



TECHNICAL NOTE 1

DATE:	30 August 2024	CONFIDENTIALITY:	Confidential
SUBJECT:	Transport Modelling - COMET		
PROJECT:	HCC Lot 3 - Land North of Great Ashby	AUTHOR:	Bipin Muley, Palash Shukla
CHECKED:	Shaista Farooq	APPROVED:	Christine Elphicke

INTRODUCTION

WSP has been commissioned by Picture Estate Limited (the ‘developer’) via Hertfordshire County Council (HCC) to assess the strategic transport impact of development proposals on the Land north of Great Ashby which includes residential developments of 650 dwellings, 500sqm of Financial and Professional Services and a local centre and land for primary and secondary schools.

To assess the impacts of the development, the modelling was undertaken using Hertfordshire’s COMET model, currently maintained by WSP. The purpose of this technical note is to present the assessment undertaken for the development and its impacts on the transport network.

This technical note is divided into the following sections:

- 1) Context
- 2) Base year performance
- 3) Base year recalibration
- 4) Scenarios modelled
- 5) Results
 - a. Demand Model
 - b. Highway Model
 - c. Public Transport Model
- 6) Summary

CONTEXT

Figure 1 shows the location of the development site within the context of the wider Great Ashby area.

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Figure 1: Development Site Location

COMET MODEL

HCC own the Countywide Model of Transport (COMET) modelling suite. This consists of a SATURN Highway Assignment Model (HAM) and an EMME-based Variable Demand (VDM) and Public Transport (PT) Model.

The COMET model has a base year of 2014 with a forecast year of 2036. There are two forecast scenarios:

- 2036 National Trip End Model (NTEM) Constrained Scenario
- 2036 Local Plan Run 6 (LPR6)

It was deemed suitable to use the 2036 NTEM Constrained Scenario for the baseline of the modelling required as this represents all core scenario growth (near certain and more than likely developments and transport schemes), as defined by DfT Transport Appraisal Guidance (TAG) and is constrained to NTEM 8.0 growth.

The highway assignment model covers three hourly time periods as given below:



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- AM peak hour between 08:00 to 09:00
- Inter-peak hour (the average of the six-hour period between 10:00 to 16:00)
- PM peak hour between 17:00 to 18:00

The Public Transport (PT) model covers hourly time periods as given below:

- AM average hour (the average of the three-hour period between 07:00 to 10:00)
- Inter-peak hour (the average of the six-hour period between 10:00 to 16:00)
- PM average hour (the average of the three-hour period between 16:00 to 19:00)

COMET Version

The COMET version used as a starting point of the local recalibration of the model is the COMET 7 Base year model updated in May 2022.

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BASE YEAR PERFORMANCE

The original COMET model was calibrated and validated to a 2014 base year. The coverage of the count data within the town centre and crucially near the Great Ashby development site was limited within the original model.

Figure 2 and **Figure 3** show the calibration and validation performance of the count data of the original COMET7 2014 model for the AM and PM peaks respectively, highlighting the counts immediately west and south of the development site.



Figure 2: GEH performance of traffic count data in Great Ashby – AM Peak

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Figure 3: GEH performance of traffic count data in Great Ashby – PM Peak

The results show that the model is not performing well on some of the key links in the study area, especially in the AM peak on Great Ashby way, Back Lane and the links around A1(M) Junction 8. The orange and red links have a GEH of over 5, demonstrating that they do not meet the Department for Transport (DfT) criteria. WSP therefore advised HCC that the 2014 base year model needed to be re-calibrated for the model to be a more accurate reflection of the 2014 conditions.

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BASE YEAR RE-CALIBRATION

The base year recalibration included the following tasks:

- 1) Reviewing the network in the local area in detail within the model and improving the calibration in the local area.
- 2) Rebuilding of forecasts to account for the changes made to the base year in the recalibration in the local area.

The AM and PM peak time periods were the focus for the assessment of the development proposals in Great Ashby, and most of the additional traffic count data only covered these hours so improvements to the base model were only made to these time periods.

LOCAL RECALIBRATION

Local recalibration of the model involved the following primary tasks:

- Network checks were conducted which included link lengths, number of lanes, speed flow curves, speed, bus lanes, banned turns, junction configuration, saturation flow, priority marker, and signal timing. It was found that there were minor speed limit changes and distance discrepancies on three links and a missing signal on A602 Hitchin Road. There were also 2 missing HGV bans on minor roads, missing flares at two junctions and incorrect saturation flow at one junction.
- Rerunning of matrix estimation (ME) to account for the network changes and improve the traffic count performance in the Great Ashby study area.

The existing counts within the COMET highway model were reviewed to understand which traffic counts were to be included in the calibration process. The performance of the transport model was then reviewed for the network and count data used to ensure it was consistent. Following that, the additional June 2023 counts provided by the developer and the March 2023 ATC counts available as part of the COMET model update were reviewed to determine which additional counts can be used for the calibration process. It is to be noted that the 1-day Junction turning counts provided by the developer were excluded from the calibration process to ensure the reliability of the traffic count data as per TAG M3.1. The additional ATC counts that were included in the calibration process are shown in **Figure 4**, presenting the location of the traffic counts used for the calibration in the Great Ashby study area. ATC 3, ATC 49 and ATC 611 are located at Great Ashby Way, Back Lane and Gunnels Wood Road respectively. ATC 3 was provided by the developer for data collected for one week in June 2023, whereas ATC 49 and ATC 611 are HCC counts collected for two weeks in March 2023.

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Figure 4: Additional ATC data location

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Figure 5 presents one of the network improvements carried out in the model where the speed was reduced from 55kph to 32kph on the Back Lane.



Figure 5: Network Improvements – Back Lane

To test the impacts of the network improvements, three 2014 COMET 7 Base year scenarios were assessed:

1. COMET 7 – original model
2. COMET 7 (Revised) – original model with network improvements
3. COMET 7 (Revised 2) – original model with matrix and network improvements

A total of 44 traffic counts were used for the local recalibration purposes.

As per the TAG unit M3.1 (Section 3.3.11), the validation criteria and guidelines for link flows are defined in **Table 1**.

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Table 1: Link Flow Validation Criteria and Acceptability Guideline

Criteria	Description of Criteria	Acceptability Guideline
1	Individual flows within 100 veh/h of counts for flows less than 700 veh/h	> 85% of cases
	Individual flows within 15% of counts for flows from 700 to 2,700 veh/h	
	Individual flows within 400 veh/h of counts for flows more than 2,700 veh/h	
2	GEH < 5 for individual flows	> 85% of cases

Table 2 presents the summary of the link performance for all the counts as per TAG criteria.

Table 2: Link Performance of Great Ashby Local Area – All Counts (TAG Criteria)

Period	No. of Counts	COMET 7	COMET 7 (Revised)	COMET 7 (Revised 2)
AM	44	27 (61%)	30 (68%)	42 (95%)
PM	44	32 (73%)	34 (77%)	38 (86%)

From **Table 2**, it is observed that there is a significant improvement in the overall link performance with the network and matrix improvements in comparison to the original model. Overall, the COMET 7 model with the network and matrix improvements meets the TAG criteria.

A comparison of the GEH values for each of these three scenarios was also carried out for the Great Ashby study area in each time period (AM, IP and PM). **Figure 6** to **Figure 11** presents these plots for the AM and PM peaks.

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Figure 6: AM Peak Base Year GEH Performance in Great Ashby Local Area – Original Model

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Figure 7: AM Peak Base Year GEH Performance in Great Ashby Local Area – With Network Improvements

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Figure 8: AM Peak Base Year GEH Performance in Great Ashby Local Area – With network and matrix improvements

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Figure 9: PM Peak Base Year GEH Performance in Great Ashby Local Area – Original Model

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Figure 10: PM Peak Base Year GEH Performance with Great Ashby Local Area – With Network Improvements

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Figure 11: PM Peak Base Year GEH Performance with Great Ashby Local Area – With network and matrix improvements

From the GEH plots, it is observed that the GEH performance improves significantly in the Great Ashby area with the network and matrix improvements, especially in the Back Lane and the Great Ashby Way in the AM peak model and the Back Lane in the PM peak. There have also been improvements in the GEH performance in the PM peak on A602 and Graveley Road which connect to the A1(M).

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SCENARIOS MODELLED

Following the recalibration of the 2014 Base Year model, the following scenarios were modelled in the full COMET modelling suite using the 2036 NTEM model as a basis:

- Do Minimum (DM): A 2036 without development scenario
- Do Something (DS): A 2036 with development scenario

The ‘without development’ scenario replicated the available 2036 NTEM network and it was modified to include the updated base year network changes. The planning data used was the most recent data provided by HCC in spring 2024, which includes all completions and developments with planning permission between 2014-2023. The CTripEnd model was run to convert the housing and jobs to 24-hour production and attraction tripends and the COMET variable demand model (VDM) was run to create a 2036 without development (DM) scenario which included the latest planning data assumptions and the matrix improvements applied to the base year model. The ‘with development’ (DS) scenario includes the development accesses and all the development quantum.

With Development Assumptions

The developer has provided the assumptions for housing and employment for the site, and that information has been updated in the planning data inputs for the COMET demand model. **Table 3** provides the planning data quantum assumed for the site, which comprises 650 dwellings, 500 sqm of financial and professional services and 2 Primary and 4 Secondary schools in total.

Table 3: Great Ashby Planning Data

Land Use Type	Land Use Category	Floor Space	Total Dwellings	Jobs
Dwellings	C3	-	650	
Financial and Professional Services	A1-A3	500sqm		29
Primary School	F1 (School)	2FE Primary 420 pupils		59
Secondary School	F1 (School)	4FE Secondary School (720 Pupils)		99
Total			650	187

Forecast Network

Highway Network

The ‘with development’ scenario included the highway development accesses via the Mendip Way and the associated zone connectors were modelled. **Figure 12** shows the network coding for the access. The

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COMET7 model includes a number of zones that are empty in the base year, for populating with trips in the forecast. Zone 9057 has been used for the trips associated with the Great Ashby Development Site.

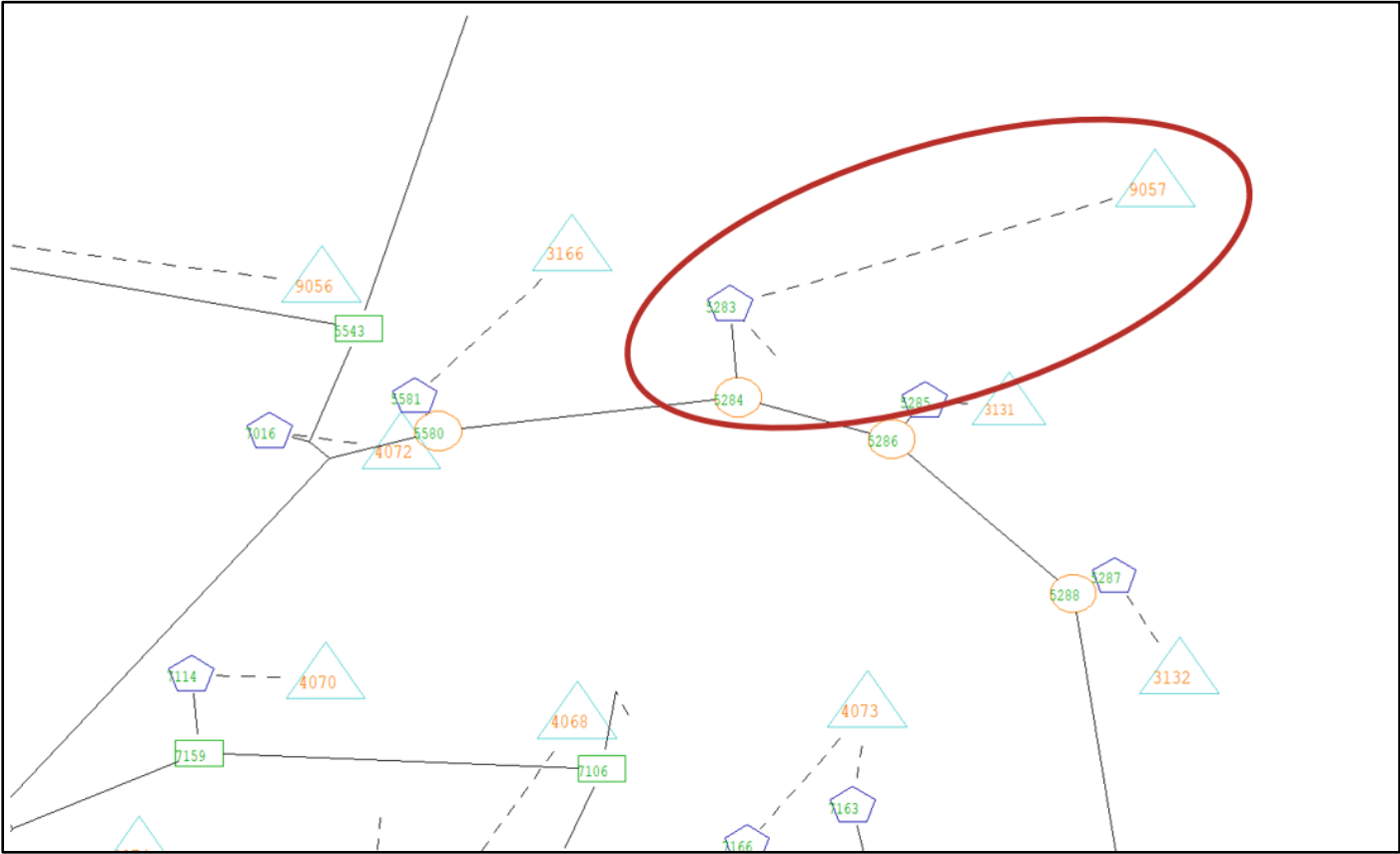


Figure 12: Forecast Network Junction Coding

Public Transport Network

Without Development Network

The ‘Without development’ network for this study is based on NTEM 2036 COMET 7 model. While the Stevenage Bus Station to Great Ashby (SB7) bus route (SB7_1) is included in the NTEM 2036 COMET 7 Scenario, its alignment differs from the current route observed as of 2024. The route coded in NTEM 2036 COMET 7 Scenario is shown in **Figure 13**.

