Shropshire Council

SHROPSHIRE LOCAL PLAN ASSESSMENT

Draft Report

70080672-R1
JUNE 2021

CONFIDENTIAL

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PROJECT NO. 70080672

OUR REF. NO. 70080672-R1

DATE: JUNE 2021

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Draft Report

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QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks	First draft for discussion	Second draft incorporating comments from client	Third draft – for final comments / issue	
Date	14-06-2021	27-08-2021	03-09-2021	
Prepared by	Ivan Tucta	Ivan Tucta	Iva Permalloo	
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Project number	70080672	70080672	70080672	
Report number	70080672-R1	70080672-R1	70080672-R1	
File reference				

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APPENDIX A

MODEL RESULTS – DETAILED PLOTS

1. INTRODUCTION

1.1. BACKGROUND

1.1.1. WSP was commissioned by Shropshire Council to assess the likely highway network impacts of the draft Shropshire Local Plan development proposals outlined in the 'Reg 19 Pre-Submission Draft of the Shropshire Local Plan 2016 to 2038'. https://shropshire.gov.uk/media/16749/regulation-19-pre-submission-draft-of-the-shropshire-local-plan.pdf

1.1.2. This report sets out the details of the assessment, undertaken using the Shrewsbury Traffic model, which was developed by WSP on behalf of Shropshire Council. The objective of the assessment is to provide an evidence base for the capacity considerations of the Shrewsbury highway network to support development proposals for Shrewsbury in light of the Local Plan review.

1.1.3. This report presents the technical transport model-based assumptions, using an appropriate methodology. The report provides an assessment of the cumulative impacts on specific junctions using a baseline scenario (which includes a number of completions and commitments) plus additional growth proposed through the Local Plan Review to 2038. Importantly, no mitigation measures are considered in this report, whereas the draft Local Plan provides site guidelines and Development Management policies which allow for appropriate mitigation measures to be provided, and the Council's Viability and Delivery Report (2020) has made realistic assumptions about the level of expected developer contribution from the proposed new development sites to improve infrastructure capacity. The Council's Strategic Infrastructure Plan will be updated to include the outcomes of this report.

1.2. PURPOSE OF THE REPORT

1.2.1. This report details the methodology adopted for forecasting the likely impacts of the Local Plan developments and presents the results against the baseline case.

1.2.2. The analysis was based on the existing Shrewsbury Traffic Model which has a base year of 2017 and forecast year 2038. The scenario for forecast year 2038 with North West Relief Road (with NWRR) has been used as the baseline against which the Local Plan development impacts were assessed.

2. TRAFFIC MODEL

2.1. INTRODUCTION

2.1.1. The Local Plan development proposal includes additional residential and employment requirements for the next 15 to 20 years. In order to assess the impact of these new development proposals, a strategic traffic model is required.

2.1.2. In that sense, following discussion with Shropshire Council and Highways England it was agreed that the Shrewsbury strategic transport model developed for the North West Relief Road (NWRR) scheme in 2020 should be used as starting point to develop the additional characteristics required by the Local Plan review.

2.1.3. The 2020 NWRR strategic model had two forecast years 2023 (opening year) and 2038 (design year). The Local Plan review is for the period 2016 to 2038, so it was decided to utilise the 2038 set of forecasts to model the full impact of the Local Plan period, the existing NWRR 2038 forecasts forms the Reference or Baseline for this study.

2.1.4. The sections below describe the main elements of the 2020 NWRR strategic transport model and the specific changes considered for the Local Plan review.

2.2. MODEL SPECIFICATION

i) Model Time Periods

- AM peak hour (08:00-09:00).
- PM peak hour (17:00-18:00).
- Inter-peak average hour (10:00-16:00).

ii) Vehicle Types and Trip Purposes

The model represents five different trip categories. These are as follows:

- Cars – Journey from home to work, and vice versa (“Commute”).
- Cars – Employers Business.
- Cars – Other trip purposes.
- Light Goods Vehicles.
- Heavy Goods Vehicles (including Medium Goods Vehicles).

2.3. SCOPE OF FORECASTS

2.3.1. The forecasts presented in this report have been prepared for the year 2038 only.

2.3.2. Forecasts have been prepared using a ‘variable demand’ modelling approach that takes account of the change in demand in response to the change in the costs of travel due to the inclusion of the intervention. The intervention which was tested using the model and reported within this report is the inclusion of the proposed Local Plan developments with no complementary highway network mitigation or demand management measures.

2.3.3. Whilst the baseline demand has been constrained to TEMPRO growth, due to the nature of the assessment, the traffic associated with the current proposed Local Plan development has been added on top of the baseline demand with no constraint back to TEMPRO.

2.4. FORECASTING SCENARIO

FORECAST NETWORKS

2.4.1. The Do-minimum forecast networks represent the existing road network and any schemes which are considered to be either committed or expected to be implemented in the future and by the models forecast year. For any potential scheme, it is necessary to establish when it is likely to be in place in order to include it in the appropriate forecast year network.

2.4.2. Do Minimum networks were created for the future year 2038. The starting point for the networks was the base networks, which were then updated to include any completed or committed highway schemes. Table 2-1 lists these updated highway schemes and Figure 2-1 shows their respective locations. All highway schemes identified were assessed to be either 'near certain' or 'more than likely', in line with guidance set out in TAG Unit M4.

2.4.3. In addition to these committed schemes, for this assessment it was assumed that the proposed North West Relief Road (NWRR) and the associated complementary 20mph speed restriction on Welshpool Road would also form part of the baseline scenario. These are shown in Figure 2-2 below.

Table 2-1 Do-Minimum highways interventions

Location	Base Year Coding	Future Years
Mytton Oak Rd next to Royal Shrewsbury Hospital	Single file traffic controlled by signals as eastbound lane was cut off due to roadworks	Eastbound lane restored and signals removed
Meole Brace Roundabout	Roundabout	Roundabout layout changed and traffic link added between Roman Road and the A5122 exit towards the A5 as part of Shrewsbury Integrated Transport Package
London Road A5064	Single file traffic controlled by signals as northbound lane was narrowed down due to roadworks	Northbound lane restored and signals removed
Chester St A528 (Between Cross St and Benbow Quay)	Capacity and speed limits reduced in both ways as southbound lane was narrowed down	Normal capacity and speed limits restored
Welshpool Road	Coded as single file traffic controlled by signals to simulate manual traffic control due to roadworks	Lane restored and signals removed
Shelton Road B4380	Single file traffic controlled by signals as Southbound lane was cut off due to roadworks	Southbound lane restored and signals removed
Frankwell Roundabout Exit - Copthorne Road	Due to roadworks, Frankwell Roundabout Exit though Copthorne Road was closed off	Exit restored
Chester St/ Castle Gates gyratory	Cruise speeds as surveyed in March 2017	Cruise speeds limited to 20mph throughout surrounding area associated with proposed 20mph zone extension in Shrewsbury Integrated Transport Package
English Bridge	Old Potts Way approach with 1 lane	Old Potts Way approach with 1 lane plus flare as recognised by Shrewsbury Integrated Transport Package
Coleham Roundabout	Coded as crossroads	Changed to mini roundabout as recognised by Shrewsbury Integrated Transport Package
Readbrook Roundabout	Standard capacity roundabout	Approaches widened and capacity increased as recognised by Shrewsbury Integrated Transport Package

