:27	00:01	0.3%
M20_02_NB	M20 between J8 and J9	NB	16:40	16:56	00:16	1.5%	14:08	14:09	00:01	0.2%	13:59	14:01	00:02	0.3%
M20_02_SB	M20 between J8 and J9	SB	10:46	10:47	00:01	0.1%	10:49	10:50	00:01	0.1%	11:44	11:44	00:00	0.0%
M20_04_EB	M20 between J4 and J7	EB	08:46	08:46	00:00	0.1%	08:41	08:43	00:02	0.4%	11:43	12:06	00:23	3.4%
M20_04_WB	M20 between J4 and J7	WB	09:23	09:27	00:04	0.6%	08:27	08:28	00:01	0.2%	08:33	08:33	00:00	-0.1%

Table 3-6: 2037 Modelled Total Travel Time Comparison: Reference Case vs Preferred Option

## 4. 2050 Forecast Results

### 4.1 Overview

This section describes the forecast results for the 2050 Reference Case and Preferred Option Scenarios. A forecast year of 2050 has been modelled combined with the use of combined TEMPro growth assumptions in the neighbouring districts and trip rates from TRICs agreed with National Highway to create the following assignment scenarios.

- Reference Case – includes committed schemes and developments to be incorporated on the transport network between the 2019 base year and 2050 forecast year; and;
- Preferred Option – includes the Reference case assumptions plus local plan developments to be included on the transport network between the 2019 base year and 2050. For this scenario, the only local plan developments with built out trajectories beyond 2037 are the Garden Settlements. Therefore, all other local plan developments sites assumed similar figures as in 2037.

Similar to 2037, a set of output plots has been produced to show the flow difference, node level of service and change in travel time in order to help identify key areas of constraint arising from additional development in the Preferred Option scenario, compared to the Reference Case.

### 4.2 2050 Reference Case

The 2050 Reference Case network was used to compare the 2050 LPR Preferred Option Scenario. The overview of flows in the 2050 Reference Case are shown in Figure 4-1 to Figure 4-3 and Table 4-1 shows the predicted traffic flows in vehicles along the key corridors in the AM, IP and PM peak periods. The node level of service is also presented in Figure 4-4 to Figure 4-6.

In the AM, the largest traffic flows are on four major corridors along M20, M2, A229 (between Old Chatham Road and Tyland Lane) and A249 Sittingbourne Road. In Maidstone Town Centre, the high traffic flows accumulate on A229 Royal Engineer's Road up to Loose Road, A20 London Road, A20 Ashford Road, A249 Sittingbourne Road and B2246 Hermitage Lane. The same traffic patterns are predicted in other time periods with the inter-peak around 15% lower and PM peak 9% higher when compared to the AM Peak. When compared the 2037 Reference Case, there is around 5%-9% average increase in the predicted traffic along these corridors in 2050.

Comparing the 2050 Reference Case to 2019 Base, the main roads show average increase of around 20% to 30% and the roads in the town centre around 14% to 20%. It should be noted that for 2050, no changes to the committed and Local Plan developments were assumed except for further build out to the completion of Lidsing and Heathlands Garden settlements.



Corridor	Road	Total Two-Way Traffic (vehicles)		
		AM	IP	PM
Main Roads	M20 (between J6 and J7)	10,570	8,790	11,490
	M2 (between J3 and J4)	6,350	5,110	7,400
	A229 (between Old Chatham Road and Tyland Lane)	7,050	5,500	7,590
	A249 (between The St and Pilgrims Way)	4,590	4,150	5,750
	A229 Royal Engineer's Road (between Chatham Road and Waterhouse Avenue)	3,780	3,290	3,770
Roads in the Town Centre	A20 London Road (between Queens Avenue and Buckland Lane)	1,850	1,630	2,050
	A20 Ashford Road (between Huntsman Lane and New Cut Road)	1,570	1,280	1,530
	A249 Sittingbourne Road (between Hampton Road and Bearsted Road)	1,540	1,360	1,820
	B2246 Hermitage Lane (between Whitepost Wood Lane and A20 London Road)	1,890	1,580	1,760