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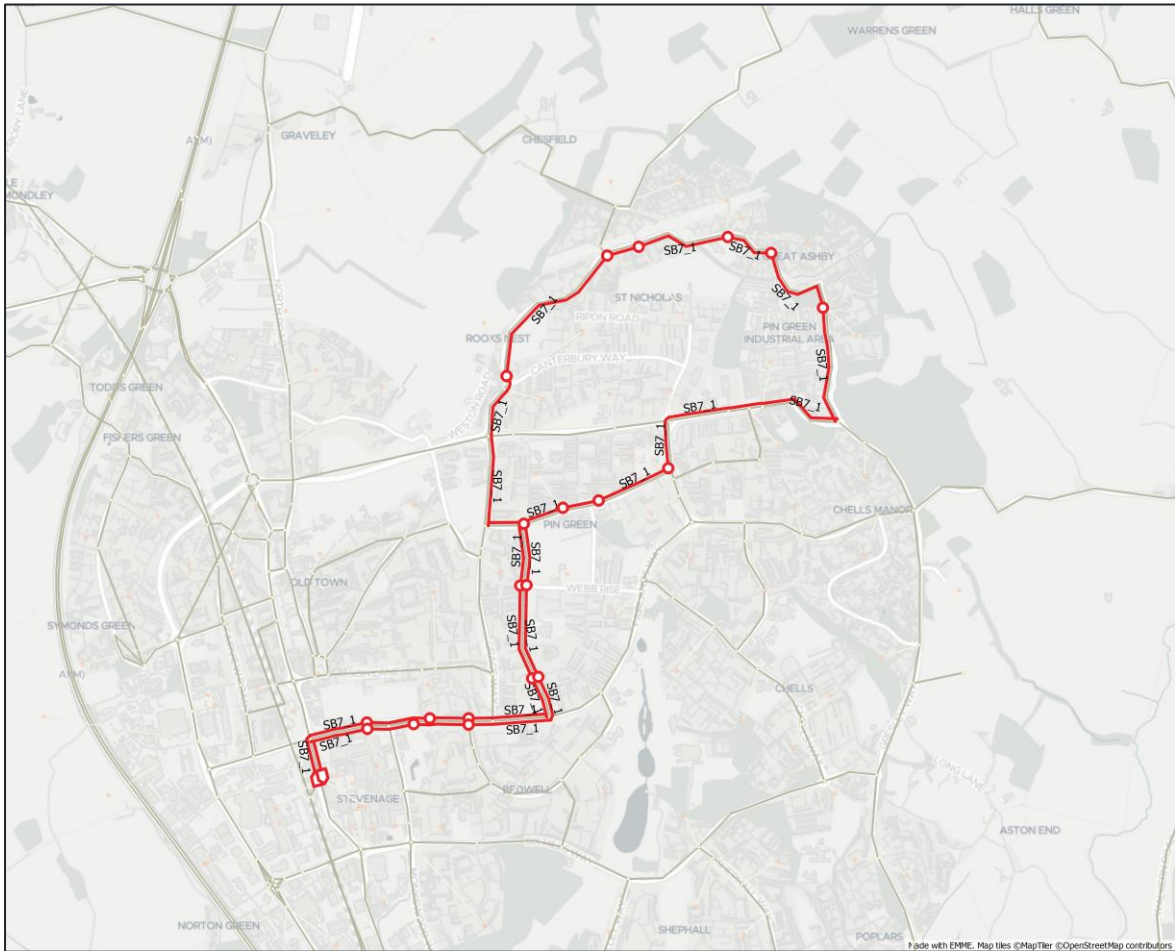


Figure 13: SB7 Route in NTEM 2036 COMET 7 Scenario

The Stevenage Bus Station to Great Ashby (SB7) bus route in the ‘without development’ scenario has been updated to reflect the route provided by Arriva Kent Thameside Ltd. The revised route is shown **Figure 14**. Unlike the single loop route in the NTEM 2036 COMET 7 Scenario, the updated route has been coded with two distinct services (SB7_1 and SB7_2) operating between Stevenage Bus Station and Great Ashby.

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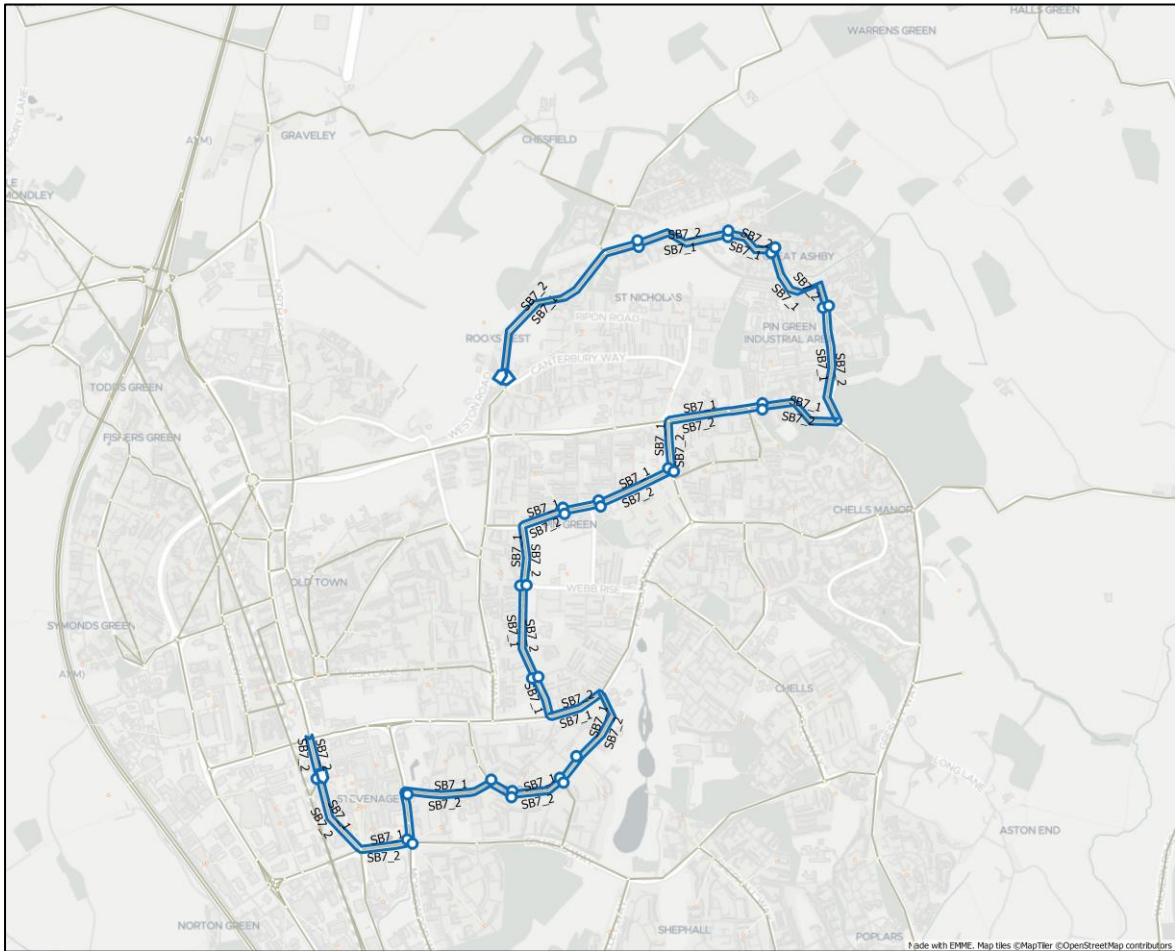


Figure 14: Revised SB7 Route in NTEM 2036 COMET 7 Scenario (DM)

With Development Network

The 'With Development' network was developed based on the 'without development' network for the SB7 route. Given that the revised route between Stevenage Bus Station and Great Ashby now provides access to the development site, new transit links were introduced to enhance bus connectivity to this area. The updated SB7_1 and SB7_2 transit lines are illustrated in **Figure 15**.

The route stopping pattern and bus travel times were finalized in consultation with Arriva (the operator) and the developer. Both routes have been coded with a 30-minute headway. Route SB7_2 begins at the Great Ashby-Manchester Close bus stop, connects to the development site, and then follows Great Ashby Way towards Stevenage Bus Station, with a travel time of 33 minutes. In contrast, Route SB7_1 travels directly from Stevenage Bus Station to the Great Ashby-Manchester Close bus stop, taking 23 minutes.

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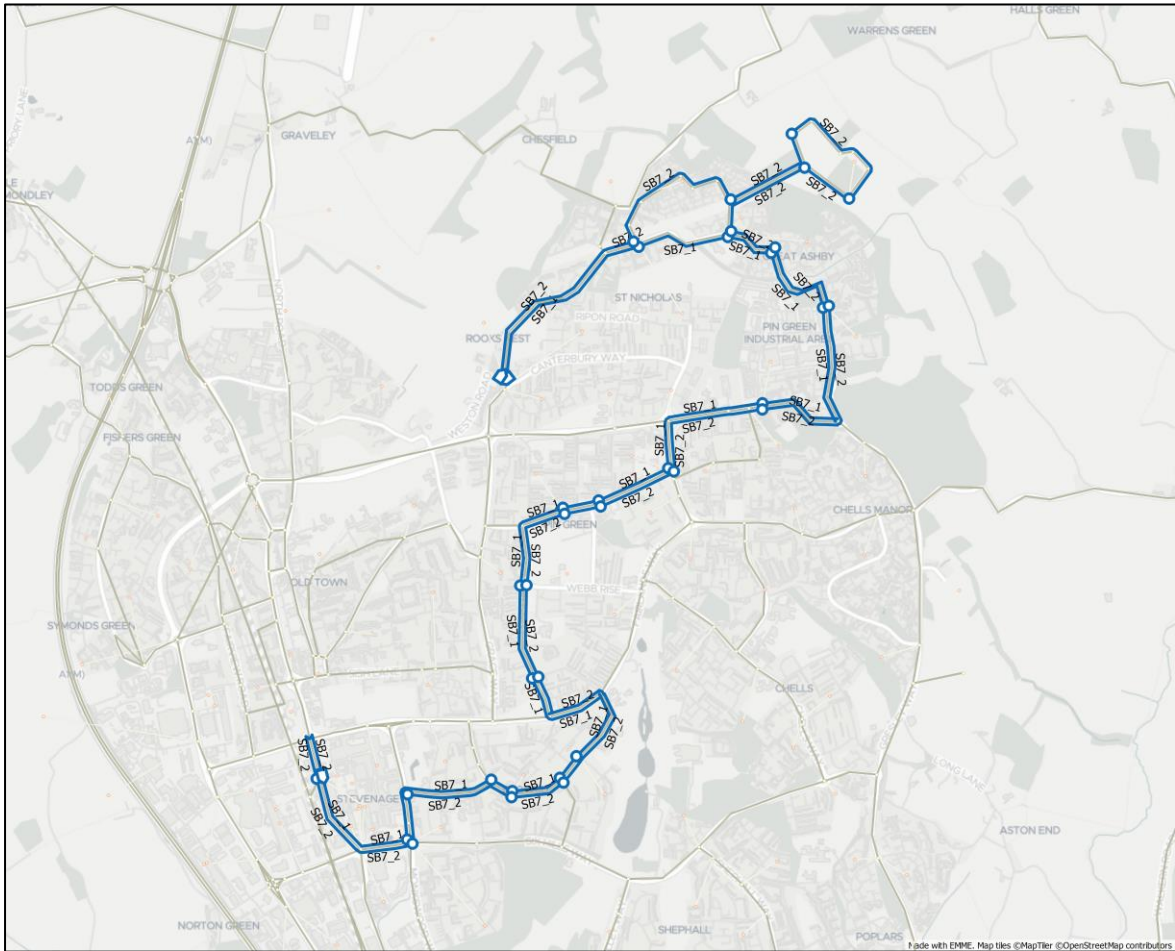


Figure 15: SB7 Route in with development scenario (DS)

Trip Generation and Distribution

Highway trips (vehicles)

The highway trip generation anticipated from the development was provided by the developer and used in 'with development' scenarios as shown in **Table 4**.

Table 4: Trip Generation by All Vehicle Types

Vehicle Type	AM Peak (0800-0900) Arrivals	AM Peak (0800-0900) Departures	PM Peak (1700-1800) Arrivals	PM Peak (1700-1800) Departures	Total
Car	276	484	268	126	1,153
LGV					
HGV					
	276	484	268	126	1,153

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Public Transport Trips (Passenger)

The public transport trip generation anticipated from the development was also provided by developer and used in Do Something scenario as shown in **Table 5**.

Table 5: Trip Generation by Public Transport

Land Use	AM Peak		PM Peak	
	Arrivals	Departures	Arrivals	Departures
03/M Residential/Mixed Private/Affordable Housing	2	13	10	4
04/A Education/Primary	40	18	0	2
04/B Education/Secondary	93	1	1	0
20% Modal Shift Allowance	27	7	3	2
Total two-way trips (inc. 20% Modal Shift)	162	39	14	8

The development trips were added on to Zone 9057 to uplift the trips generated by the demand model for each user class in order to match them with the trip generation targets as provided by the developer. The uplift of Education land use-related trips are assumed to be originating/destined within Stevenage and have been attributed to be using buses. Non-education land-use trips are split among the Bus, Rail and BusRail user classes using the split associated with the zone obtained from VDM.

RESULTS

This section highlights some of the key results from the modelling undertaken, providing results from the Demand, Highway and Public Transport models. It is important to note that all figures include the development flows in line with those provided to use by the developer, as outlined in Tables 4 and 5.

DEMAND MODEL

DEMAND MODEL

The full COMET VDM for the NTEM scenario has been run for the development which predicts the trip movements in and out of the development and the mode share between highway and public transport trips (PT). The model has been run for two scenarios, which are:

- 2036 without Great Ashby development
- 2036 with Great Ashby development

The main result from the demand model for this assessment is the mode share between highway and PT trips.