Figure 2-1 - Network changes in DM network

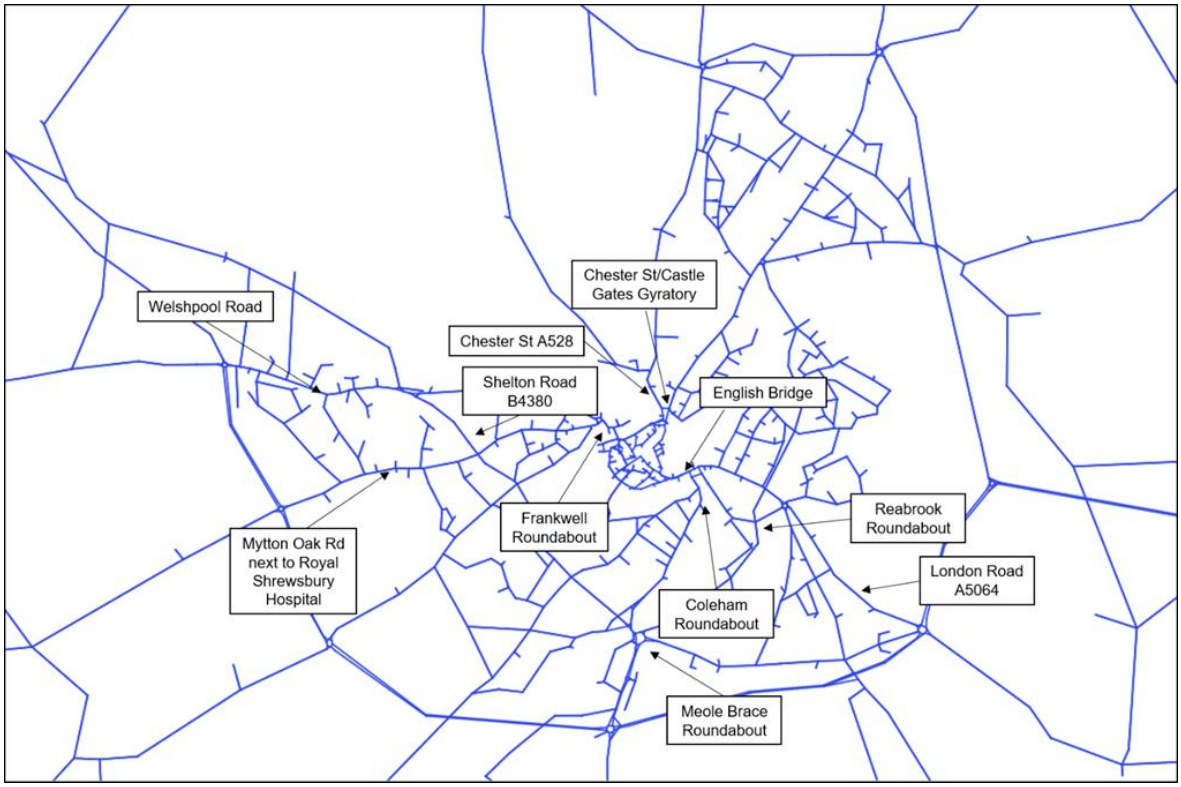
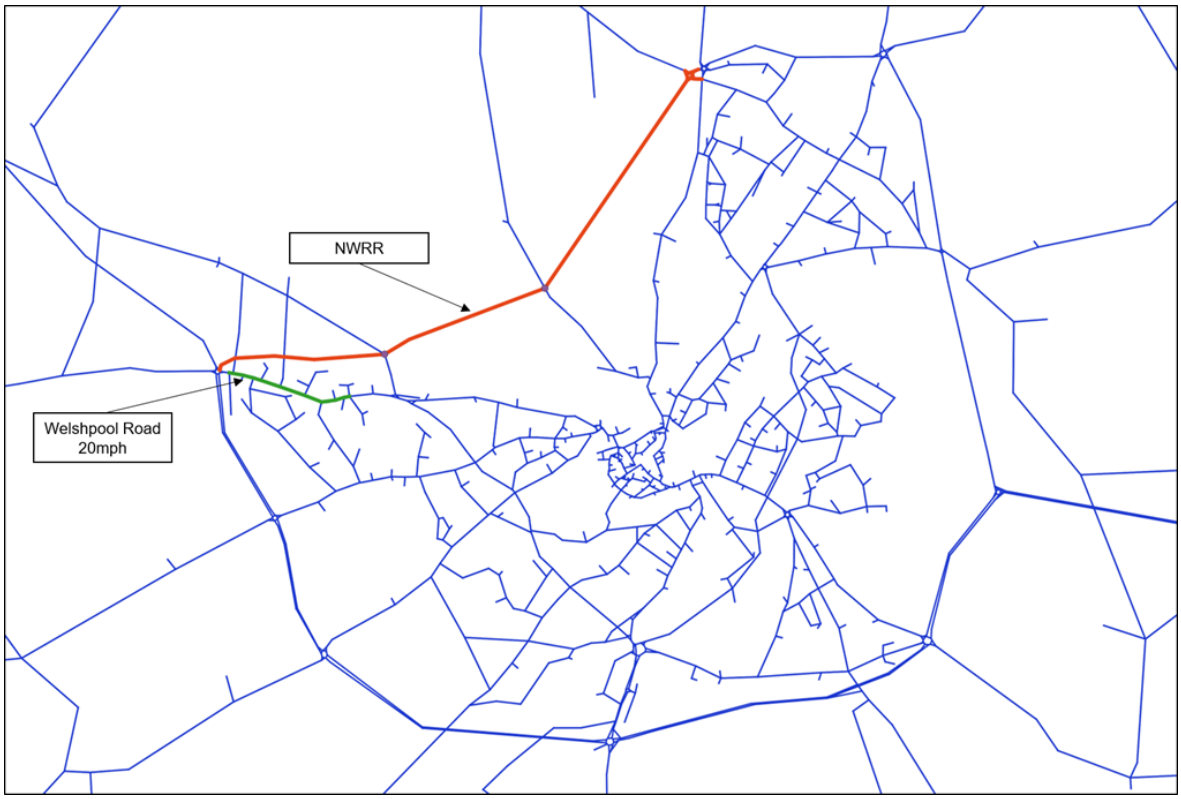


Figure 2-2 - Network changes for the proposed NWRR scheme



DEMAND FORECASTS

2.4.4. For the current Local Plan Assessment, and in agreement with Shropshire Council and Highways England, the baseline demand scenario is the same as that used in the 2020 NWRR Strategic Model (which was used to inform the evidence base of the NWRR Planning Application submitted on behalf of Shropshire Council earlier in 2021).

2.4.5. In the 2020 NWRR Strategic Model, the major consideration in the assessment of uncertainty in local demand was the nature of development, together with its location, size and timing for becoming occupied. As with the supply side, details of prospective developments were collated from local planning authorities and captured within the Uncertainty Log, along with their prescribed level of uncertainty. Only the policy planned and committed developments were included and since the Local Plan has not yet been adopted, the 'emerging local plan sites' could not explicitly be taken into account within the forecast modelling of the scheme within the scenario used by the NWRR planning application (although the overall traffic growth forecast within Shrewsbury up to a forecast year of 2038 was taken into account within the traffic modelling of the scheme).

2.4.6. All developments within the core study area, irrespective of their size, were considered. However, in line with WebTAG guidance, only those developments assigned a likelihood level of 'near certain' or 'more than likely' were explicitly included in the demand forecasts. All the developments were incorporated within the existing model zone structure.