Table 4-1: Total Two-Way Flows – 2050 Reference Case

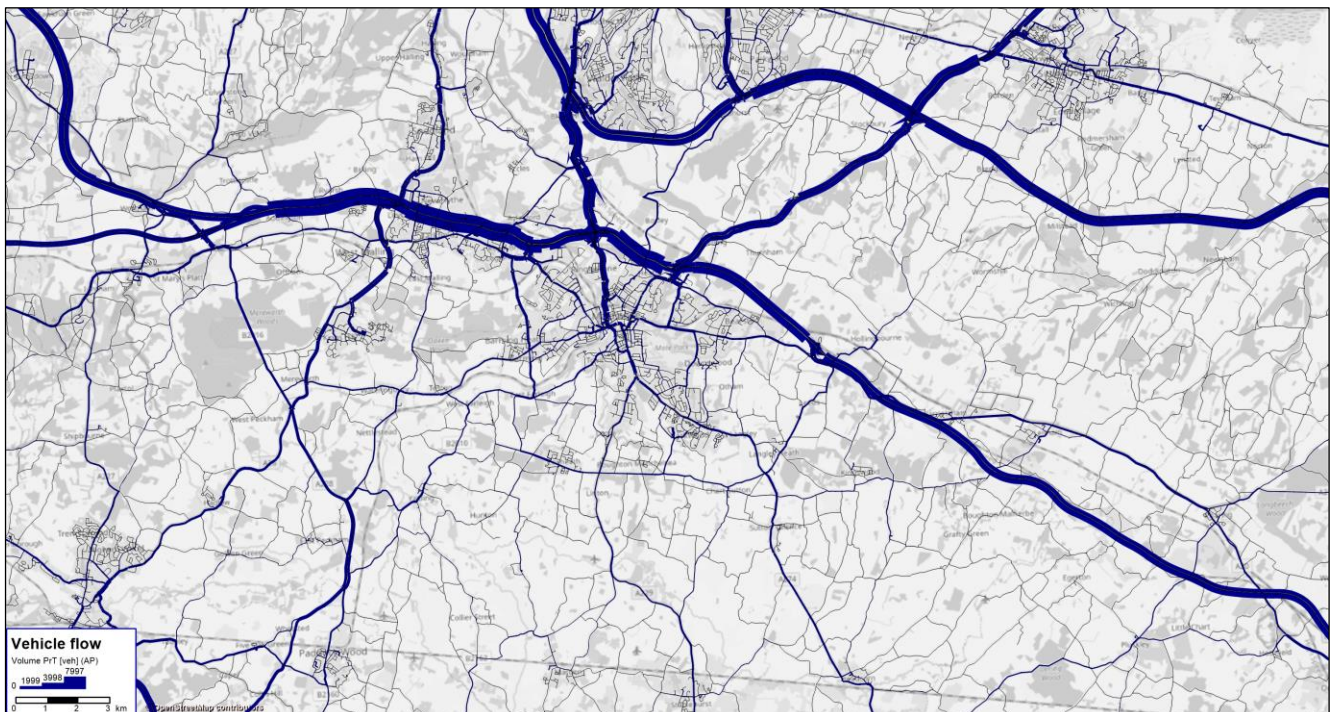


Figure 4-1: 2050 Reference Case AM Flows



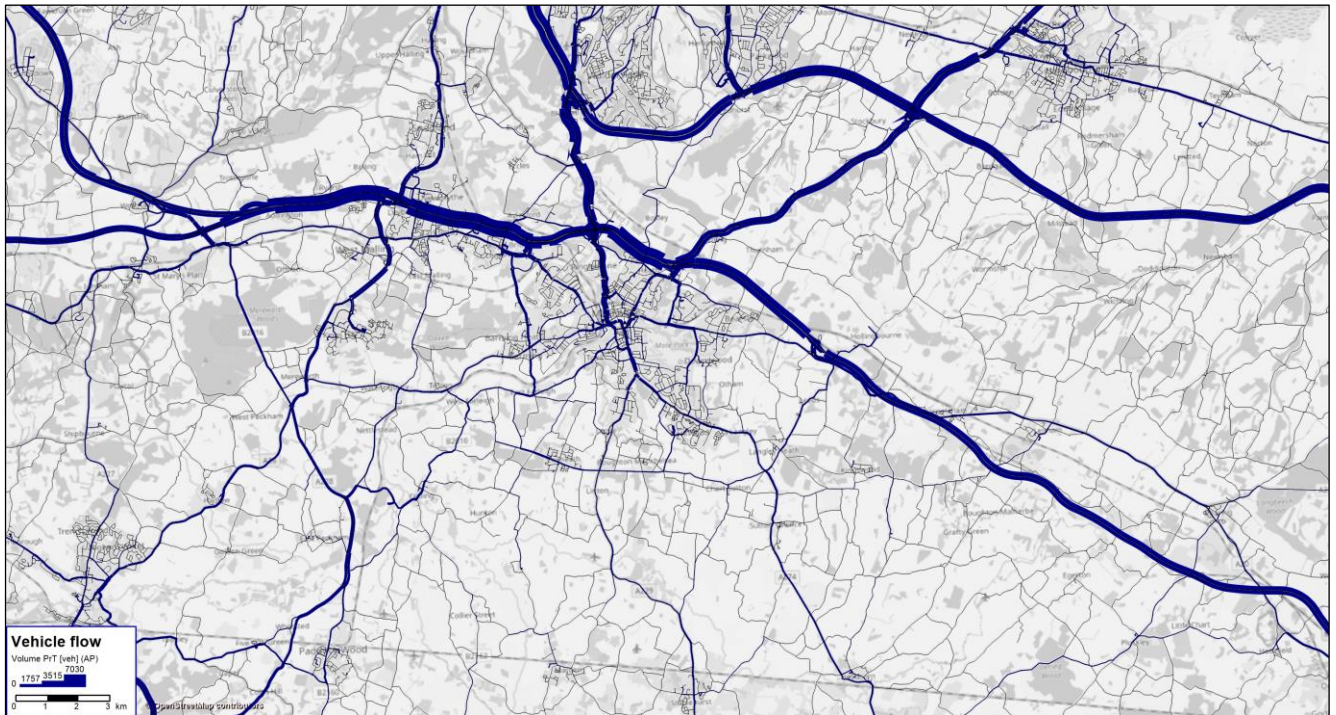


Figure 4-2: 2050 Reference Case IP Flows

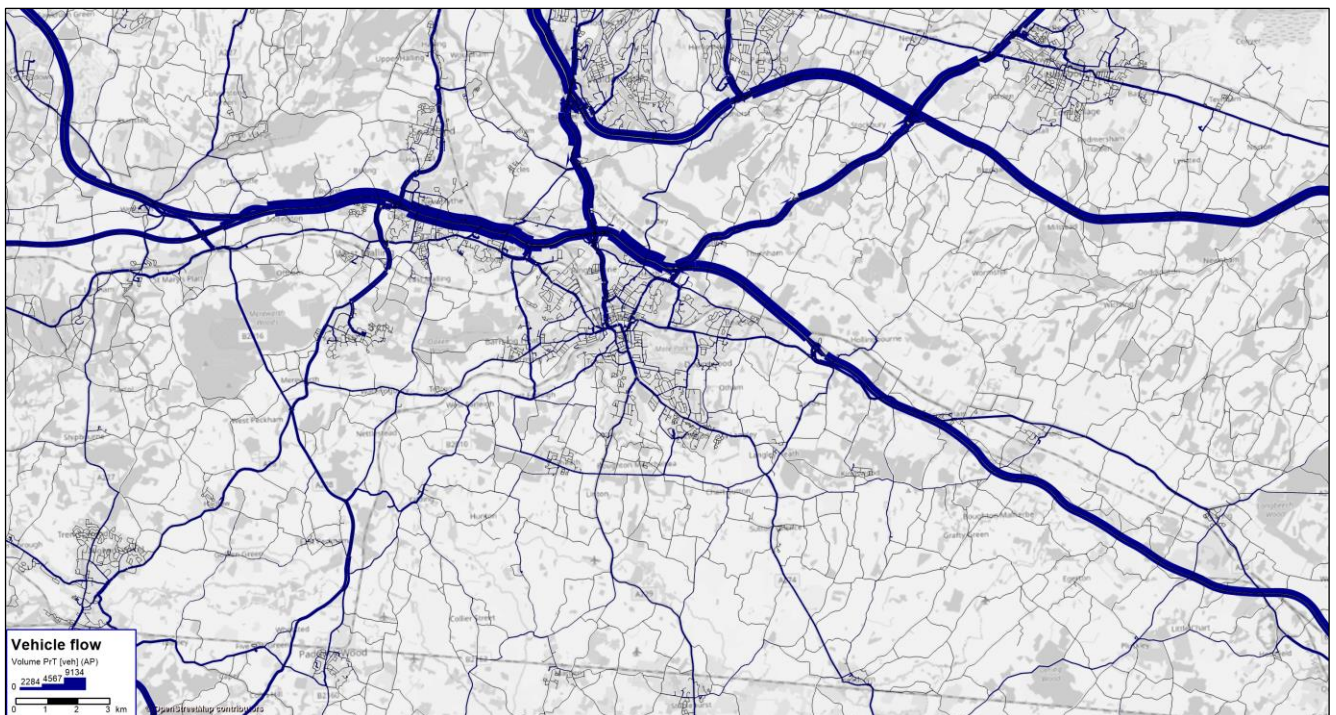


Figure 4-3: 2050 Reference Case PM Flows



Figure 4-4, Figure 4-5 and Figure 4-6 show the junction level of service in 2050 Reference case for the AM, IP and PM peak periods. In the AM, majority of the key junctions around Maidstone Town Centre displayed moderate levels of delay (LOS D) except for A26 Tonbridge Rd/ Red Hill and A20 London Road / Station Road junctions where severe level of delay (LOS E and F) are predicted. These junctions have also already indicated severe levels of delays in the base model and 2037 Reference Case. Similar level of delay (LOS E) is also observed in A20 Ashford Road / Willington Street which is consistent to the increase in traffic and queue patterns observed in 2037. In the IP, the LOS is generally better in comparison to the AM and PM peak periods as expected, except for some junctions around the town centre which exhibit LOS D and E. The level of service in the PM shows a similar pattern to the AM peak, with Willington Street / Madginford Road and Boxley Road / Well Road junctions showing LOS E. Further investigation is recommended for these junctions alongside a review of the any potential mitigations that can be considered.



Figure 4-4: 2050 Reference Case AM LOS`



Figure 4-5: 2050 Reference Case IP LOS



Figure 4-6: 2050 Reference Case PM LOS

### 4.3 2050 Preferred Option

This scenario incorporates the proposed local plan developments in addition to the committed developments included in the Reference Case.