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MODE SHARE

The demand model results are as person trips and in the form of productions and attractions for just the development zone 9057. The mode share is provided as:

- 24-hour mode share – from the demand model for the entire day
- Peak Period mode share – from the demand model for peak periods defined in the COMET model (AM:0700-1000, and PM: 1600-1900)
- Peak hour mode share – from the assignment model results for the peak hours in form of origin and destination. The highway model is a peak hour model whereas the PT model is an average hour model. The peak hours for highway model are AM (0800-0900), PM (1700-1800), and for the PT model the average hours are: AM (0700-1000), PM (1600-1900)

The 24 hour mode share is provided in **Table 6**, the peak period model share is provided in **Table 7**, and the peak hour model share is provided in **Table 8**. The 24 hour and peak period mode share show that the highway users have 94-95% of the total share whereas public transport is about 5-6% of total usage.

For peak hours, which are taken from the assignment outputs, the main share is for car users in both morning and evening peaks, and public transport users are using BusRail (7%).

Table 6: 24 Hour Mode Share for the Development

Mode	Productions	Attractions	Total	Mode share
Highway	1,512	2,100	3,612	95%
PT	116	70	187	5%
Total	1,628	2,170	3,799	

Table 7: Peak Period Mode Share for the Development

Mode	Productions	Attractions	Total	Mode share
AM Peak				
Highway	383	440	823	94%
PT	34	18	53	6%
Total	417	459	876	
PM Peak				
Highway	388	481	869	94%
PT	33	19	52	6%
Total	421	500	921	

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Table 8: Peak Hour Mode Share for the Development (VDM)

User Class	Origin	Destination	Total	Mode share
AM				
Car Commute	53	18	71	30%
Car Business	6	3	9	4%
Car Other	62	80	142	59%
LGV	0	0	0	0%
HGV	0	0	0	0%
Bus	0	0	0	0%
Rail	0	0	0	0%
BusRail	11	6	17	7%
Total	132	107	239	100%
PM				
Car Commute	25	34	59	25%
Car Business	3	4	7	3%
Car Other	77	77	154	65%
LGV	0	0	0	0%
HGV	0	0	0	0%
Bus	0	0	0	0%
Rail	0	0	0	0%
BusRail	7	10	17	7%
Total	112	125	237	100%

Post VDM, the trip ends for the development zone have been uplifted to match the trip ends provided by the developer, the resultant peak hour mode share for the development zone is depicted in **Table 9**. It total share for the Bus trips have gone up to 16% in the AM peak whereas the share for BusRail has come down to 5%. In the PM peak, BusRail makes up 4% whereas Bus share is at 1%.

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Table 9: Peak Hour Mode Share for the Development post Trip End Uplift

User Class	Origin	Destination	Total	Mode share
AM				
Car Commute	210	49	259	27%
Car Business	22	7	29	3%
Car Other	251	220	471	49%
LGV	0	0	0	0%
HGV	0	0	0	0%
Bus	19	133	153	16%
Rail	0	1	1	0%
BusRail	19	28	47	5%
Total	522	438	960	100%
PM				
Car Commute	29	78	107	26%
Car Business	4	10	14	3%
Car Other	93	180	273	66%
LGV	0	0	0	0%
HGV	0	0	0	0%
Bus	2	1	3	1%
Rail	0	0	0	0%
BusRail	6	13	18	4%
Total	134	282	416	100%

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HIGHWAY MODEL

The impact of the Great Ashby development site on the highway network was assessed using the 2036 COMET 7 NTEM-constrained scenario using the SATURN model.

This section considers the following parameters which were used for the assessment:

- Flow differences with and without the development
- Delay difference with and without the development
- Forecast flows surrounding the development
- Volume to Capacity (V/C) ratios at junctions
- Origin and Destination Development flow distribution

Flow Differences

Flow difference plots with and without the development (DS – DM), are presented **Figure 16** and **Figure 17** for the AM and PM peaks respectively.

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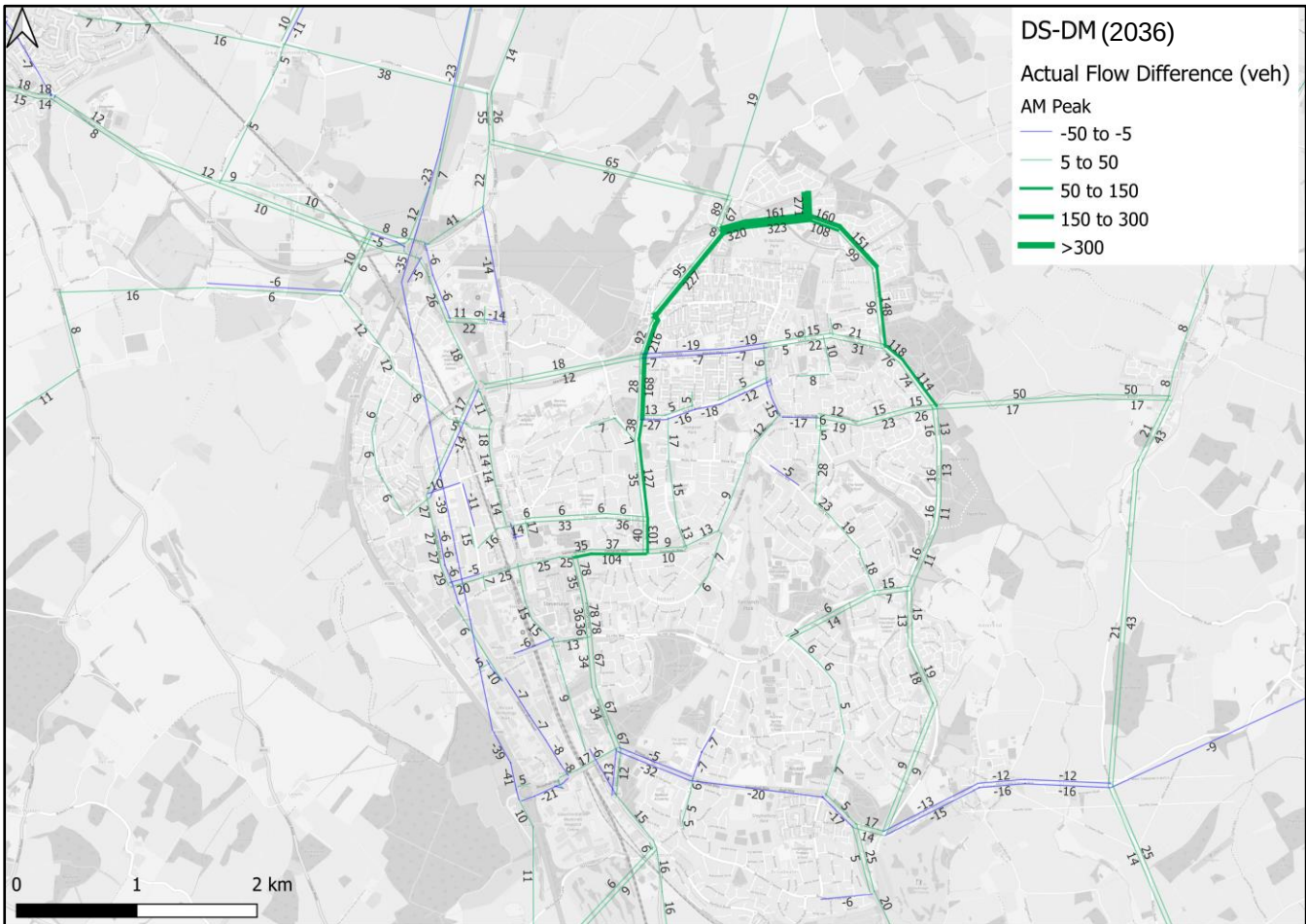


Figure 16: Actual Flow Difference (DS – DM) - AM peak

From **Figure 16**, it is observed that there is an increase in traffic flows on the Great Ashby Way of up to 484 and 268 two-way flows on the west and east of the development access road (Mendip Way) respectively. The major increase in traffic flows is seen along the Grace Way/Fairlands Way and St George's Way towards the west side of the development access road while traffic flow increases are seen along Gresley Way, B1037 towards the east side of the development access road. An increase in traffic flows along the Back Lane is also observed towards the west side of the development. A minor decrease in traffic flows is seen along Martins Way (between the Grace Way/Martins Way/Canterbury Way roundabout and A1155 Verity Way/Pilgrims Way roundabout), and Vardon Road near the development site.

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CHECKED:	Shaista Farooq	APPROVED:	Christine Elphicke