2.4.7. In this Assessment to inform the Local Plan Review, a new Uncertainty Log was provided and, in agreement with Shropshire Council, this focused on proposed residential and employment allocations and proposed windfall allowances within the draft Shropshire Local Plan, assessed as additional quantum to the baseline demand. For the avoidance of doubt, existing residential and employment commitments (including existing residential and employment allocations) are considered within this Assessment, primarily as part of the baseline demand. However, part of the employment element of the mixed-use allocation at Shrewsbury South SUE with capacity for employment floorspace on around 9.2ha of land (identified with a * on Figure 2-3), and associated infrastructure interventions, was specifically considered within this Assessment due to the scale and evolution of proposals for this element of the site (assumptions within this Assessment include 785 arrivals and 163 departures in the AM period and 151 arrivals and 651 departures in the PM period – these assumptions are included within future references to Local Plan trip generation and demand).

2.4.8. The list of these proposed residential and employment allocations considered within this Assessment is shown in Table 2-2 and a summary of the total residential capacity of these proposed allocations, by settlement, is presented in Table 2-3. In addition to these proposed residential and employment allocations, 724 dwellings (505 dwellings for Shrewsbury and 219 dwellings for other settlements) are considered as potential windfall development reflecting proposed windfall allowances within the draft Shropshire Local Plan.

2.4.9. Figure 2-3 shows the location of these proposed residential and employment allocations considered within this Assessment.

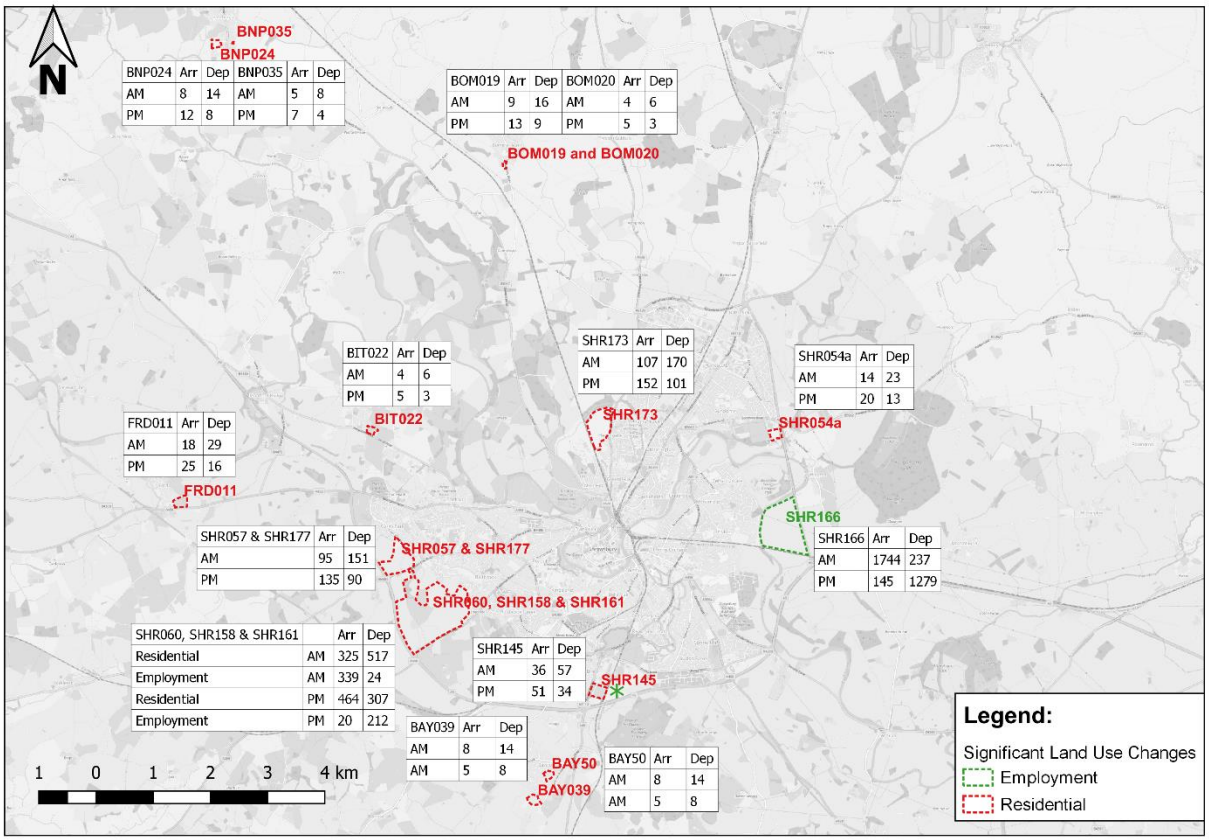
Table 2-2 Development sites considered in Local Plan assessment

Type	Development site	Quantum (dwellings/ha)
Residential	Land west of Shrewsbury Road, Baschurch	35
	Land east of Prescott Fields, Baschurch	20
	Land off Lyth Hill Road, Bayston Hill	100
	Former Oaklands School Site, Bayston Hill	47
	Land East of Villa Farm, Bicton	15
	Land West of Shrewsbury Road, Bomere Heath - Phase 1	40
	Land West of Shrewsbury Road, Bomere Heath - Phase 2	15
	Land adjoining But Lane on A458, Ford	75
	Land south of Sundorne Road, Shrewsbury	60
	Land North of Mytton Oak Road, Shrewsbury	400
	Land between Mytton Oak Road and Hanwood Road, Shrewsbury	1,500
	Land south of Meole Brace Retail Park, Shrewsbury	150
	Land west of Ellesmere Road, Shrewsbury	450
	Sub Total Residential (dwellings)	**2,907**
Employment	Land between Mytton Oak Road and Hanwood Road	2.0
	Land to the west of the A49	18.0
	Sub total Employment (ha)	**20.0**

Table 2-3 Residential quantum by settlement

Settlement	Dwellings
Baschurch	55
Bayston Hill	147
Bicton	15
Bomere Heath	55
Ford	75
Shrewsbury	2,560
Total Residential	**2,907**

Figure 2-3 - Location of development sites considered in the Local Plan Assessment



LOCAL PLAN DEVELOPMENT TRIP GENERATION

2.4.10. Local Plan development trip estimates were calculated by applying trip rates obtained from the TRICS database to the development quantum proposed within the current Local Plan Assessment. To ensure robust estimates, a proportion of goods vehicle trips were calculated for B2 and B8 land use developments and added separately.

2.4.11. The resulting trip generation associated with the current Local Plan is shown in Table 2-4. These tables present the trip generation in terms of the total volume of traffic generated by the combined development sites.

Table 2-4 Trip growth (PCU) associated with Local Plan developments (2038)

Trip Generation (in PCU)	Departures			Arrivals		
	AM	IP	PM	AM	IP	PM
Additional cars generated	1,543	1,472	2,685	3,362	1,477	1,357
Additional goods vehicles generated	53	142	241	336	101	17
TOTAL	1,596	1,614	2,925	3,698	1,578	1,374

2.4.12. Without any demand management interventions, the current Local Plan developments are forecast to add around 3,700 PCUs of arrivals and 1,600 PCUs of departures on the Shropshire highway network in the AM peak hour in 2038; around 2,900 PCUs of departures and 1,400 PCUs of arrivals in the PM peak hour and around 1,600 PCUS of arrivals balanced with around 1,600 PCUs of departures in the average inter-peak hour.

2.4.13. Due to the relatively large quantum of the employment sites proposed within the Local Plan, which would be attracting traffic in the AM peak, there is a dominance in arrivals in the AM peak and departures in the PM peak, with a balance achieved in the Inter-peak between the arrivals and departures.

VARIABLE DEMAND FORECASTING

2.4.14. Following the forecasting methodology adopted for the NWRR assessment, the total demand forecasts presented above were assigned through the Variable Demand Model. Table 2-5 presents the resulting hourly totals for the Baseline and the Local Plan test scenario following the Variable Demand Modelling (VDM). The matrix totals are presented for each purpose, vehicle category and time period. The 2017 Base Year is also presented in Table 2-5 for comparison.