#### 4.3.1 2050 Preferred Option Flow Difference from Reference Case

Figure 4-7, Figure 4-8 and Figure 4-9 below show the flow difference plots for each peak period, comparing the 2050 Reference Case and 2050 Preferred Option. Detailed comparison of the flows at key sections of the network are also presented at the end of this section.

Across the peak periods, the flow difference for the 2050 forecast year attains similar patterns to that of 2037 with an overall flow increase. In the AM Peak, significant increases in traffic are predicted in the road network surrounding the proposed Lidsing and Heathlands Garden Settlements. The predicted reduction of trips around Lidsing development is due to the impact of the new link road proposed. This new link road diverts the traffic which was previously using local roads. Similar to 2037, the direct connection of the new link road to M2 J4 results in more trips using M2 and A229 and its connection to Westfield Sole Road and Lidsing Road in the south provided alternative access to Maidstone Town Centre via the Boxley Road, where additional traffic flows are predicted. Increases in traffic are also predicted along A20 Ashford Road, Lenham Rd and local roads as the access points to and from the Heathlands Garden Settlements are directly connected to these roads.

The decrease in actual flow shown along M20 and Royal Engineer's Road is due to the increase in queue length in M20 J6 which directs the traffic to use alternative routes. Similarly, the decrease in flows in A249 seen during the PM peak is a result of the increase in queue length in M20 J7. These queues were also predicted in 2037 for both Reference Case and Preferred Option scenarios. The increases in queue length in 2050 which triggered the traffic to re-route is due to the overall growth assumed in 2050. Further analysis through junction modelling is recommended in order to assess the impacts of the increase in flows and queue lengths in these junctions.