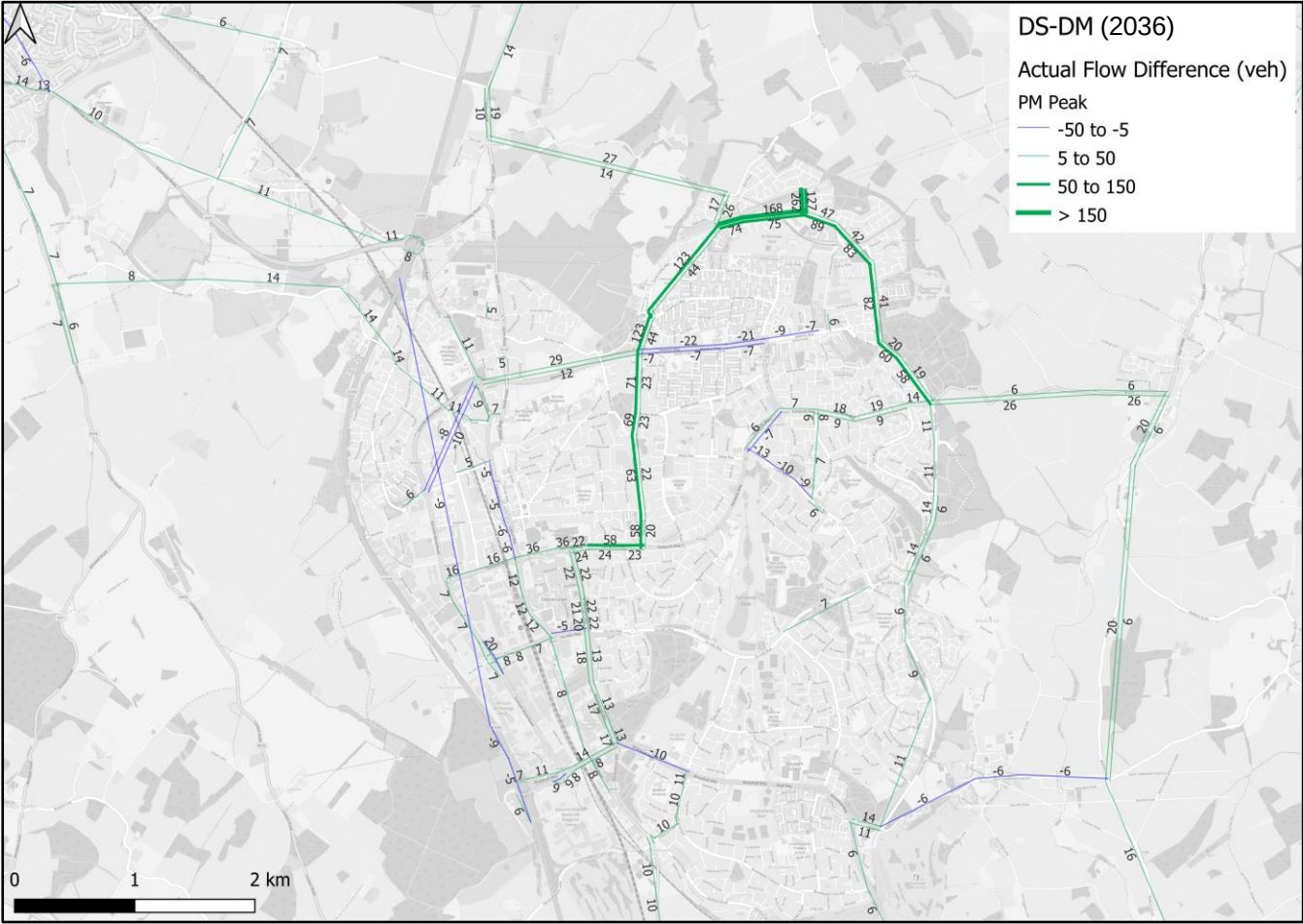


Figure 17: Actual Flow Difference (DS – DM) - PM peak

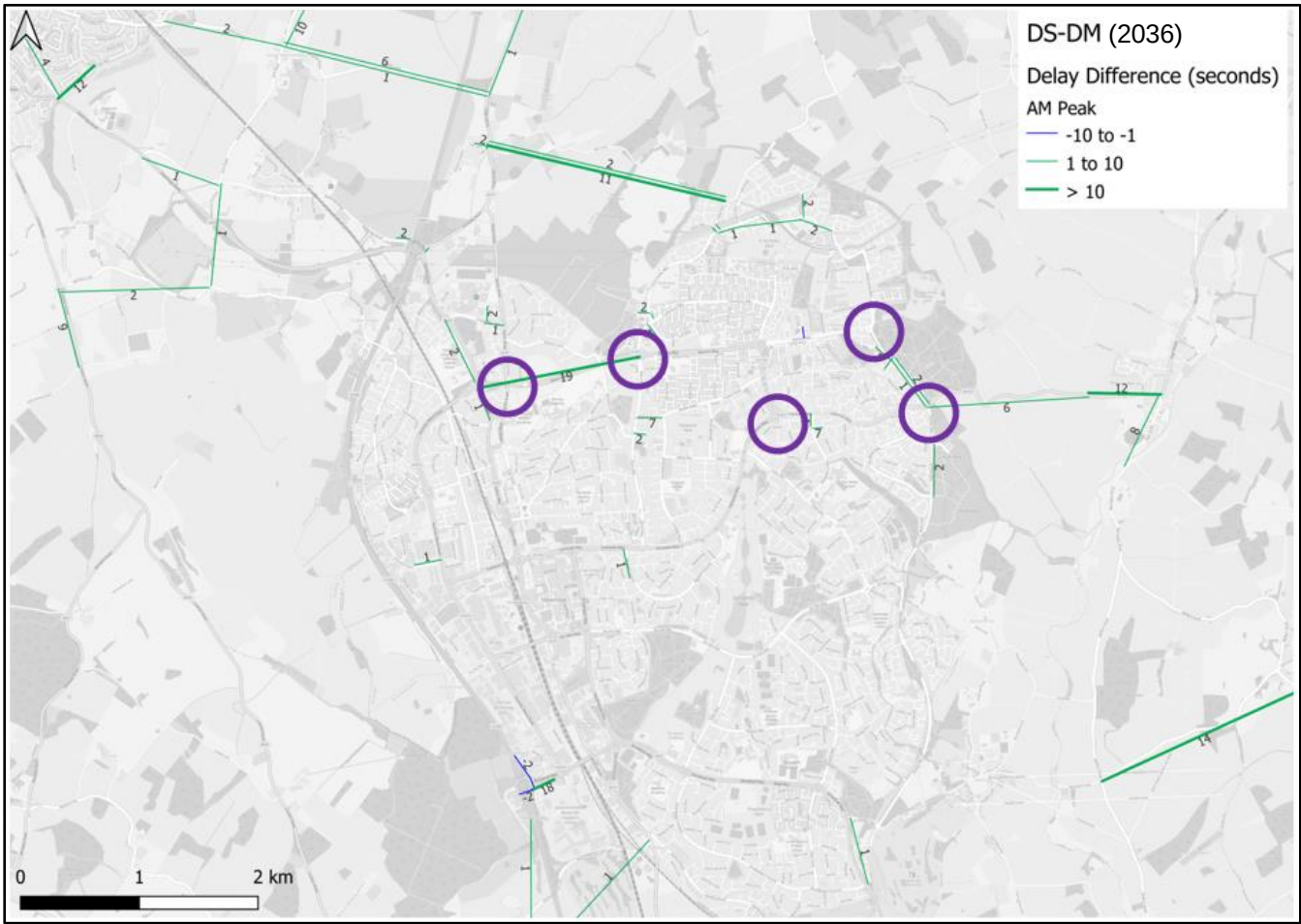
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From **Figure 17**, it is observed that there is an increase in traffic flows on the Great Ashby Way of up to 243 and 136 two-way flows on the west and east of the development access road (Mendip Way). The rest of the traffic flow changes show a similar trend to those presented in the AM peak with the major increases in traffic flows seen along the Grace Way/Fairlands Way towards the west side of the development access road while it is seen along Gresley Way towards the east side of the development access road. There is a minor decrease in traffic flows along the Martins Way (between the Grace Way/Martins Way/Canterbury Way roundabout and A1155 Verity Way/Pilgrims Way roundabout).

LINK DELAY DIFFERENCE PLOTS

Delay difference plots between the DS and DM scenarios were obtained to understand the impact of the development on link delays and are presented in **Figure 18** and **Figure 19** for the AM and PM peaks respectively.



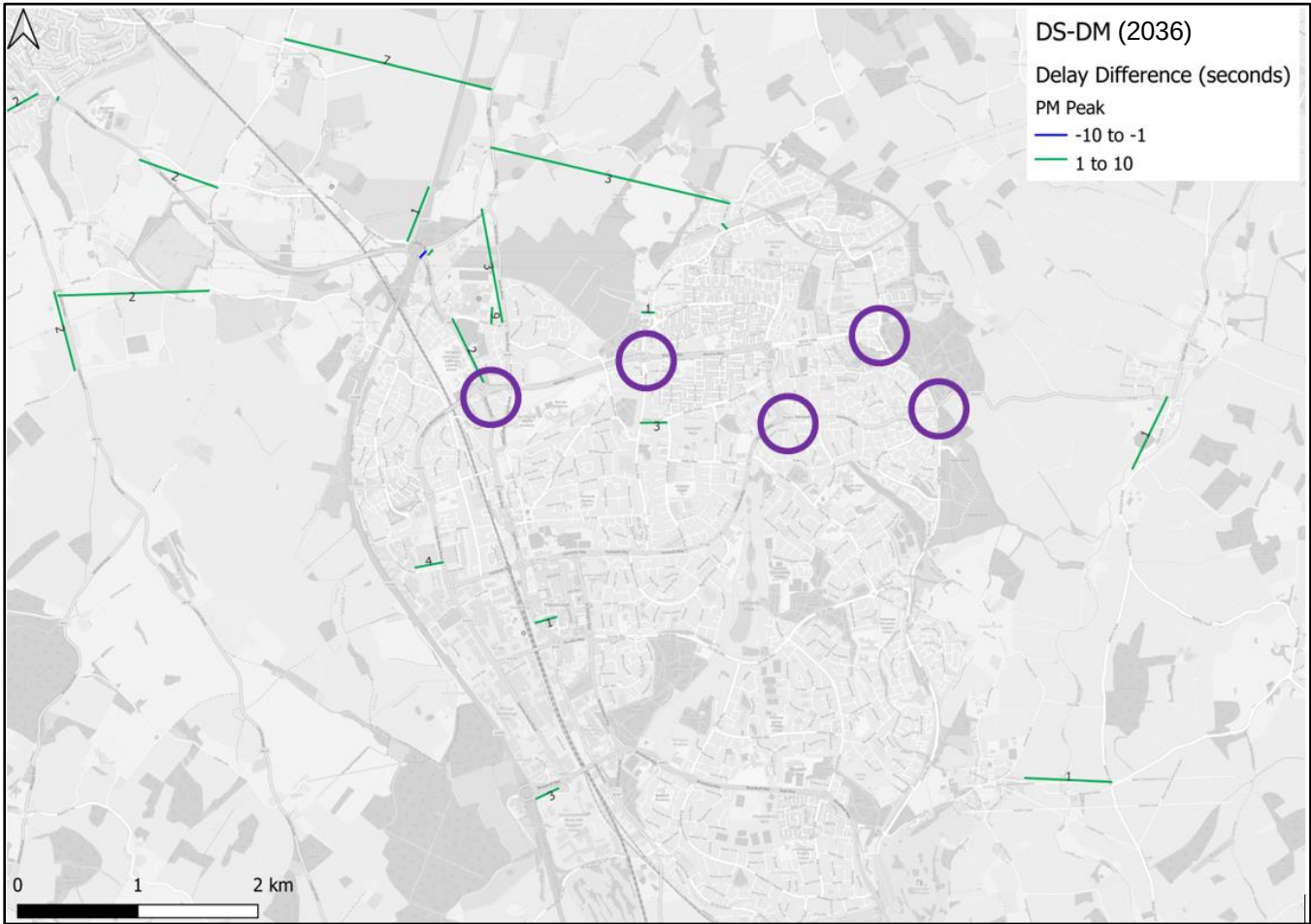
* The circled locations (violet) are some of the key junctions of focus as per the Proforma.

Figure 18: Link Delay Difference (DS – DM) - AM peak

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In the AM peak, delays of around 19 seconds are seen across the Martins Way westbound (west of the Grace Way/Martins Way/Canterbury Way roundabout) and around 11 seconds on Back Lane southbound towards the west of the development site access road (Mendip Way) while delays of approximately 12 seconds on B1037 eastbound are observed on the east of the development site access road. An increase in delay of 18 seconds is also observed on the Broadhall Way westbound connecting the A1(M) at the Langley Sidings Interchange.



* The circled locations (violet) are some of the key junctions of focus as per the Proforma.

Figure 19: Link Delay Difference (DS – DM) - PM peak

The PM peak does not indicate any major delays on the transport network neither in the vicinity of the development site nor in the greater Great Ashby area due to the development trips.

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FORECAST TRAFFIC FLOWS

The forecast traffic flows for the DS scenario with the development site are presented in **Figure 20** and **Figure 21** for the AM and PM peaks respectively. It is to be noted that the DS scenario comprises existing base model traffic and NTEM forecast growth traffic as well as the Land North of Great Ashby development traffic.

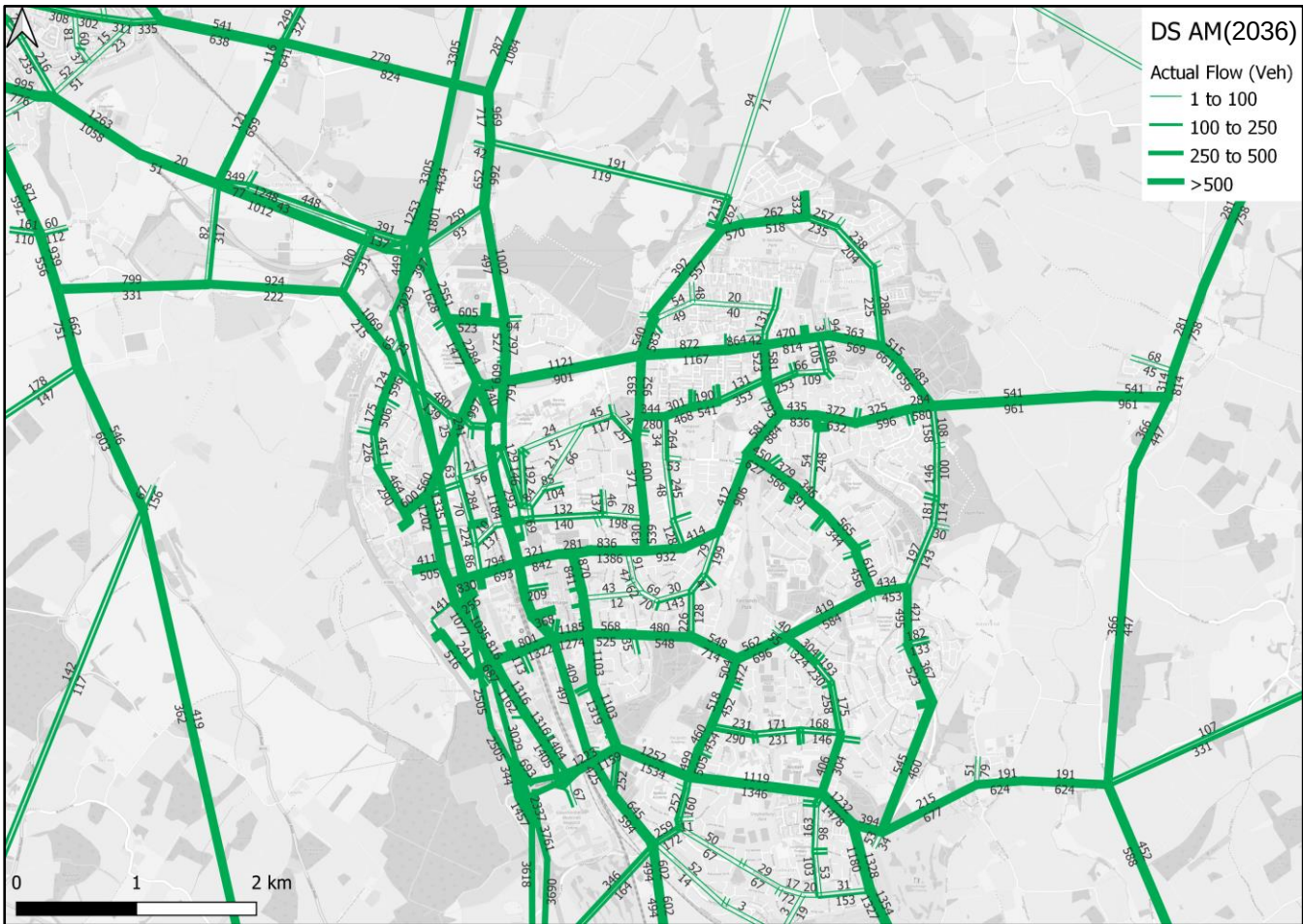


Figure 20: Forecast Flows (DS) - AM peak

In the AM peak, it is observed that there are about 780 (518 westbound and 262 eastbound) and 492 (235 westbound and 257 eastbound) two-way traffic flows on the Great Ashby Way immediately on the west and east of the development site access road (Mendip Way). It is also observed that there are around 310 (119 westbound and 191 eastbound) two-way traffic flows on the Back Lane while 921 (596 westbound and 325 eastbound) and 1,140 (656 southbound and 483 northbound) on the Martins Way and Gresley Way respectively.