Table 2-5 Summary of Matrix Totals – 2038 Baseline

Year	Time Period	Cars			Good Vehicles		Total Vehicles
		Commute	Business	Other	LGV	HGV	Total
2017	AM	21,960	6,450	19,671	4,165	1,527	53,773
	IP	4,309	5,580	27,328	3,435	1,300	41,952
	PM	11,685	6,058	29,169	3,403	779	51,094
2038 Base line scenario	AM	27,813	8,142	26,368	5,526	1,601	69,450
	IP	5,346	6,969	36,547	4,558	1,363	54,784
	PM	14,547	7,605	38,376	4,514	817	65,860
2038 Local Plan scenario	AM	29,854	8,742	27,881	5,915	1,601	73,992
	IP	5,698	7,321	38,331	4,801	1,363	57,515
	PM	15,633	8,047	40,217	4,772	816	69,486
Difference relative to 2038 Baseline	AM	2,041	600	1,513	389	0	4,542
	IP	352	352	1,784	243	0	2,731
	PM	1,086	442	1,841	258	-1	3,626

2.4.15. Table 2-6 presents the proportions of vehicle types and trip purposes for the 2038 Baseline and 2038 Local Plan scenarios. The table demonstrate that the inclusion of Local Plan developments does not affect the overall vehicle and trip purpose splits within the study area.

Table 2-6 - Vehicle Proportions (percentage of total trips) – Baseline

Year	Time Period	Cars			Good Vehicles		Total Vehicles
		Commute	Business	Other	LGV	HGV	Total
2017	AM	41%	12%	37%	8%	3%	100%
	IP	10%	13%	65%	8%	3%	100%
	PM	23%	12%	57%	7%	1%	100%
2038 Base line scenario	AM	40%	12%	38%	8%	2%	100%
	IP	10%	13%	67%	8%	2%	100%
	PM	22%	12%	58%	7%	1%	100%
2038 Local Plan scenario	AM	40%	12%	38%	8%	2%	100%
	IP	10%	13%	67%	8%	2%	100%
	PM	22%	12%	58%	7%	1%	100%

ASSIGNMENT MODEL

2.4.16. The forecast year trip demand matrices were assigned to the road network and an equilibrium process applied which enabled the traffic to seek alternative routes according to cost between each origin and destination. This is designed to represent drivers' choice of routes.

2.4.17. Each trip matrix was assigned separately (by user class and time period) as the values of time and vehicle operating costs used in the assignment vary by vehicle type and trip purpose. The assignment parameters were a combination of time and operational costs (mainly fuel) and were calculated using TAG data book March 2017 issue, to maintain consistency with the base year model.

2.4.18. The highway assignment parameters are presented in Table 2-7 below.

Table 2-7 Assignment Parameter

Year	Time Period	Cars			Goods Vehicles	
		Commute	Business	Other	LGV	HGV
2038 Vehicle Operating Costs (pence per km)	Across all time periods	5.30	11.74	5.30	12.88	55.73
2038 Values of Time (pence per minute per vehicle)	AM	30.46	45.42	21.01	32.10	74.96
	IP	30.95	46.54	22.38	32.10	74.96
	PM	30.56	46.07	22.01	32.10	74.96

3. TRAFFIC FORECAST - LOCAL PLAN OUTPUT OVERVIEW

3.1.1. The traffic forecast outputs presented in this chapter have been produced utilising a 'variable demand' modelling approach that takes account of the change in demand in response to the change in the costs of travel.

3.1.2. Two set of forecasts scenarios have been prepared for the forecast year 2038, representing a Baseline scenario and a Local Plan scenario. The high-level comparisons between these scenarios have been presented for the 2038 AM and PM peak hour. A more detailed analysis is presented in Section 4.

3.1.3. Table 3-1 below summarises the changes in total travel time and travel distance across the model network, between the Baseline and Local Plan scenarios for the forecast year 2038.

Table 3-1 Change in kilometres and hours travelled

Time Period	% difference relative to Baseline	
	PCU Kms	PCU Hours
AM	1.8%	5.1%
PM	2.1%	4.4%

3.1.4. Table 3-1 shows that, as expected, there are net increases in forecast vehicle kilometres and vehicle hours travelled as a result of the increased demand due to the Local Plan proposals. Furthermore, the increase in congestion is likely to be contributing to the increase in the total reported hours travelled, while the re-routing of traffic onto alternative and often longer routes in order to avoid some of the increasing delays would contribute to the increase in total distance travelled.

3.2. TRAFFIC ASSIGNMENT - LOCAL PLAN DEMAND ONLY

3.2.1. The 2038 forecast trip matrices developed independently for the Local Plan developments has been assigned to the Baseline network using the congested network travel costs. This provides an initial indication of the areas likely to be impacted directly by the Local Plan development traffic. The results of this traffic assignment can be seen in Figure 3-1 and Figure 3-2 which show the routes taken by the traffic from the Local Plan residential and employment sites for AM and PM peaks respectively.

3.2.2. In AM peak, it can be seen that the traffic routes mainly via the A5 (between Edgebold and Preston Island roundabouts), the A49 (between Sundorne and Preston Island roundabouts), Oteley Road (between Meole Brace and Weeping Cross), London Road (A5064) and some western sections of the Sundorne Road. Also, specific sections of the Mytton Oak Rd and Hanwood Rd are affected due to additional trips of the residential and mixed sites located nearby. In PM peak, the pattern is similar with specific changes such as the impact on the A49

that extends until the Battlefield roundabout. On the other end, the impact on the A5 extends until Churncote roundabout.

3.2.3. It is worth noting that this analysis presents the areas likely to be impacted directly by the Local Plan development traffic only and it takes no account of any displacement or re-routing effects of the baseline traffic. The combined impact of the Baseline plus the Local Plan proposal is presented in the next section.

Figure 3-1 - Traffic Flow levels from Local Plan development trips only - 2038 AM