In Maidstone Town Centre, increases in traffic are also predicted in Preferred Option in relation to the proposed housing development around the area. The thick bars around A26 / Fountain Lane Junction do not represent significant traffic flow increase into the junction. These are due to the network coding changes where new links which do not exist in the Reference Case were added to the traffic model in Preferred Option as part of mitigation schemes coding, hence the flow difference shows thicker bars. The total two-way flow difference in that area is around 40 to 220 vehicles per hour. This increase is related to the additional capacity as a result of the proposed improvements in the junction.

Similar trip patterns can be seen in the inter peak and PM peak periods.





Figure 4-7: 2050 AM Flow Comparison: Preferred Option vs Reference Case



Figure 4-8: 2050 Inter Peak Flow Comparison: Preferred Option vs Reference Case





Figure 4-9: 2050 PM Flow Comparison: Preferred Option vs Reference Case

Flow differences at key locations, as shown in Figure 4-10 below, were also analysed and presented in detail in Table 4-2 to Table 4-4. Lenham Forstal Road, A20 Ashford Road (between Pilgrim's Way and Faversham Road) and Lidsing Road have the highest increases in traffic for all time periods which are related to the Garden Settlements located in these areas. These are followed by Boxley Road where additional traffic is predicted due to its connection to the new link road and A26 (between Hermitage Lane and Queen's Road) due to the additional capacity as a result of the junction improvement. For Lenham Forstal Road, the high percentages shown in the tables are due to the figures in the reference case being low. However, in reality these are very small numbers, and no significant impacts are expected.

Overall, the increases in traffic flows are comparable to 2037 traffic patterns as the growth are proportionate across the corridors. However, the level of traffic flow increases on the roads surrounding the Garden Settlements are higher compared to 2037 due the development assumed to be fully built in 2050.

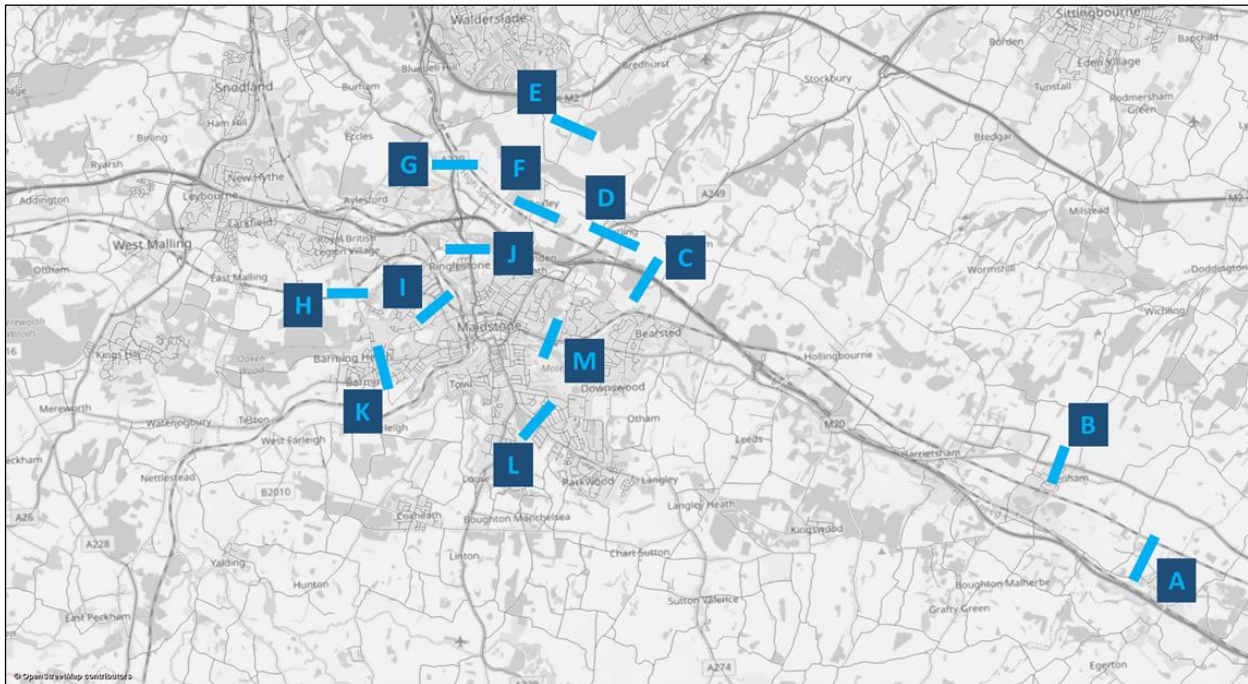


Figure 4-10: Key Location For Total Flow Comparison: Preferred Option vs Reference Case

Point Description		AM Total 2-Way Flows (Vehicles)		AM Actual Flow Difference	AM % Difference
Section	Road Name	2050 Ref Case	2050 Preferred Option	Preferred Option - Ref Case	Preferred Option - Ref Case
A	Lenham Forstal Road	15	297	282	1822%
B	A20 Ashford Road (between Pilgrim's Way and Faversham Road)	960	1,470	510	53%
C	M20 (between J7 and J8)	6,910	7,150	240	3%
D	A249 (between The St and Pilgrims Way)	4,590	4,580	-10	-1%
E	Lidsing Road (Harp Farm Road and Dunn St Road)	900	1,270	370	41%
F	Boxley Road	1,080	1,220	140	13%
G	A229	7,050	7,270	220	3%
H	Hermitage Lane	1,890	1,910	20	1%
I	A20 London Road	1,850	1,930	80	4%
J	A229 Royal Engineer's Road	3,780	3,770	-10	0%
K	A26 (between Hermitage Lane and Queen's Road)	1,220	1,350	130	11%
L	A274 Sutton Road	1,500	1,540	40	3%
M	A20 Ashford Road (between Huntsman Lane and New Cut Road)	1,570	1,620	50	3%