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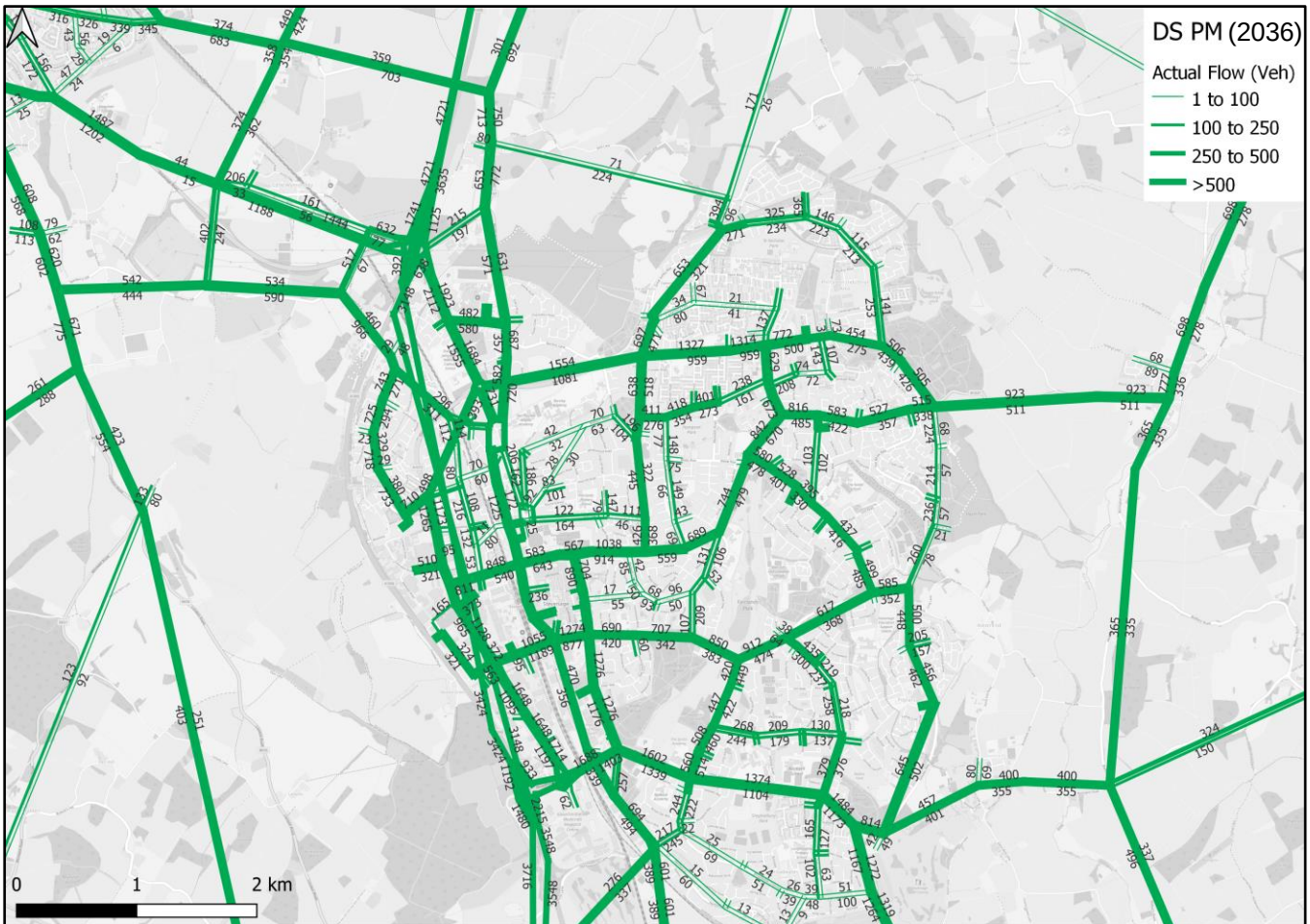


Figure 21: Forecast Flows (DS) - PM peak

In the PM peak, it is observed that there are about 559 (234 westbound and 325 eastbound) and 369 (223 westbound and 146 eastbound) two-way traffic flows on the Great Ashby Way immediately on the west and east of the development site access road (Mendip Way). It is also observed that there are around 295 (224 westbound and 71 eastbound) two-way traffic flows on the Back Lane while 884 (357 westbound and 527 eastbound) and 931 (426 southbound and 505 northbound) on the Martins Way and Gresley Way respectively.

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JUNCTION VOLUME TO CAPACITY RATIO

The volume-to-capacity (V/C) ratio was assessed based on the worst turn at the junction (where the V/C values are greater than 80%), therefore the results only apply to one arm of the junction **Figure 22 to Figure 25** present the V/C ratio at junctions during the AM peak for DM and DS scenarios respectively.

It is important to note that the increase in V/C provides an indication of where the development traffic is generating additional stress points within the highway network. SATURN is a strategic model and to understand the impacts at a local junction level it is advised detailed junction modelling is undertaken, using the SATURN modelled flows and observed counts, to assess the impacts in detail.



* The circled locations (violet) are some of the key junctions of focus as per the Proforma.

Figure 22: Volume to Capacity (V/C) Ratio (DM) - AM peak

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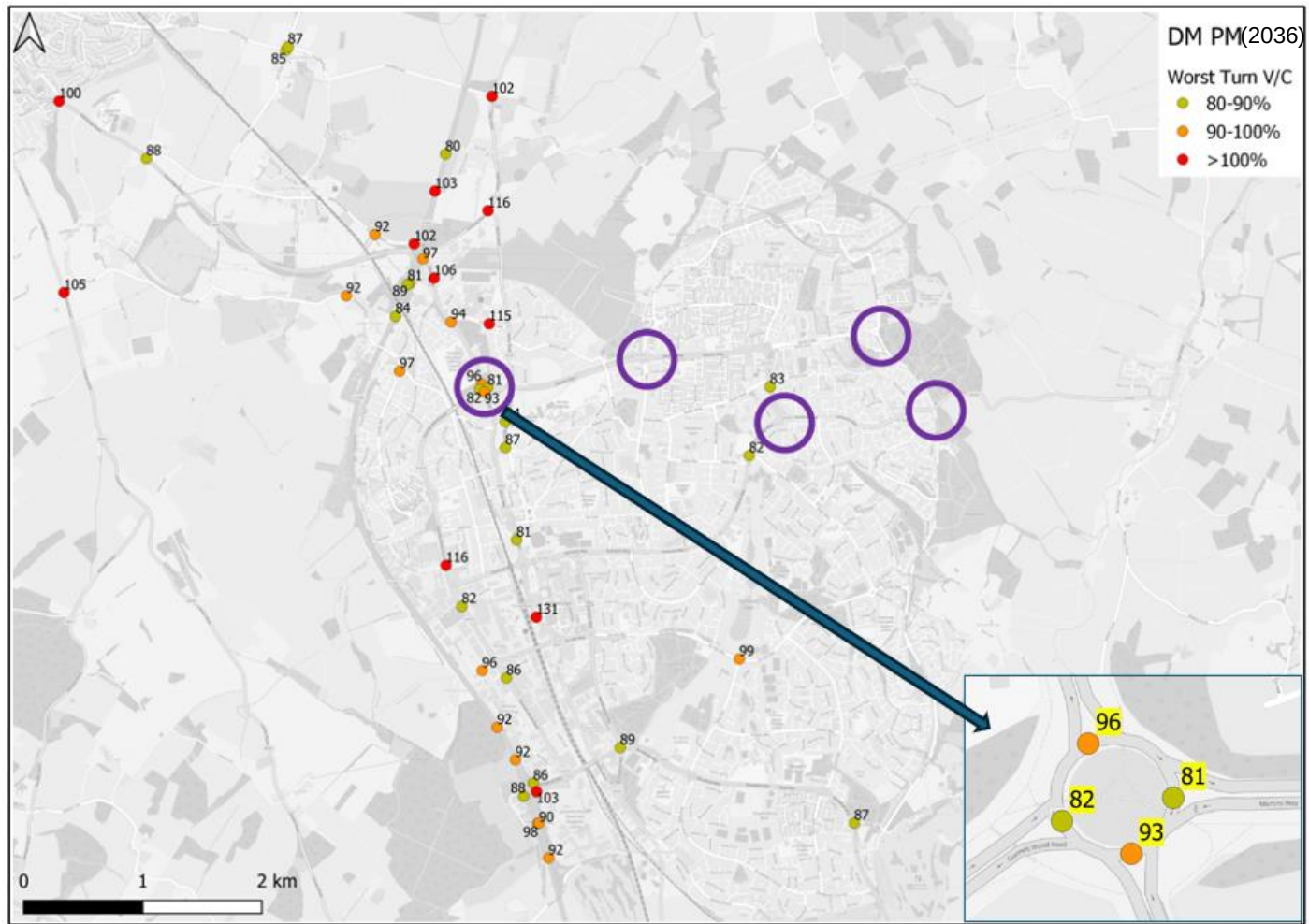
* The circled locations (violet) are some of the key junctions of focus as per the Proforma.

Figure 23: Volume to Capacity (V/C) Ratio (DS) - AM peak

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From **Figure 22** and **Figure 23**, it is observed that the V/C at the A602/Martins Way increases slightly in the DS scenario in comparison to the DM scenario (from 102% to 103% from Martins Ways (already overcapacity in the DM scenario and 90% to 92% from Hitchin Road) while the Gresley Way/B1037 roundabout sees an increase in V/C from 85% to 94%. The Great Ashby Way/Martins Way roundabout, Martins Way/Gresley Way roundabout and A1155/B1037 roundabout have V/C of less than 80% in the DM scenario and do not see any major increase in the DS scenario.



* The circled locations (violet) are some of the key junctions of focus as per the Proforma.

Figure 24: Volume to Capacity (V/C) Ratio (DM) - PM peak

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* The circled locations (violet) are some of the key junctions of focus as per the Proforma.

Figure 25: Volume to Capacity (V/C) Ratio (DS) - PM peak

From **Figure 24** and **Figure 25**, it is observed that the V/C at the A602/Martins Way increases slightly in the DS scenario in comparison to the DM scenario (from 81% to 82% from Martins Ways and 93% to 94% from Hitchin Road South and 96% to 97% from Hitchin Road North). The Great Ashby Way/Martins Way roundabout, Martins Way/Gresley Way roundabout, Gresley Way/B1037 roundabout and A1155/B1037 roundabout have V/C of less than 80% in the DM scenario and do not see any major increase in the DS scenario.

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ORIGIN AND DESTINATION FLOW DISTRIBUTION PLOTS

Origin and Destination trip distribution plots have been generated for the distribution of the Great Ashby development trips. **Figure 26** and **Figure 27** show the origin flow distribution plots for AM and PM peaks respectively.

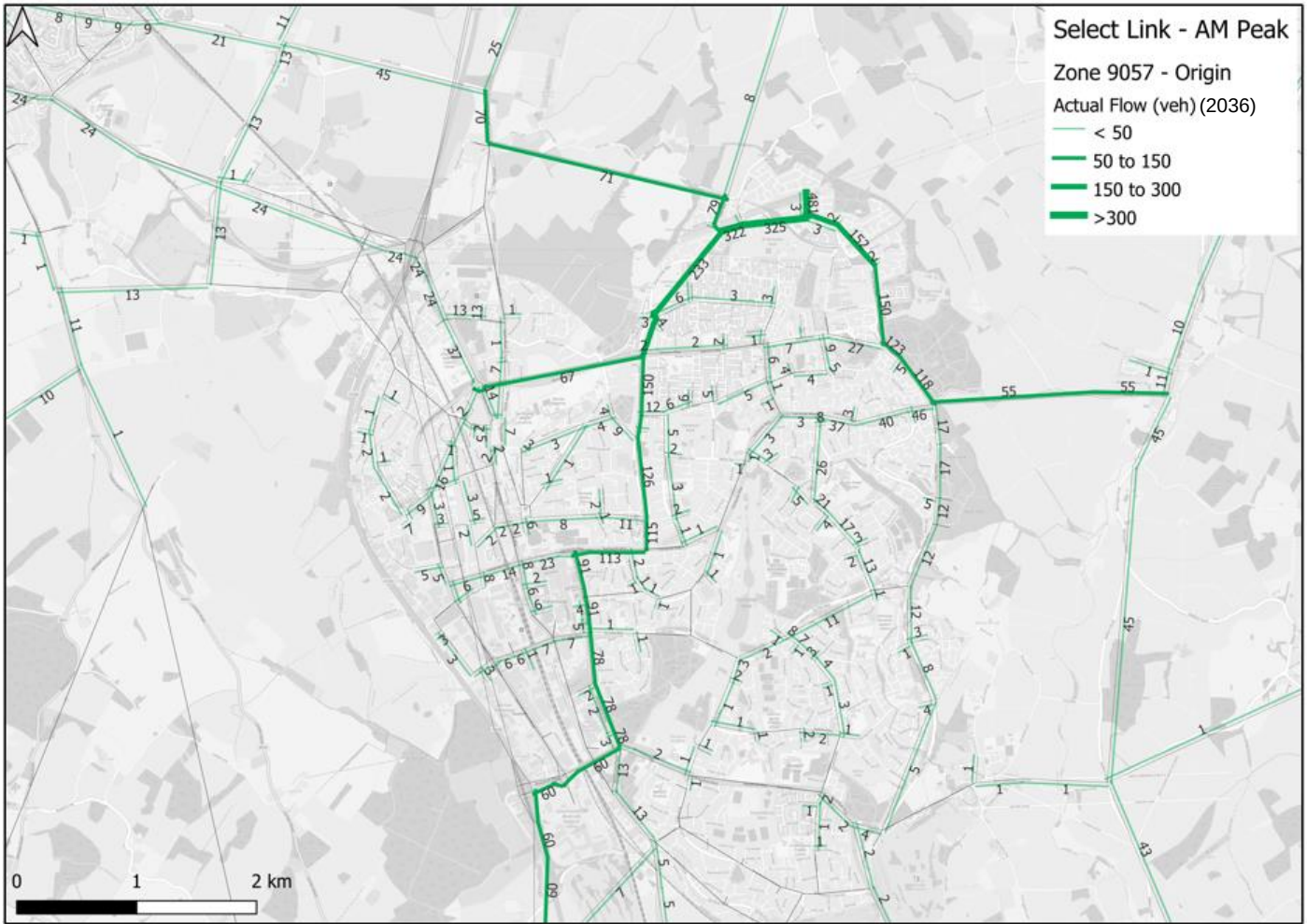


Figure 26: Origin Flow Distribution (DS) - AM Peak

It is observed that, in the AM peak, the majority of the trips originating from the development site traverse west of the development access road (Mendip Way) via Great Ashby Way, Grace Way, A1155 Fairlands Way, St Georges Way, Monkswood Way and joins A1(M) via A602. Around 67 development trips are distributed to Martins Way and then dissipate via A602 Hitchin Road and Gunnels Wood Road while 79 development trips are distributed to Back Lane (the trips originated from the development site majorly get distributed to Hitchin and Letchworth Garden City and use Back Lane running in the east-west direction (71 trips in the above figure) rather than the north-south direction). The majority of the development trips

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traversing east of the development access road (Mendip Way) go via Great Ashby Way, Gresley Way, and B1037 Stevenage Road.