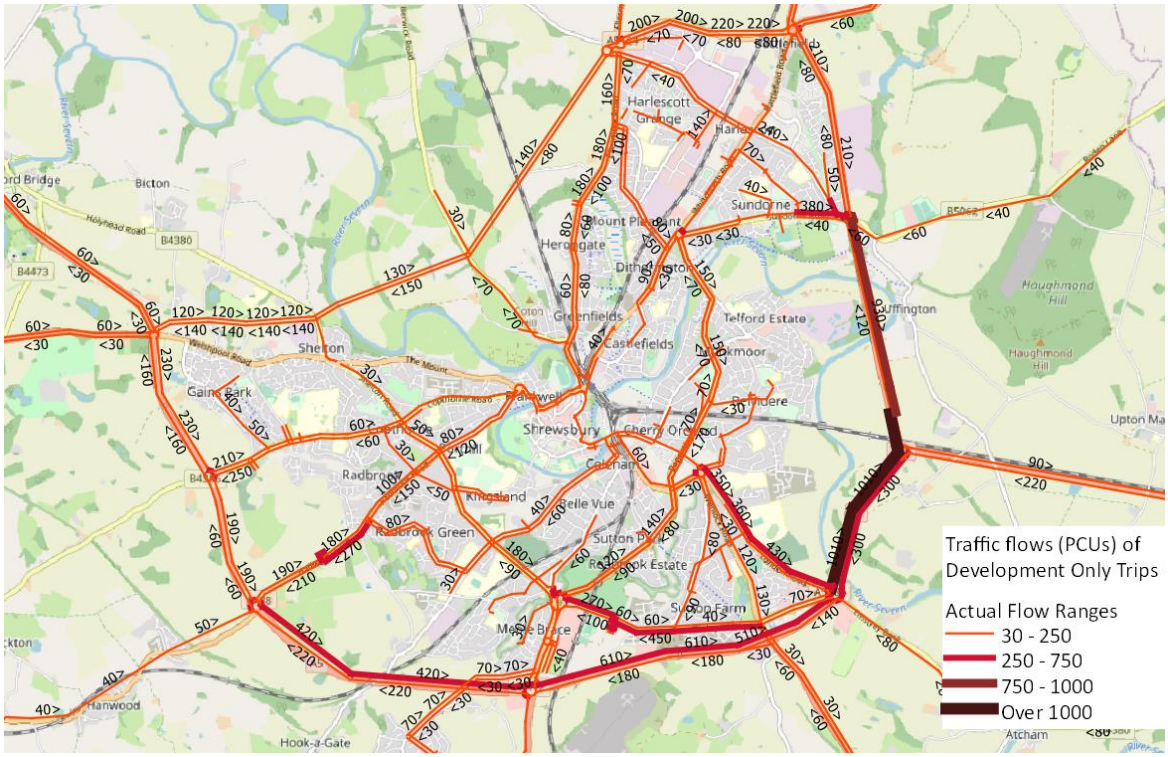
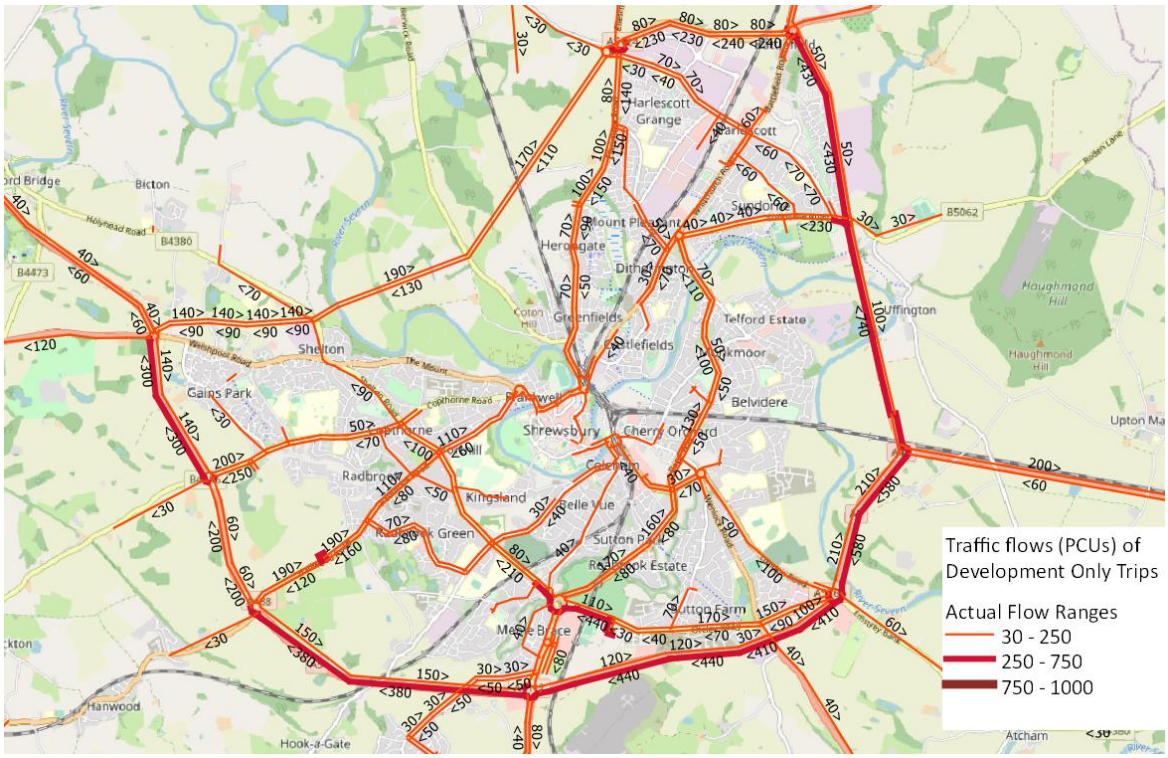


Figure 3-2 - Traffic Flow levels from Local Plan development trips only - 2038 PM



3.3. TRAFFIC ASSIGNMENT - OVERALL DEMAND

3.3.1. This section presents the assignment result of the full forecast 2038 demand (baseline plus the additional proposed sites).

3.3.2. Figure 3-3 and Figure 3-4 show the 2038 forecast traffic flow for the Baseline (Reference) and the Local Plan test (Do-Something) in AM peak hour respectively. Similar figures for other time periods are included in the Appendix A.

3.3.3. As expected, in the Baseline scenario (Figure 3-3) significant volumes of traffic are forecast to route via the main strategic roads like A5, A49, Battefield Link Rd and via the NWRR scheme. Figure 3-4 shows noticeable changes in traffic levels on the A5, A49 and other main roads due the additional Local Plan residential and employment developments.