Table 4-2: AM Total Flow Comparison: Option 2 vs Ref Case

Point Description		IP Total 2-Way Flows (Vehicles)		IP Actual Flow Difference	IP % Difference
Section	Road Name	2050 Ref Case	2050 Preferred Option	Preferred Option - Ref Case	Preferred Option - Ref Case
A	Lenham Forstal Road	11	127	116	1026%
B	A20 Ashford Road (between Pilgrim's Way and Faversham Road)	670	880	210	31%
C	M20 (between J7 and J8)	5,720	5,870	150	3%
D	A249 (between The St and Pilgrims Way)	4,160	4,180	20	1%
E	Lidsing Road (Harp Farm Road and Dunn St Road)	430	730	300	70%
F	Boxley Road	490	680	190	39%
G	A229	5,500	5,560	60	1%
H	Hermitage Lane	1,580	1,610	30	2%
I	A20 London Road	1,630	1,670	40	2%
J	A229 Royal Engineer's Road	3,290	3,320	30	1%
K	A26 (between Hermitage Lane and Queen's Road)	1,060	1,130	70	7%
L	A274 Sutton Road	1,490	1,510	20	1%
M	A20 Ashford Road (between Huntsman Lane and New Cut Road)	1,270	1,300	30	2%

Table 4-3: IP Total Flow Comparison: Option 2 vs Ref Case



Point Description		PM Total 2-Way Flows (Vehicles)		PM Actual Flow Difference	PM % Difference
Section	Road Name	2037 Ref Case	2037 Preferred Option	Preferred Option - Ref Case	Preferred Option - Ref Case
A	Lenham Forstal Road	16	247	231	1456%
B	A20 Ashford Road (between Pilgrim's Way and Faversham Road)	1,010	1,470	460	46%
C	M20 (between J7 and J8)	7,540	7,750	210	3%
D	A249 (between The St and Pilgrims Way)	5,750	5,710	-40	-1%
E	Lidsing Road (Harp Farm Road and Dunn St Road)	950	1,370	420	44%
F	Boxley Road	1,020	1,210	190	19%
G	A229	7,590	7,680	90	1%
H	Hermitage Lane	1,770	1,790	20	1%
I	A20 London Road	2,050	2,130	80	4%
J	A229 Royal Engineer's Road	3,770	3,810	40	1%
K	A26 (between Hermitage Lane and Queen's Road)	1,400	1,430	30	2%
L	A274 Sutton Road	1,630	1,690	60	4%
M	A20 Ashford Road (between Huntsman Lane and New Cut Road)	1,530	1,570	40	3%

Table 4-4: PM Total Flow Comparison: Preferred Option vs Ref Case

#### 4.3.2 2050 Preferred Option Level of Service

Figure 4-11, Figure 4-12 and Figure 4-13 show the changes in the level of service and link volume capacity ratio between 2050 Preferred Option and 2050 Reference Case. Some of the junctions around the town centre increases the LOS from LOS B to C which are still within the acceptable range. The list of junctions in which the LOS increases to D, E and F are predicted are presented below.

##### A. AM Peak

- A229 Loose Rd/ Park Way/ Armstrong Road – the LOS increases from D to E as a result of additional trips towards the town centre.
- Bearsted Road / Newnham Court Way – the LOS increases from C to D due to the overall growth in the town centre.

##### B. Inter-Peak

- There are no significant changes in the LOS are predicted.

##### C. PM Peak

- A20 Ashford Road / Penfold Hill roundabout – the LOS increases from C to D due due to the increase in traffic related to Heathlands Garden Settlements
- A249 Wat Tyler Way / Romney Place – the LOS increases from C to D due to the overall growth in the town centre.

Further investigation is recommended for these junctions alongside a review of the any potential mitigations that can be considered.

In terms of link volume capacity ratio, increases are shown mainly on the roads around the Garden Settlements. Some improvements are also seen around the local roads in Medway due to the addition of the new link road.