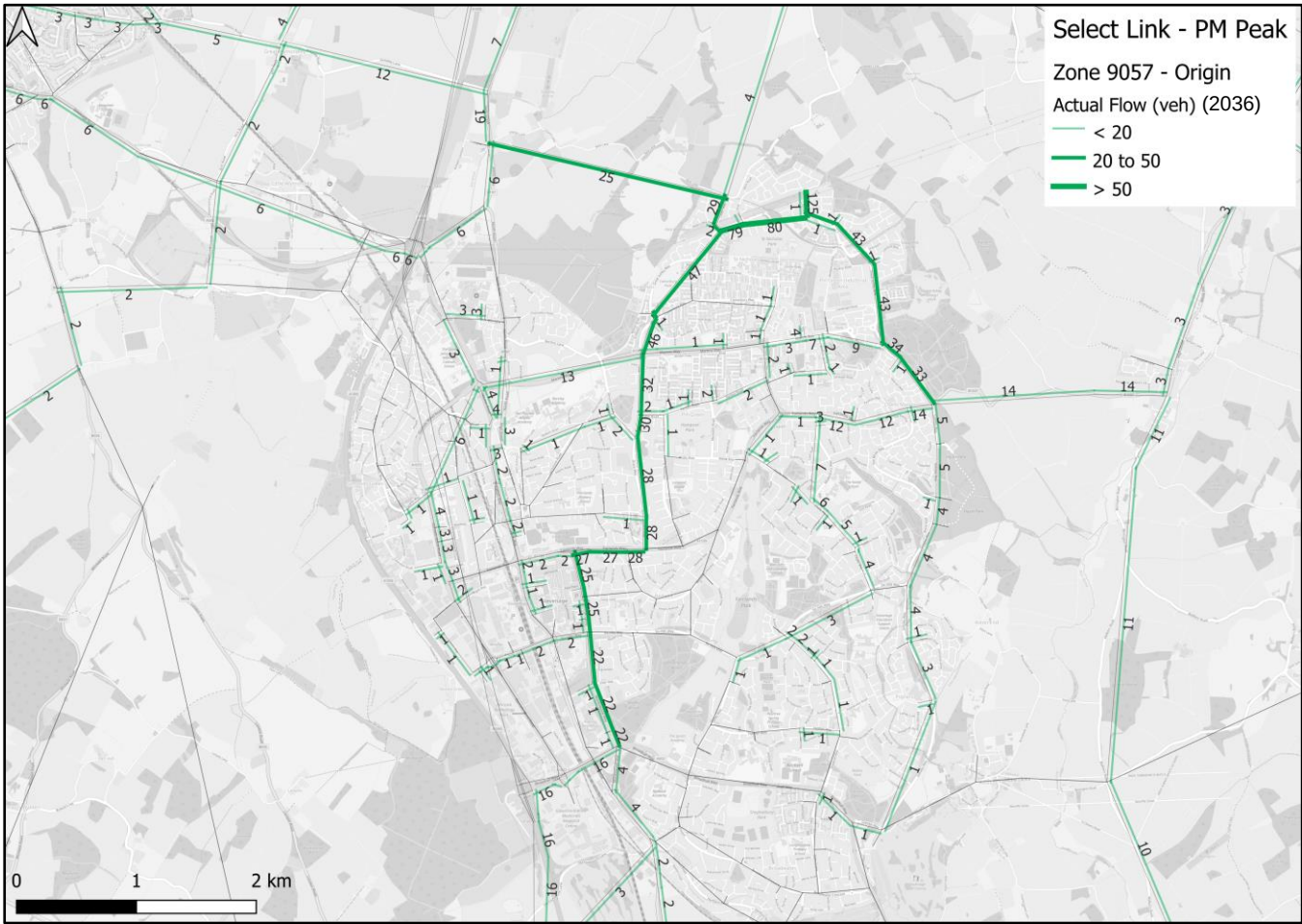


Figure 27: Origin Flow Distribution (DS) - PM peak

The PM peak trip distribution shows a similar trend as the AM peak with the majority of the trips originating from the development site traversing the west of the development access road (Mendip Way) via Great Ashby Way, Grace Way, A1155 Fairlands Way, St Georges Way, Monkswood Way and joins A1(M) via A602. Around 29 development trips are distributed to Back Lane while a few trips distribute to Martins Way. The majority of the development trips traversing east of the development access road (Mendip Way) go via Great Ashby Way and Gresley Way.

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Figure 28 and Figure 29 show the destination flow distribution plots for AM and PM peak Great Ashby development trips respectively.

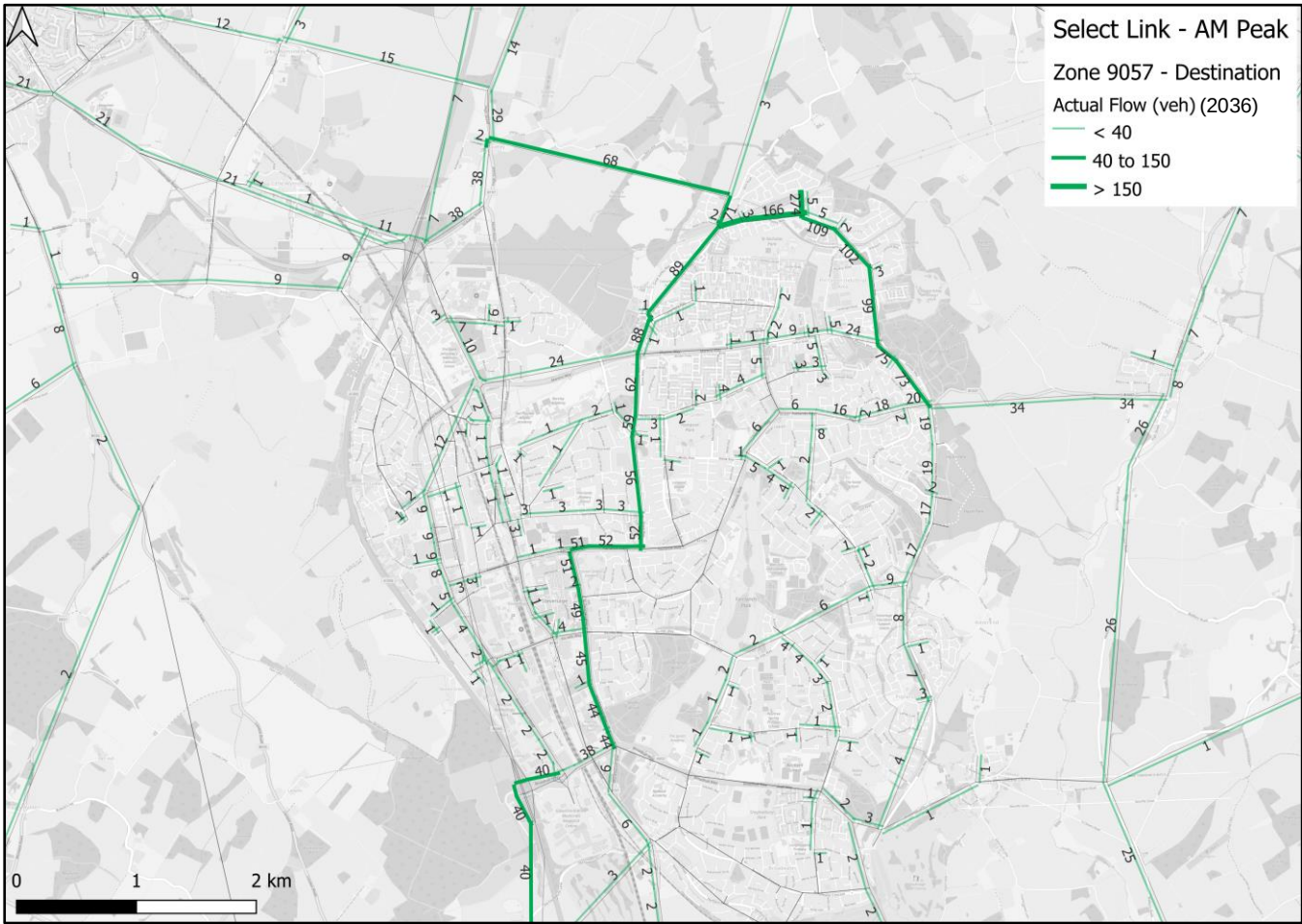


Figure 28: Destination Flow Distribution (DS) - AM peak

It is observed that similar to the AM peak origin distribution, the majority of the trips to the west of the development site access road (Mendip Road) arrive via south from A1(M), St Georges Way, Fairlands Way, Grace Way and Great Ashby Way. It is also observed that there are around 68 development trips that arrive via the Back Lane. The development trips from the east of the development site access road (Mendip Way) arrive from Gresley Way and Great Ashby Way.

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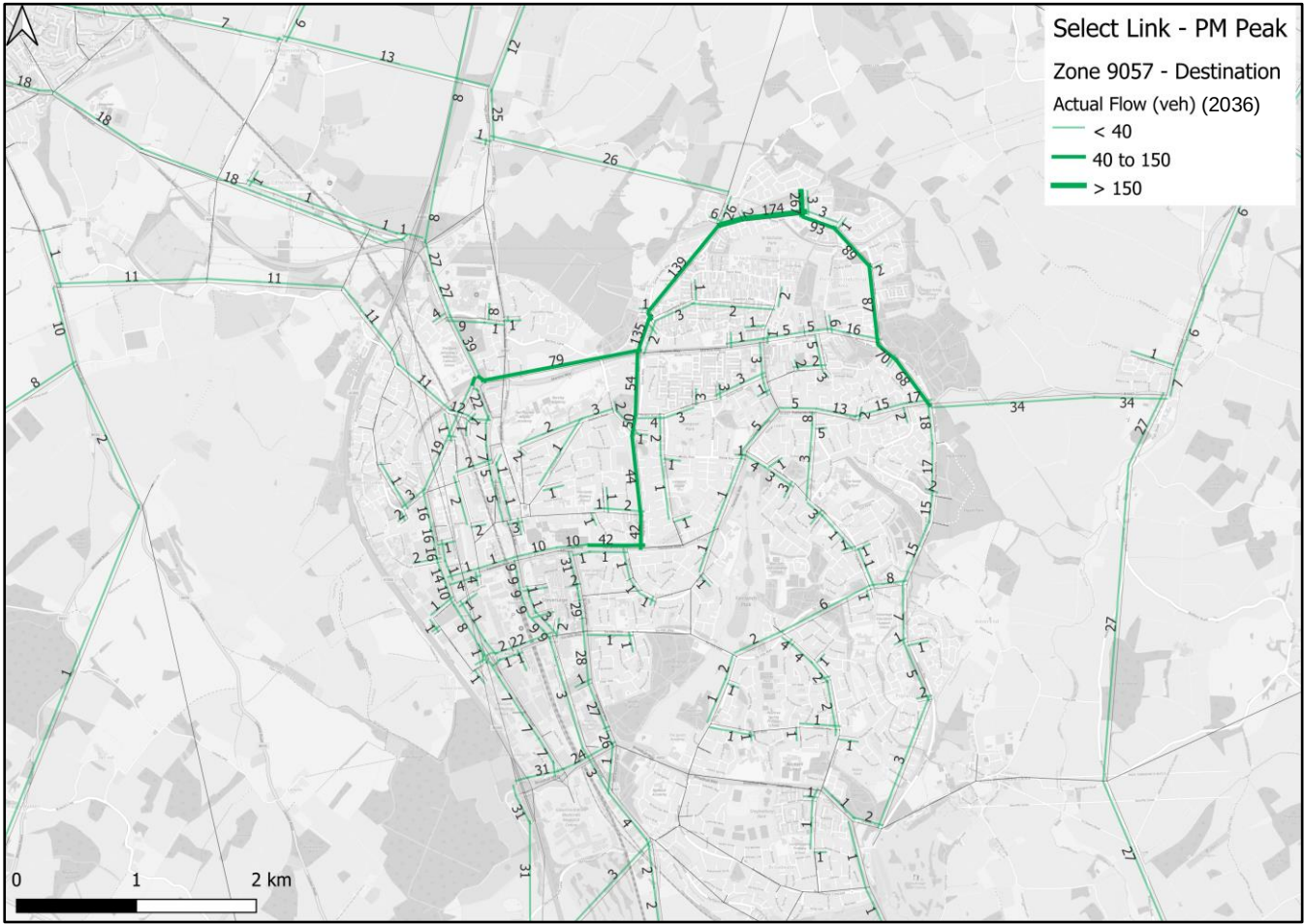


Figure 29: Destination Flow Distribution (DS) - PM peak

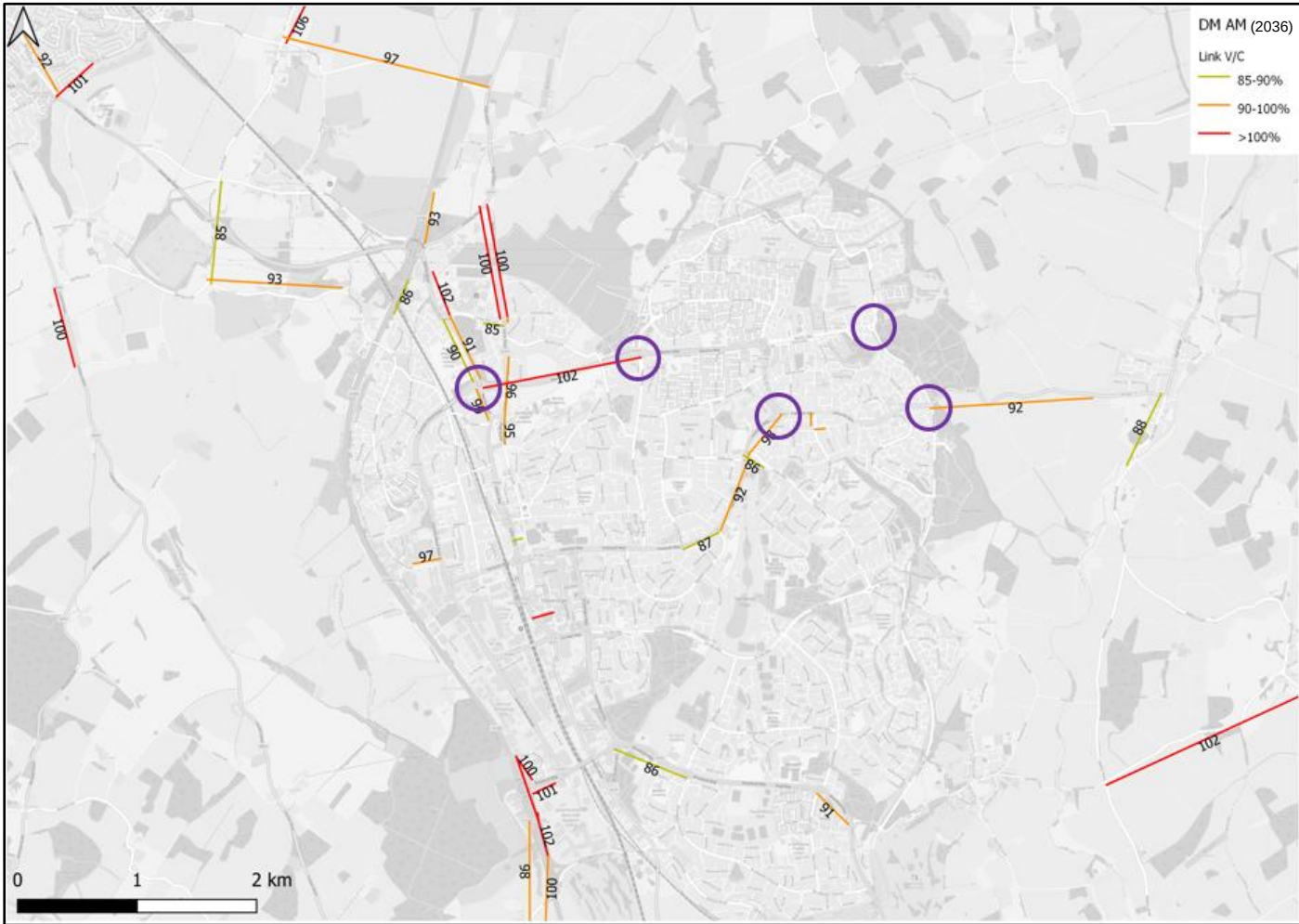
A similar pattern as compared to the AM peak is observed in the PM peak destination trips as well. However, it is also observed that a significant number of the trips also arrive via Martins Way as compared to Back Lane which is observed in the AM peak

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LINK VOLUME TO CAPACITY RATIO

Volume to Capacity (V/C) plots between the DS and DM scenarios were obtained to understand the impact of the development on link delays and are presented in **Figure 30** to **Figure 33** for the AM and PM peaks respectively.