Figure 3-3 - Traffic Flow levels - Baseline demand - 2038 AM

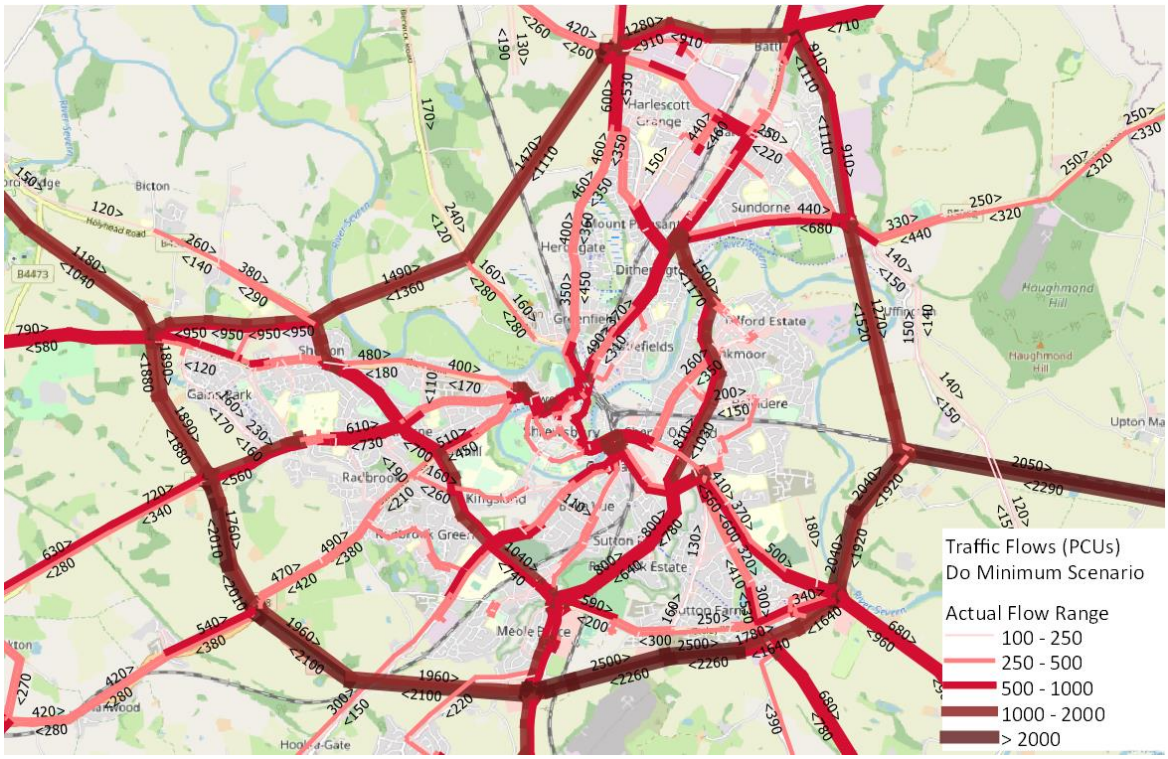


Figure 3-4 - Traffic Flow levels - Baseline plus Local Plan demand - 2038 AM

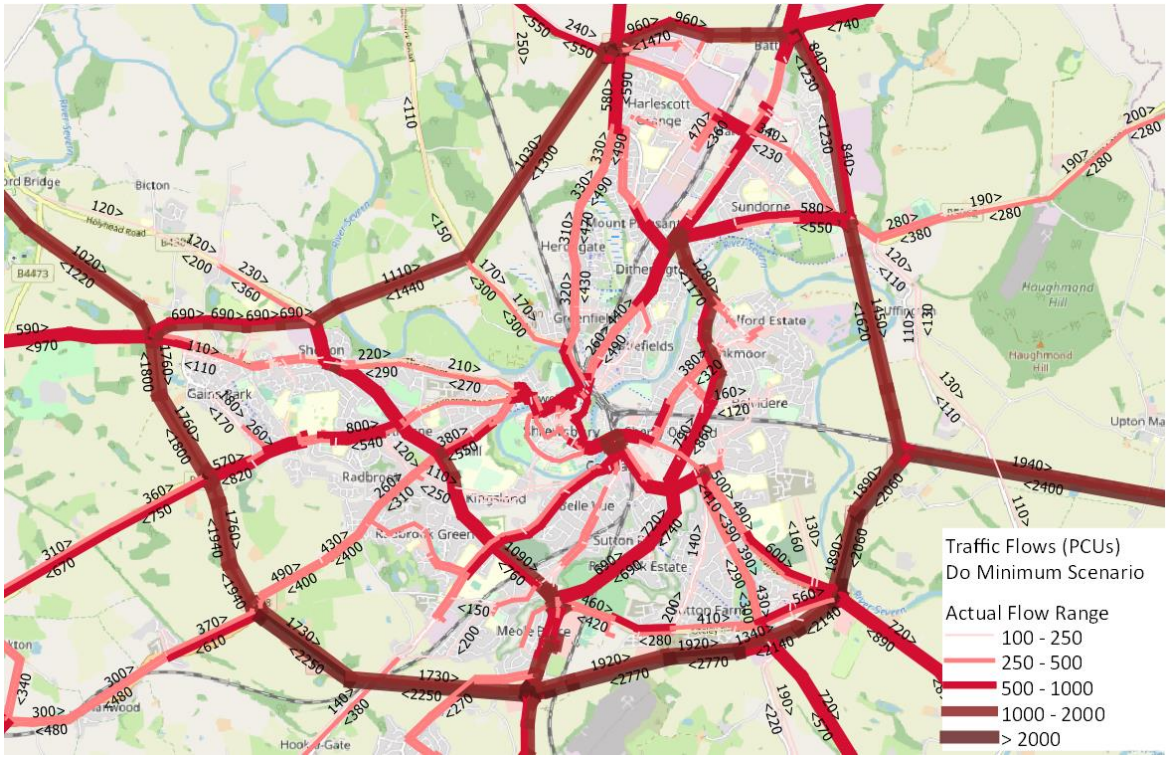


Figure 3-5 shows the traffic flow differences between the 2038 Baseline and the Local Plan test for the AM peak hour. The colour range clearly identifies that the impact of the new residential and employment requirements are located in the southern part of the A5 ring road (mainly between Preston Island and Bayston Hill roundabouts) and also in the eastern A49 section (between Sundorne and Preston Island roundabouts). Other roads with impact are Otely Rd (B4380), London Rd (A5064), Hanwood Rd, A5112 and Sundorne Rd.

3.3.4. Figure 3-6 show similar difference between the 2038 Baseline and the Local Plan test (Do-Something) for PM peak hour. The pattern is similar as the main roads in Shrewsbury are affected by the new developments although in PM peak scenario the traffic flow along the A5112 corridor (between Reabrook and Heathgates roundabouts) increases more.

3.3.5. More individual traffic flow plots (similar to Figure 3-3 and Figure 3-4) for IP and PM peak hours can be found in Appendix A.

Figure 3-5 - Traffic Flow difference between Baseline vs Local Plan test, 2038 AM

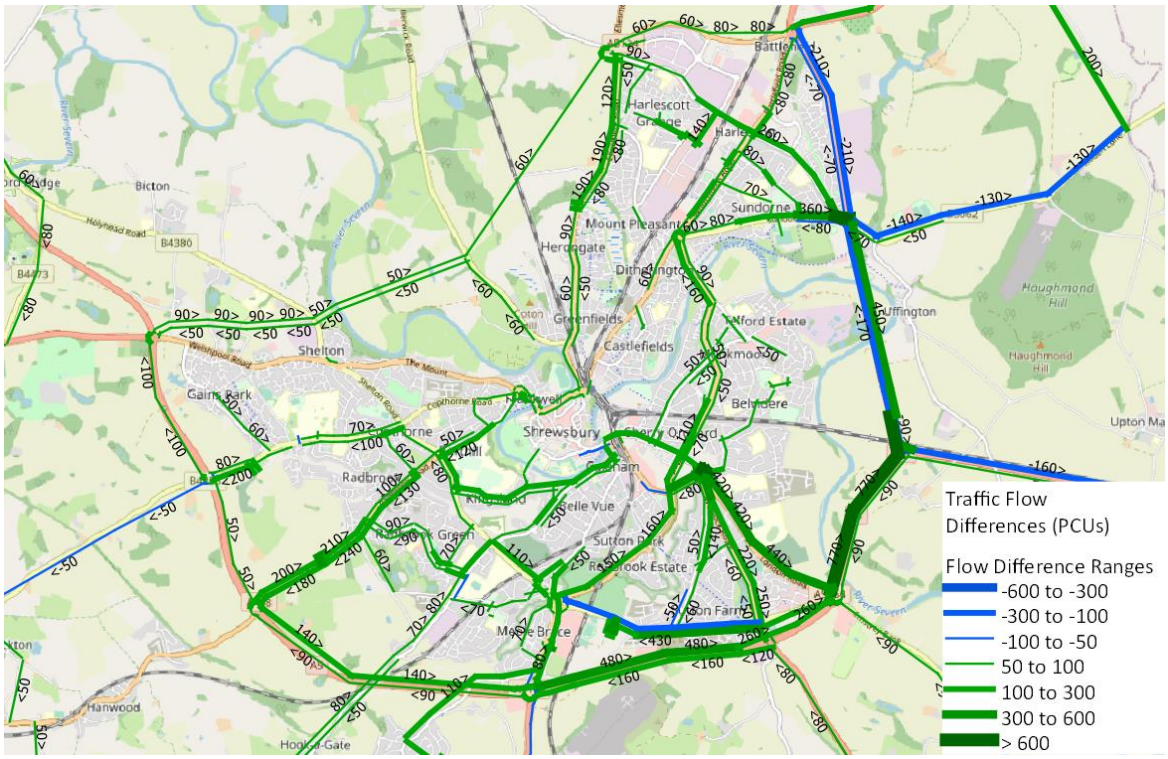
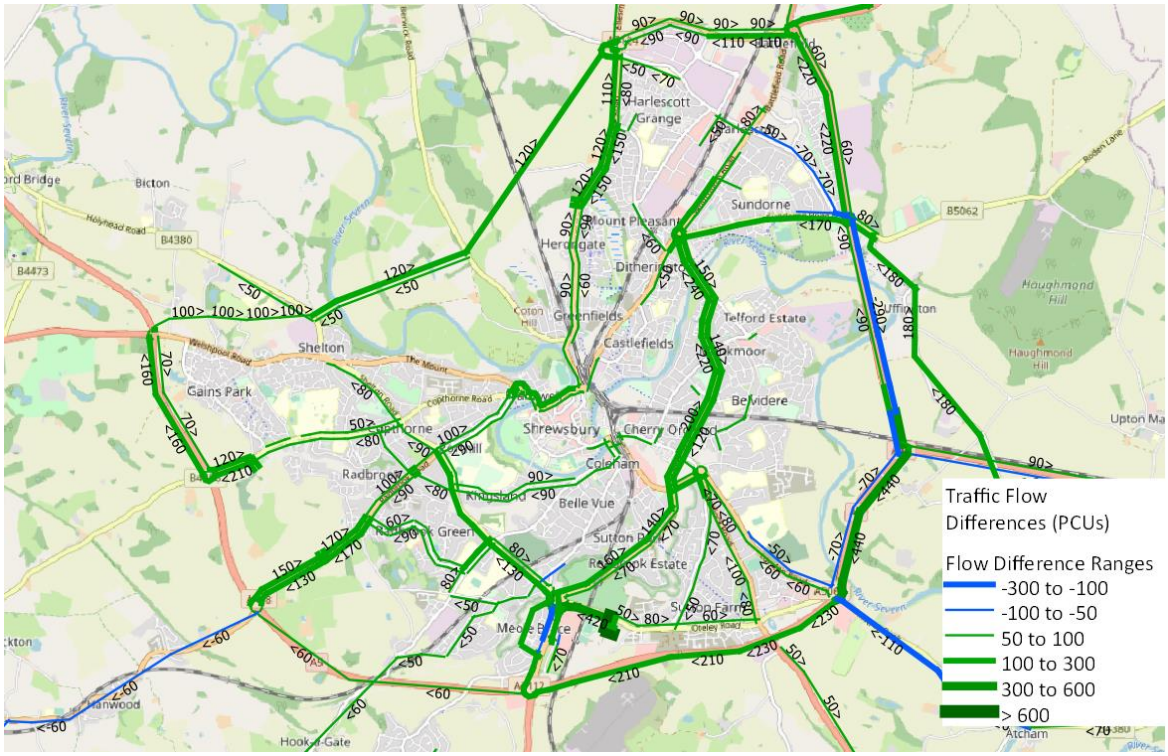