Figure 4-11: 2050 AM LOS Comparison: Forecast Baseline vs Preferred Option

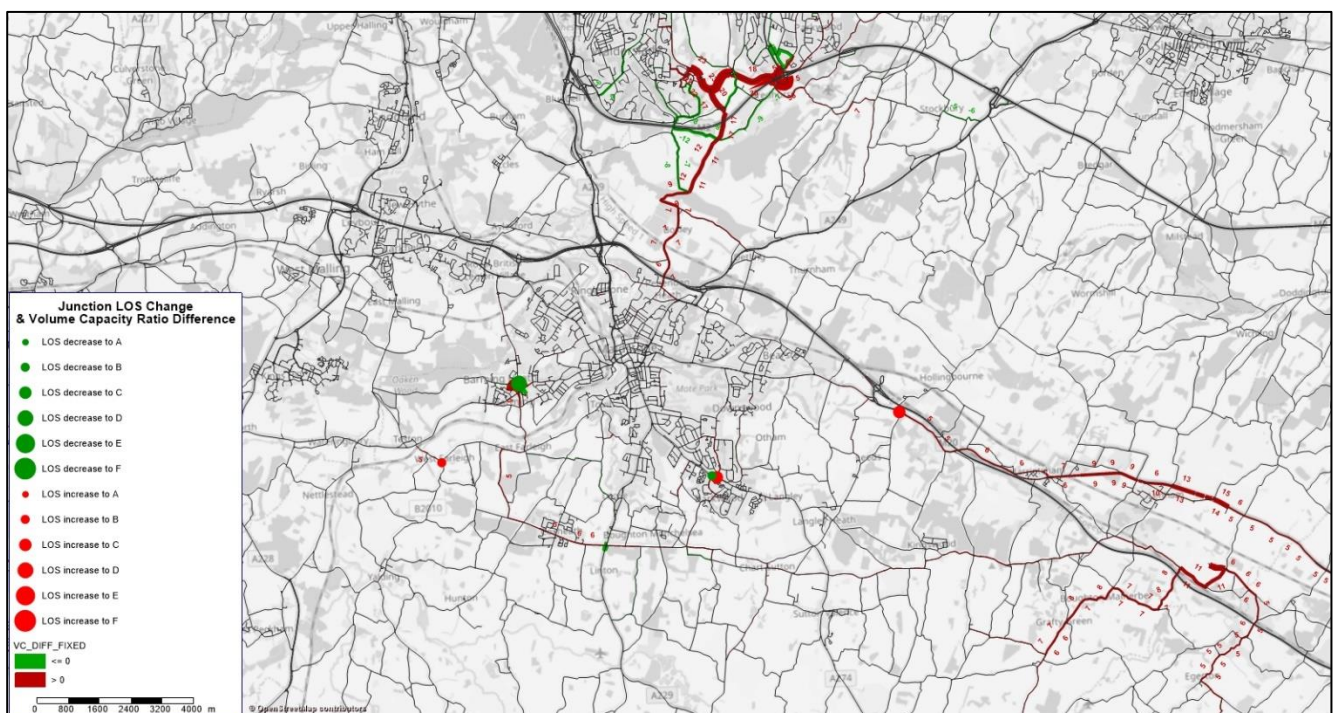


Figure 4-12: 2050 Inter Peak LOS Comparison: Forecast Baseline vs Preferred Option





Figure 4-13: 2050 PM LOS Comparison: Forecast Baseline vs Preferred Option

#### 4.3.3 2050 Preferred Option Journey Time Comparison

This section focuses on the predicted journey times of local routes in Maidstone between Preferred Option and Reference Case for the forecast year of 2050. The routes used for the analysis were shown in Figure 3-14 above and the detailed comparisons between Reference Case and Preferred Option, for each time period, are presented in Table 4-5.

The analysis highlights some routes which exhibit increases in travel time of greater than 5% between the two scenarios being compared. When compared to the Reference Case, Preferred Option AM peak shows 10.7% (~ 50 seconds) increase in travel time along Route 100 northbound along A249 between A229 Upper Stone St and M20 J7 due to the increase in queue along Bearsted Road. This increase in queue length is a result of increase in traffic flow rerouting to A249 due to the increase in queues in M20 J6 discussed in Section 4.3.1. In addition, journey time increases along Route 200 westbound along A20 Ashford Rd between A20 roundabout south of M20 J8 and A249 roundabout to 7.0% (~ 46 seconds). This is a result of additional trips coming from the Heathlands development in combination with additional trips from the north and west entering the town centre.

Lower increase in journey time is seen in Route 300 westbound and Route A249 southbound of 5.7% (~25seconds) and 5.1% (~34 seconds), respectively. For Route 300 along A20 London Road westbound, an increase in outbound traffic is predicted due to additional traffic entering the route from local roads. This additional traffic increases delays at the junctions along the route. For Route A249 southbound, the increase in journey time is a result of the additional queue length around A249 due to small increases in traffic related to housing developments around the area of Detling and Thurnham.

In the PM peak, Route 100 northbound along A249 between A229 Upper Stone St and M20 J7 results in an 8.9% (~50 seconds) increase in journey time. This is due to the additional traffic coming from the Town Centre and in the southeast of the Town Centre which creates longer queues along A249 approaching M20 J7. In addition, Route 200 eastbound along A20 Ashford Rd between A249 and M20 J8 demonstrates increases in travel time by 5.7% (~ 42 seconds). This is due to the additional traffic along the route related to the Heathlands development.

Although the report highlights the routes with a journey time difference of greater than 5%, it should be noted that a low percentage increase can still have impacts in the junction delays, especially on areas where congestion currently exists. For reference, journey time difference above 20 seconds that were not included in the 5% were also highlighted in the table.