* The circled locations (violet) are some of the key junctions of focus as per the Proforma.

Figure 30: Volume to Capacity (DM) – AM peak

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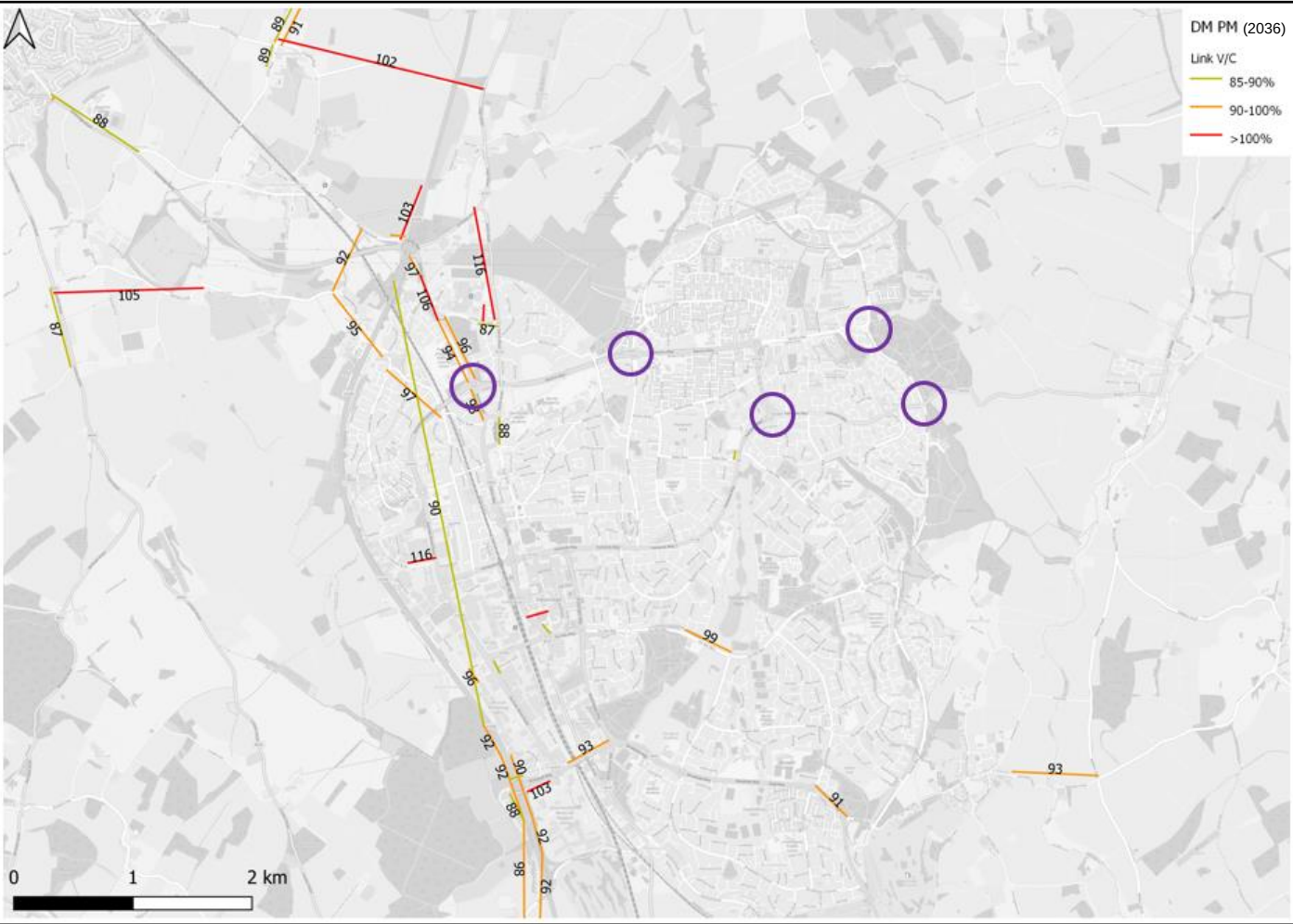
* The circled locations (violet) are some of the key junctions of focus as per the Proforma.

Figure 31: Volume to Capacity (DS) – AM peak

In the AM peak, it is observed that there is a slight increase in V/C on Martins Way (102% to 103%) and an increase in V/C on B1037 Stevenage Road (92% to 97%) between the DM and DS scenario. The rest of the key areas do not see any major increases. It is to be noted that while some of the additional traffic flows generated from the development site use the Back Lane as seen from Figures 26 and 28, but the V/C increase is from 18% to 27% in the eastbound and 21% to 57% in the westbound direction in the DS scenario compared to the DM scenario, which shows that it is within the capacity provided for Back Lane.

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* The circled locations (violet) are some of the key junctions of focus as per the Proforma.

Figure 32: Volume to Capacity (DM) – PM peak

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* The circled locations (violet) are some of the key junctions of focus as per the Proforma.

Figure 33: Volume to Capacity (DS) – PM peak

In the PM peak, it is observed that there is a slight increase in V/C on A602 Hitchin Road (96% to 97%) and A602 Franklin Road (93% to 94%) between the DM and DS scenarios. The rest of the key locations do not see any major increases.

It is to be noted that while some of the additional traffic flows generated from the development site use the Back Lane as seen from Figures 27 and 29, but the V/C increase is from 18% to 27% in the eastbound and 21% to 57% in the westbound direction in the DS scenario compared to the DM scenario, which is within the capacity provided for Back Lane.

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PUBLIC TRANSPORT MODEL

The impact of the development on the PT network was assessed using the EMME model. For public transport assessment, the with development model includes the development trip assumptions as detailed in **Table 5**.

This section considers the following:

- Passenger flow changes for AM/PM
- Trip distribution of PT trips to and from development
- Number of PT trips using the new bus route – number of those coming from development/ number of existing trips using new bus route

PASSENGER FLOW DIFFERENCE

Flow differences plots with and without the development are presented in **Figure 34** and **Figure 35** for the AM and PM peak respectively.

The AM peak shows an increase in passenger flows northbound on Grace Way and Great Ashby Way. A1155 is showing increase of trips in both North and Southbound direction. Slight increase of trips is also observed on High Street Southbound direction, north of Stevenage Station. Trips are also increasing in both east and westbound direction of Six Hills Way.

The PM peak difference between with and without development is very minimal in scale due to the smaller number of development trips. Slight increase in trips is observed in Great Ashby Way and A1155.

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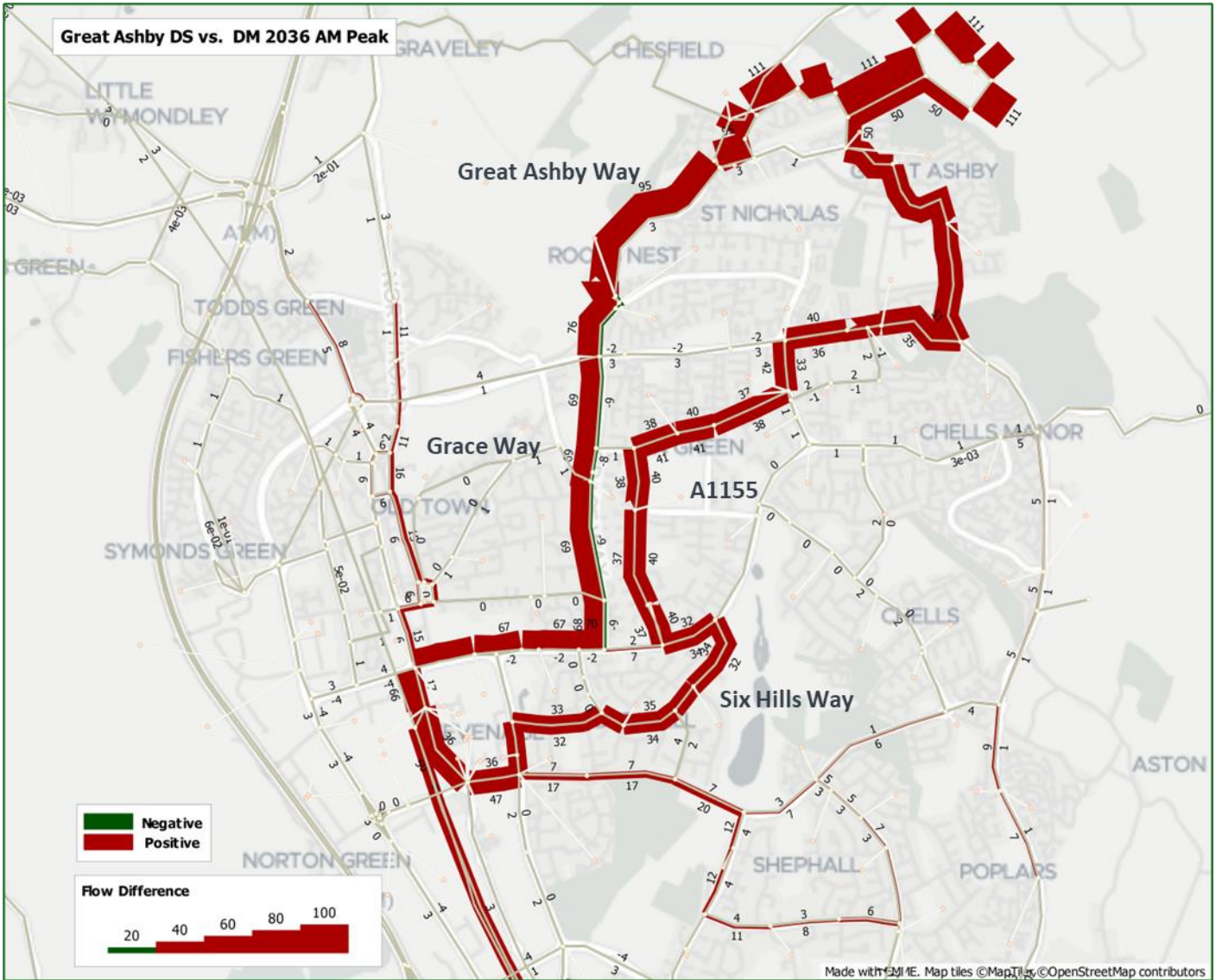


Figure 34: Passenger Flow Difference (With Development vs Without Development) - AM Peak

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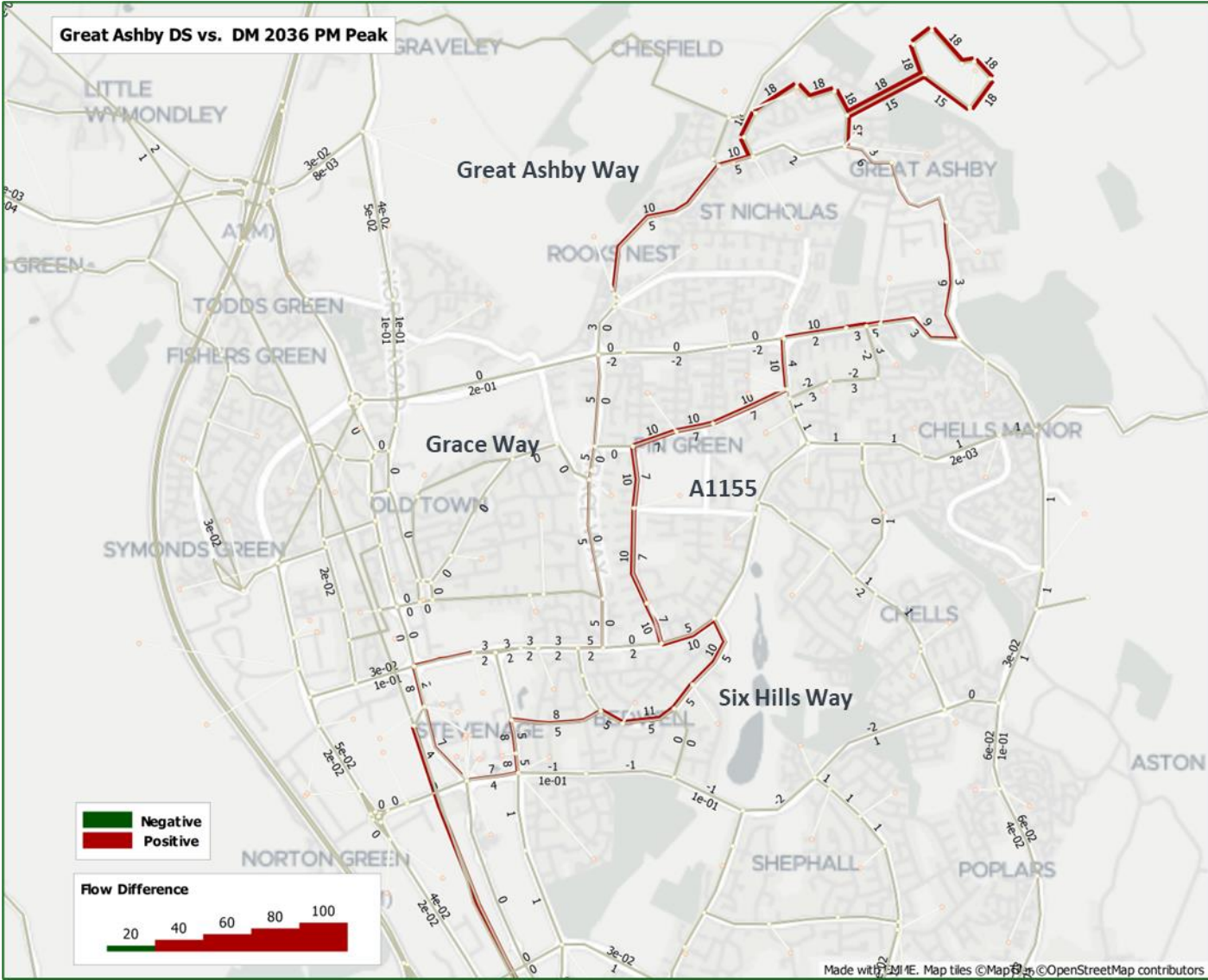


Figure 35: Passenger Flow Difference (With Development vs Without Development) - PM Peak

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Trip Distribution of PT Trips to and from Development

The public transport trip distribution for the development zone is shown in **Figure 36** and **Figure 37** for AM and PM peak respectively.