Figure 3-6 - Traffic Flow difference between Baseline and Local Plan test, 2038 PM



3.3.6. There are some reductions in flow, illustrated by blue bandwidths, shown in the AM and PM peak hours along the A49, section of A5 east of Preston Island roundabout and the area around Meole Brace and Oteley Road. This is due to a significant volume of development traffic accessing their respective development zones located in these areas and displacing the baseline through traffic onto alternative routes. This displacement is shown as an increase, illustrated by green bandwidths, along a wider network of alternative, mainly local, routes.

3.3.7. The impacts of the development traffic can therefore be classified as:

- direct impacts, namely at those locations where network performance is directly affected by the increased development traffic flows (as illustrated on Figure 3-1and Figure 3-2); and
- indirect impacts, as illustrated by the increasing number of routes along which traffic flow increases are evident relative to the baseline case.

4. LOCAL PLAN TEST OUTPUT - ANALYSIS

4.1.1. This chapter presents detailed analysis of the traffic forecasts focusing on the strategic highway network and the key junctions and corridors within Shrewsbury. This analysis was undertaken within the strategic model, using the SATURN V/C (volume to capacity) ratio to identify the location of any junctions and any approaches to junctions which are predicted to be adversely affected by the Local Plan development proposals. A threshold of V/C ratio exceeding 95% was chosen to locate the worst affected junctions.

4.1.2. It should be noted that the results presented here are based on the scenarios assuming no mitigation measures, in terms of both demand management and network capacity improvements.

4.1.3. For the NWRR corridor, the analysis made use of the readily available junction operational models which were used with the forecast traffic flows from the strategic Local Plan modelling. This enabled a more detailed assessment of the likely Local Plan impacts on the NWRR corridor to be undertaken, in line with the assessments already undertaken for the NWRR Planning Application.

4.2. ANALYSIS - NETWORK PERFORMANCE OVERVIEW

AM PEAK PERIOD

4.2.1. Figure 4-1 shows junctions where at least one approach to the junction exceeds V/C ratio higher than 95% in the 2038 AM peak Baseline Scenario. The figure shows that there are already some junctions with one or more approaches above the threshold.

4.2.2. Figure 4-2 highlights junctions where at least one approach to the junction exceeds 95% V/C ratio in the 2038 AM peak with the Local Plan developments in place. There is an increase in the number of junctions highlighted in the Oteley Road area, along the A5, A49 and the A5112 (Telford Way roundabout) and Ditherington Road.

4.2.3. Figure 4-3 shows the change in V/C ratio between the Baseline and the Local Plan scenario for all locations where the 95% V/C threshold is exceeded in either the Baseline or the Local Plan scenario. The figure shows that at around a third of these locations, the increase in maximum approach V/C is less than 2%, however at around two thirds of the locations the V/C increase is higher than 5%

Figure 4-1 Junction approach V/C ratio excess of 95% - Baseline scenario 2038 AM

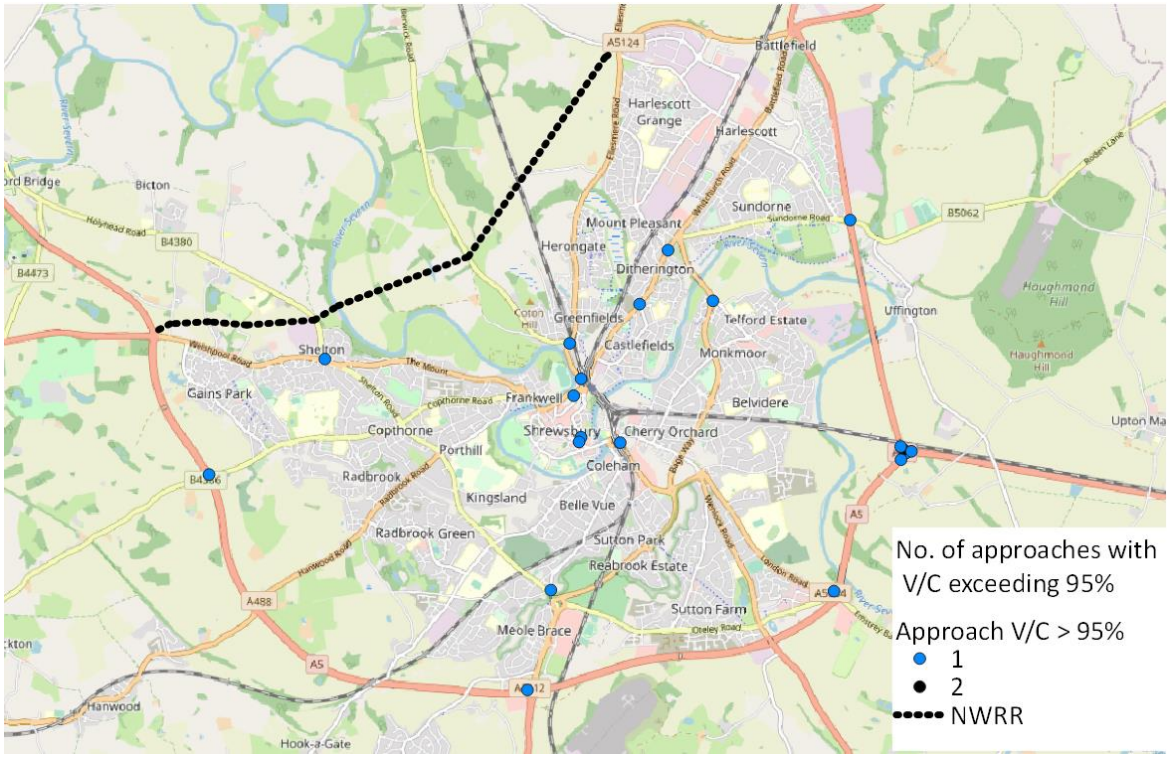


Figure 4-2 Junction approach V/C ratio excess of 95% - Local Plan scenario 2038 AM