## Maidstone Local Plan – Extended Forecast Modelling Report

Route Section	Description	Direction	AM (0800-09:00)				IP (10:00-16:00)				PM (17:00-18:00)			
			Forecast Baseline [min:sec]	Preferred Option [min:sec]	Forecast Baseline vs Preferred Option	% Difference	Forecast Baseline [min:sec]	Preferred Option [min:sec]	Forecast Baseline vs Preferred Option	% Difference	Forecast Baseline [min:sec]	Preferred Option [min:sec]	Forecast Baseline vs Preferred Option	% Difference
					[min:sec]				[min:sec]				[min:sec]	
100_NB	A249 between M20 and Upper Stone St.	NB	07:46	08:36	00:50	10.7%	07:16	07:21	00:05	1.1%	09:16	10:05	00:49	8.9%
100_SB	A249 between M20 and Upper Stone St.	SB	12:04	12:13	00:09	1.3%	07:25	07:28	00:03	0.8%	08:14	08:22	00:08	1.7%
200_EB	A20 Ashford Rd	EB	07:24	07:28	00:04	0.8%	07:27	07:32	00:05	1.2%	12:15	12:57	00:42	5.7%
200_WB	A20 Ashford Rd	WB	11:04	11:50	00:46	7.0%	07:51	07:57	00:06	1.2%	08:35	08:45	00:10	1.9%
300_EB	A20 London Rd	EB	07:22	07:26	00:04	0.9%	05:46	05:48	00:02	0.8%	06:38	06:54	00:16	3.9%
300_WB	A20 London Rd	WB	07:20	07:45	00:25	5.7%	06:02	06:05	00:03	0.9%	06:43	06:48	00:05	1.2%
400_EB	A26 Tonbridge Rd	EB	13:09	13:19	00:10	1.3%	11:54	11:48	-00:06	-0.7%	13:19	13:33	00:14	1.7%
400_WB	A26 Tonbridge Rd	WB	12:55	13:14	00:19	2.5%	11:41	11:45	00:04	0.6%	12:11	12:30	00:19	2.6%
500_NB	Lower Rd / B2010	NB	09:01	08:41	-00:20	-3.7%	08:13	08:13	00:00	0.2%	09:08	09:13	00:05	1.0%
500_SB	Lower Rd / B2010	SB	08:28	08:40	00:12	2.3%	08:17	08:18	00:01	0.2%	08:43	08:46	00:03	0.6%
600_EB	B2163	EB	22:31	22:45	00:14	1.0%	21:31	21:27	-00:04	-0.3%	23:17	23:20	00:03	0.2%
600_WB	B2163	WB	22:55	23:26	00:31	2.2%	21:32	21:26	-00:06	-0.4%	22:16	22:12	-00:04	-0.3%
700_EB	A20 London Rd between Castle Way and Coldharbour Ln	EB	10:21	10:24	00:03	0.5%	08:53	08:53	00:00	0.0%	10:37	10:42	00:05	0.8%
700_WB	A20 London Rd between Castle Way and Coldharbour Ln	WB	09:29	09:32	00:03	0.6%	08:37	08:40	00:03	0.5%	09:47	09:31	-00:16	-2.7%
39_40_SB	Sutton Rd/Maidstone Rd/Biddenden Rd	SB	20:42	20:54	00:12	0.9%	20:44	20:53	00:09	0.7%	22:09	22:30	00:21	1.5%



## Maidstone Local Plan – Extended Forecast Modelling Report

Route Section	Description	Direction	AM (0800-09:00)				IP (10:00-16:00)				PM (17:00-18:00)			
			Forecast Baseline [min:sec]	Preferred Option [min:sec]	Forecast Baseline vs Preferred		Forecast Baseline [min:sec]	Preferred Option [min:sec]	Forecast Baseline vs Preferred		Forecast Baseline [min:sec]	Preferred Option [min:sec]	Forecast Baseline vs Preferred	
					Baseline vs Preferred	% Difference			Baseline vs Preferred	% Difference			Baseline vs Preferred	% Difference
39_40_NB	Sutton Rd/Maidstone Rd/Biddenden Rd	NB	22:44	23:10	00:26	1.9%	20:42	20:48	00:06	0.5%	20:49	20:56	00:07	0.6%
800_SB	A229 Royal Engineer's Rd / A229 Loose Rd	SB	16:12	15:59	-00:13	-1.3%	15:03	15:07	00:04	0.4%	16:51	17:13	00:22	2.2%
800_NB	A229 Royal Engineer's Rd / A229 Loose Rd	NB	16:26	17:15	00:49	4.9%	15:49	16:17	00:28	3.0%	19:13	19:51	00:38	3.2%
900_NB	A229 between M20-J6 and M2-J3	NB	03:25	03:28	00:03	1.3%	03:18	03:18	00:00	0.1%	03:49	03:48	-00:01	-0.6%
900_SB	A229 between M20-J6 and M2-J3	SB	05:07	05:14	00:07	2.3%	03:12	03:13	00:01	0.4%	03:53	04:02	00:09	3.8%
1000_SB	Lidsing to Boxley	NB	06:17	06:20	00:03	0.9%	06:14	06:15	00:01	0.3%	07:00	07:06	00:06	1.4%
1000_NB	Lidsing to Boxley	SB	07:30	07:50	00:20	4.4%	06:17	06:21	00:04	1.2%	06:37	06:55	00:18	4.6%
A249_NB	A249	NB	08:35	08:36	00:01	0.2%	08:08	08:08	00:00	-0.1%	09:22	09:18	-00:04	-0.8%
A249_SB	A249	SB	11:07	11:41	00:34	5.1%	08:08	08:08	00:00	0.0%	08:36	08:38	00:02	0.4%
M20_02_NB	M20 between J8 and J9	NB	17:30	17:55	00:25	2.4%	14:19	14:21	00:02	0.2%	14:08	14:10	00:02	0.2%
M20_02_SB	M20 between J8 and J9	SB	10:51	10:52	00:01	0.1%	10:56	10:57	00:01	0.1%	11:57	11:56	-00:01	-0.1%
M20_04_EB	M20 between J4 and J7	EB	09:04	09:04	00:00	0.0%	08:58	09:00	00:02	0.3%	13:38	14:10	00:32	4.0%
M20_04_WB	M20 between J4 and J7	WB	09:37	09:40	00:03	0.5%	08:36	08:37	00:01	0.1%	08:39	08:38	-00:01	-0.2%

Table 4-5: 2050 Modelled Total Travel Time Comparison: Forecast Baseline vs Preferred Option

## 5. Conclusions and Recommendations

This Report provides a comprehensive description of the methodologies used and the 2037 and 2050 forecasts provided by the Maidstone Transport Local Model.

Planned land use developments and highway schemes were identified in collaboration with Kent County Council and they were implemented in the Maidstone Transport Local Model to replicate 2037 and 2050 developments and network schemes in the Maidstone area. These forecast scenarios have been developed in order to test the impacts of local plan developments in Maidstone in comparison to the Reference Case.