The passenger journeys are depicted for each peak period for trips to and from the development. The green volume represents walking trips (auxiliary), while the red indicates public transport trips (Bus and Rail). During the AM peak, journeys to the development follow two main routes. The majority of inbound trips (71 journeys) come via SB2 (Stevenage Bus Station to St Nicholas) and then transfer onto SB7_2 (Great Ashby to Stevenage Bus Station), with 3 additional journeys from nearby zones also joining SB7_2 to reach the development. Most of the remaining inbound journeys (50 trips) travel to The Beacons Bus stop, south of the development, using SB7_1 (Stevenage Bus Station to Great Ashby), and then walk to the development via Mendip Way. The rest of the inbound trips involve walking directly to the development. Nearly all outbound trips (38 journeys) from the development use the SB7_2 route.

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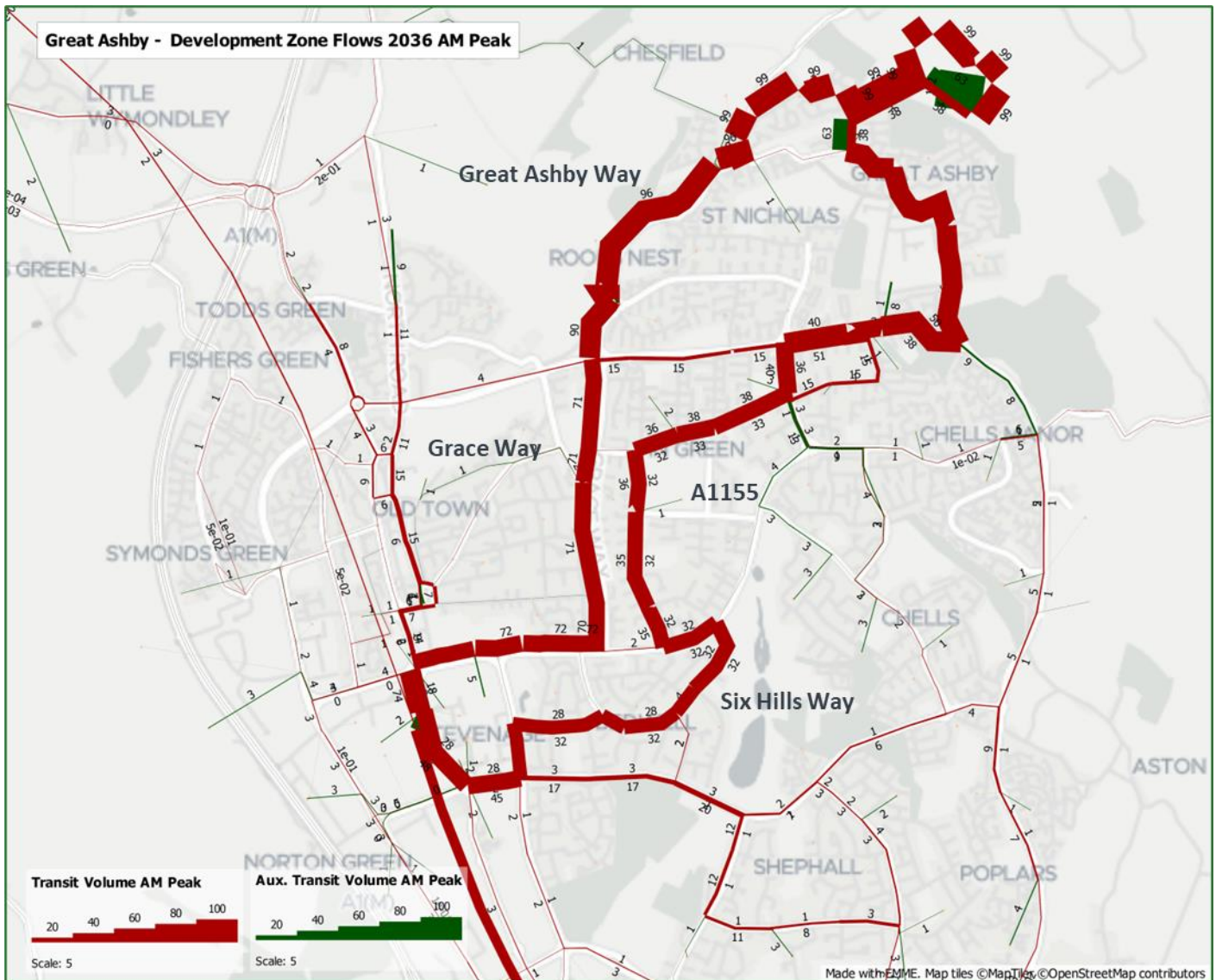


Figure 36: Passenger Flow Distribution – Origin & Destination – AM Peak

In the PM peak, 10 trips are boarding SB2 and SB7_2 to access the development whereas 3 trips are travelling on SB7_1 till The Beacons bus stop and walking to the development. Only one trip is accessing the development by walking entirely. All the outbound trips are using SB7_2 in the PM peak.

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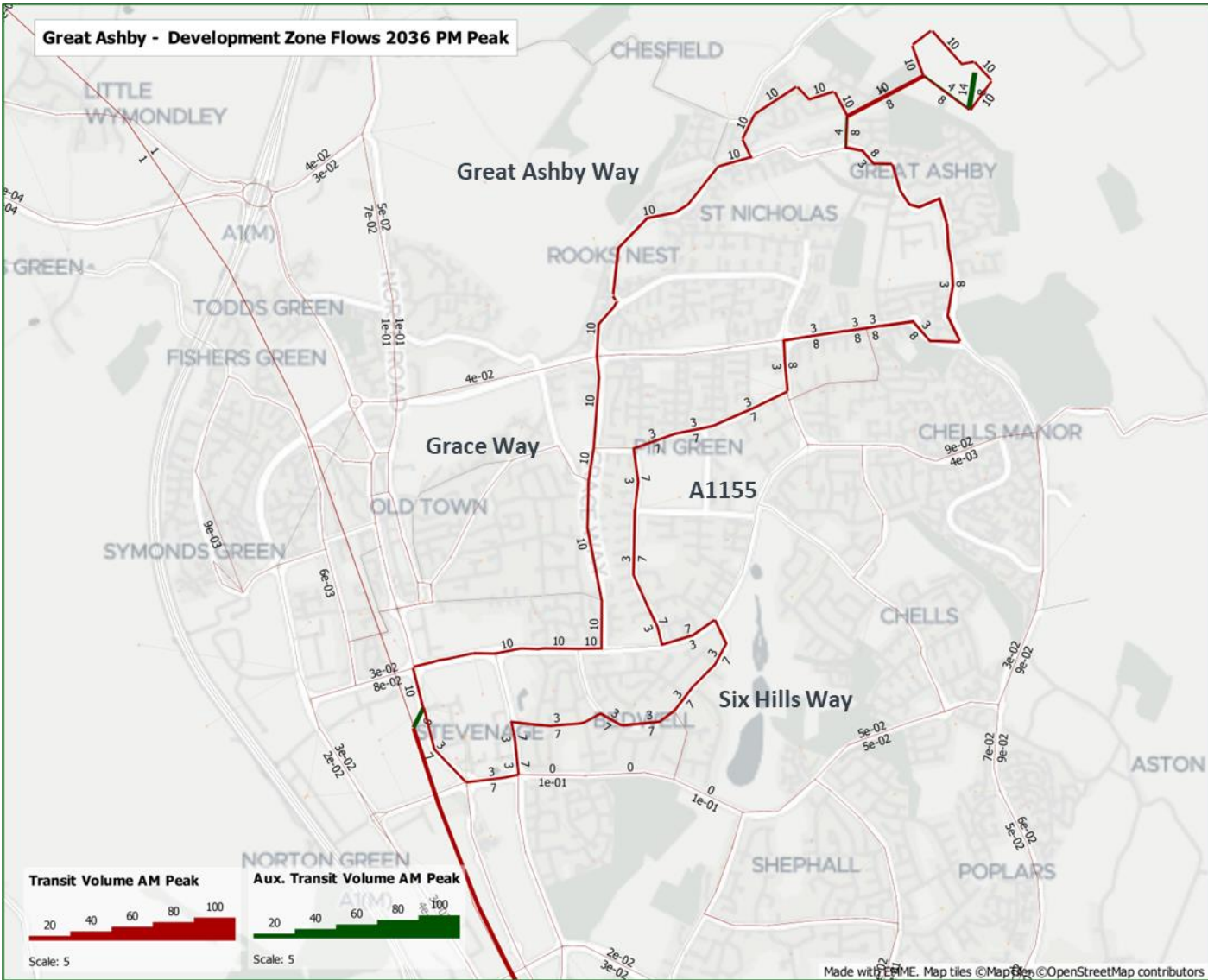


Figure 37: Passenger Flow Distribution – Origin & Destination – PM Peak

Number of PT Trips

Table 10 shows the total passenger on the respective bus services in the Stevenage area to/from the development zone. The total passenger boardings on the buses have been presented and the total trips when combined within a peak match with the trip generation targets as in **Table 5**.

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Table 10: Total Boardings With-Development (Development trips only)

Peak Hour	Mode	Total Trips IN	Total Trips OUT
AM	Stevenage Bus Station to Great Ashby (SB7_1)	50	0
	Great Ashby to Stevenage Bus Station (SB7_2)	99	38
	Chells M to Stevenage Bus Station (SB1_1)	1	0
	Chells M to Stevenage Bus Station (SB1_2)	4	0
	Walk	8	1
	Total	162	39
PM	Stevenage Bus Station to Great Ashby (SB7_1)	4	0
	Great Ashby to Stevenage Bus Station (SB7_2)	10	8
	Chells M to Stevenage Bus Station (SB1_1)	0	0
	Chells M to Stevenage Bus Station (SB1_2)	0	0
	Walk	0	0
	Total	14	8

SUMMARY

WSP has been commissioned by Picture Estate Limited (the 'developer') via HCC to assess the strategic transport impact of development proposals on the Great Ashby transport network which includes residential developments of 650 dwellings, 500sqm of Financial and Professional Services and a local centre and land for primary and secondary schools.

The modelling was undertaken in Hertfordshire's COMET model, currently maintained by WSP. The 2014 base year calibration and validation performance of the model showed that the performance of the model in the Great Ashby study area needed improvement. Hence, the base year model was recalibrated after network and matrix improvements which showed satisfactory calibration and validation performance and thus formed the basis for the 2036 forecast network.

Two scenarios were modelled for the 2036 NTEM forecast model which consisted of:

- DM: 'without' development scenario
- DS: 'with' development scenario

It should be noted that all results show the impacts in the forecast year 2036. The highway model results for the Do Something scenarios were compared against the Do Minimum Scenario for both AM and PM peaks. The assessment has shown that the development does increase traffic levels surrounding the Great Ashby study area, mostly on Great Ashby Way immediately on the west and east of the development site access road (Mendip Way). The major increase in traffic flows is seen along the Grace Way/Fairlands Way and St George's Way towards the west side of the development access road while traffic flow increases are seen along Gresley Way, B1037 towards the east side of the development access road. An increase in traffic flows along the Back Lane is also observed towards the west side of the development in both AM and PM peaks.

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From the delay plots, it was observed that in the AM peak, overall delay increases are less than 20 seconds, with the highest increase of 19 seconds on Martins Way westbound (west of the Grace Way/Martins Way/Canterbury Way roundabout) and 18 seconds on Broadhall Way westbound connecting the A1(M) at the Langley Sidings Interchange. The PM peak does not indicate any major delays on the transport network neither in the vicinity of the development site nor in the greater Great Ashby area due to the development trips.

From the V/C plots, it is observed that in the AM peak, the highest increase in V/C due to the development trips is on the Gresley Way/B1037 roundabout with an increase in V/C from 85% to 94%, whereas for the rest of the junctions, there is a very minimal increase in both AM and PM peak.

For the public transport trips, Do Something scenario (DS) compared against Do Minimum (DM) shows that the main increase in passenger flows is in the AM peak, with an increase in passenger flows northbound on Grace Way and Great Ashby Way and A1155 showing an increase in trips in both north and southbound direction. The increase in passenger flow is within the capacity provided on the bus services being used for the trips to and from the development.