The 2037 Preferred Option scenario shows increases in traffic flows in areas where major developments are proposed, particularly around the Lidsing and Heathlands Garden Settlements. The modelling undertaken suggests that the addition of the new link road in the Lidsing Garden Settlement predicted more trips using M2 and A229. The link road connection to Westfield Sole Road and Lidsing Road in the south provides alternative access to the Maidstone Town Centre via Boxley Road, where additional traffic flows are also predicted. However, reductions in traffic along some local roads in Medway are also predicted as a result of the potential diversion of traffic to M2 and A229. Around Heathlands Garden Settlement, significant increases in traffic are predicted along A20 Ashford Road, Lenham Heath Road and Bowley Lane.

In terms of the junction level of service, consideration should be given to the following key junctions where significant increases in LOS are predicted in the 2037 Reference Case and Preferred Option scenarios:

- A26 Tonbridge Road/Red Hill/Bow Road
- A20 London Road/Station Road
- Hermitage Lane/Heath Road/St Andrew's Road
- Willington Street/Madginford Road
- A20 Ashford Road/Willington Street

Further investigation is recommended for these junctions alongside a review of the any potential mitigations that can be considered.

For the journey time, the 2037 comparison highlights the following significantly impacted routes caused by additional traffic related to the Garden Settlements and additional queues predicted at some of the junctions.

- A249 between A229 Upper Stone St and M20 J7 (Route 100 Southbound)
- A229 between Loose Road and M20 J6 (Route 800 Northbound)
- A20 Ashford Rd between A249 and M2 J8 (Route 200 Eastbound)

In 2050, the Preferred Option scenario predicts similar areas where traffic increases are predicted in 2037 but with a higher traffic flow range. It should be noted that for this scenario, no changes to the committed and Local Plan developments were assumed except for further build out to the completion of Lidsing and Heathlands Garden settlements.

There are a number of junctions which show LOS E and F around the town centre in the 2050 Reference Case and Preferred Option scenarios where further investigation is recommended. These include the five junctions above and the following junctions below:

- A20 London Road / Castle Way
- Boxley Road / Well Road
- A229 Loose Rd/ Park Way/ Armstrong Road

Lastly, in terms of 2050 journey time comparison, the following routes predicted significant increase in journey time due to the additional traffic related to the garden settlements and traffic rerouting due to the increase in the number of junctions where additional queues are predicted.

- A249 between A229 Upper Stone St and M20 J7 (Route 100 Northbound)
- A20 Ashford Road between A20 Roundabout South of M20 J8 and A249 Roundabout (Route 200 Eastbound and Westbound)
- A20 London Road between Terrace Road and Coldharbour Roundabout (Route 300 Westbound)
- A249 between Quinton Road and The Street (Route A249 Southbound)

Similar to 2037, further investigation is recommended for the junctions along these routes to review any potential mitigations that can be considered.

## Appendix A. List of Committed Schemes

The table below shows the infrastructure schemes included in the Reference Case and Preferred Option scenarios. The two network schemes located in Tonbridge and Malling and classified as “near certain” were confirmed with KCC to be implemented in the Reference Case and Preferred Option scenarios due to its proximity to the detailed modelled area. The other proposed network schemes which were not classified as “near certain” during the time of modelling were not included in the transport models. However, it should be noted that some of these schemes may now have changed the status (i.e A20/Hall Road/Mill Road) and sensitivity test including these junctions can be considered if required.

District	Scheme Name	Scheme Description
Maidstone	1 - Capacity improvements at A20 London Road junction with St. Laurence Avenue	Capacity improvements at A20 London Road junction with St. Laurence Avenue
	2 - Improvements to capacity at the junctions of Willington Street/Wallis Avenue and Sutton Road	Improvements to capacity at the junctions of Willington Street/Wallis Avenue and Sutton Road
	3 - Improvements to capacity at the A229/A274 Wheatsheaf junction	Improvements to capacity at the A229/A274 Wheatsheaf junction
	4 - A20 Ashford Road highways improvements	A20 Ashford Road highways improvements to include carriageway narrowing, reduction of the speed limit and pedestrian crossing facilities
	5 - Signalisation of the Kings Road / Mill Bank junction, Headcorn	Signalisation of the Kings Road / Mill Bank junction, Headcorn
	6 - Goudhurst Road, Church Green	Package of measures including the upgrading of the zebra crossing on Goudhurst Road to a pelican crossing, the provision of a pedestrian crossing on Church Green, traffic calming measures and improvements to bus infrastructure
	7 - Boughton Lane	Highway improvements at Boughton Lane and at the junction of Boughton Lane and the A229 Loose Road, as proven necessary
	8 - Capacity improvements and signalisation of Bearsted roundabout and capacity improvements at New Cut roundabout	Capacity improvements and signalisation of Bearsted roundabout and capacity improvements at New Cut roundabout
	9 - Upgrading of Bearsted Road to a dual carriageway between Bearsted roundabout and New Cut roundabout	Upgrading of Bearsted Road to a dual carriageway between Bearsted roundabout and New Cut roundabout
	10 - Capacity improvements at A20 Ashford Road junction with Willington Street	Implementation of traffic lights
	11. Coldharbour Roundabout	Additional capacity on the approach lanes and removal of the traffic signals.

District	Scheme Name	Scheme Description
Tonbridge & Malling	1 - Whitepost field Link between Hermitage Lane and A20 including new roundabout junction with Hermitage Lane and improved Poppyfields roundabout at A20/St Laurence Avenue	Developer schemes to be delivered by S278
	2 - Link road between Bellingham Way and Station Road, Aylesford	To be provided by developer of Aylesford Newsprint site