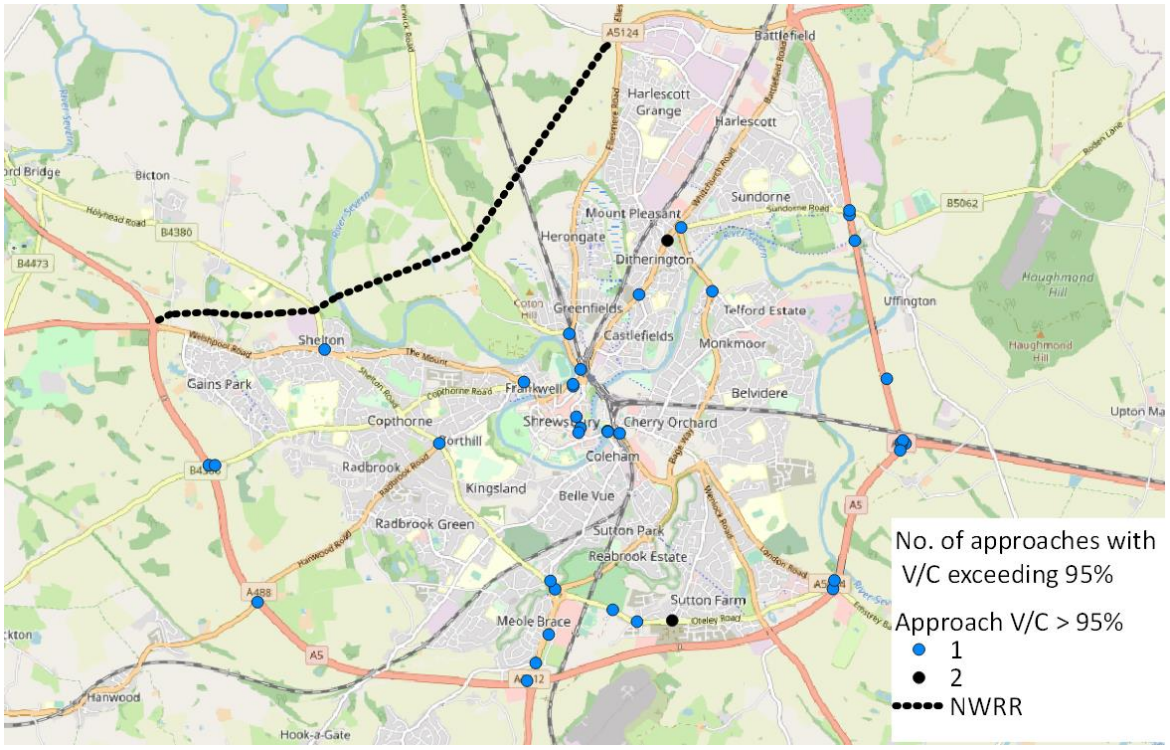
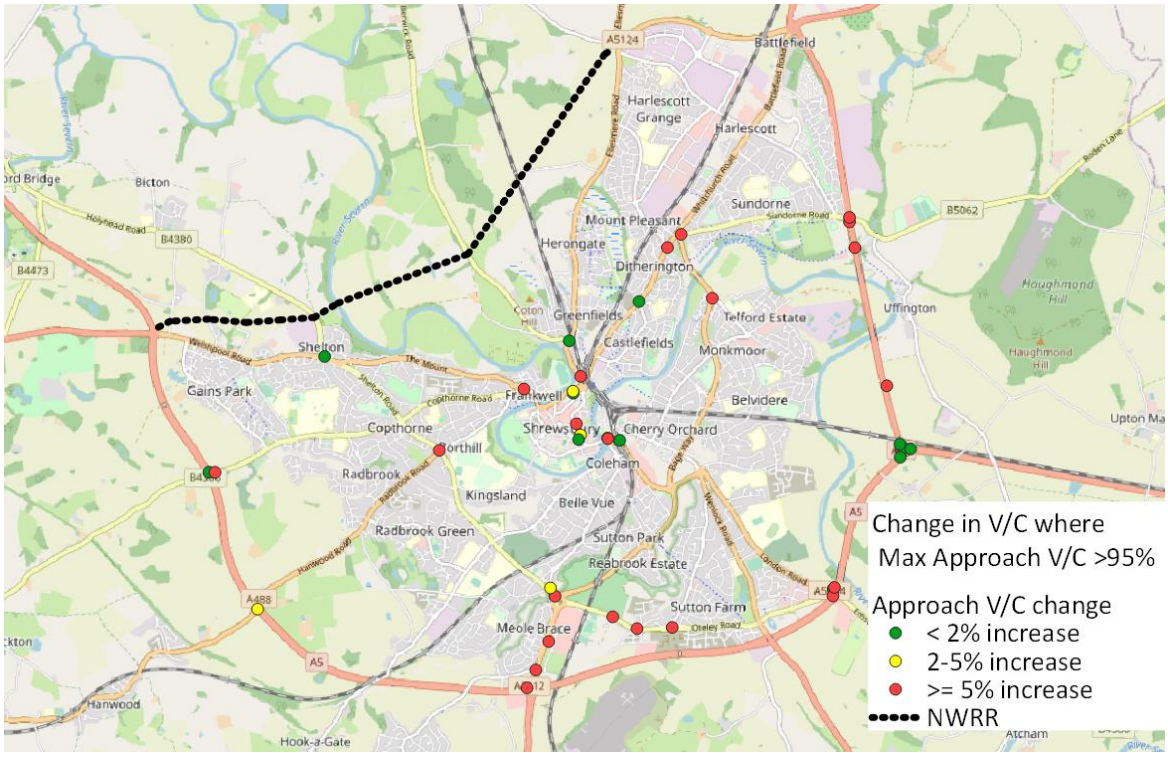


Figure 4-3 Change in V/C ratios - Baseline Vs Local Plan scenarios - 2038 AM



PM PEAK PERIOD

4.2.4. Figure 4-4 shows junctions where at least one approach to the junction exceeds 95%V/C ratio in the 2038 PM peak Baseline Scenario. It should be noted that there are already some junctions with one or more approaches above the threshold.

4.2.5. Figure 4-5 shows where at least one approach to the junction exceeds 95% V/C ratio in the 2038 PM peak with the Local Plan developments in place. Relative to the Baseline, there is an increase in number of highlighted junctions exceeding the threshold, particularly along Oteley Rd and the A5124 (Battlefield Link Road).

4.2.6. Figure 4-6 shows the change in V/C ratio between the Baseline and the Local Plan scenario for all locations where the 95% V/C threshold is exceeded in either the Baseline or the Local Plan scenario. The figure shows that around half of the junctions have a V/C increase lower than 5% and around half have a V/C increase greater than 5%.

Figure 4-4 Junction approach V/C ratio excess of 95% - Baseline scenario 2038 PM

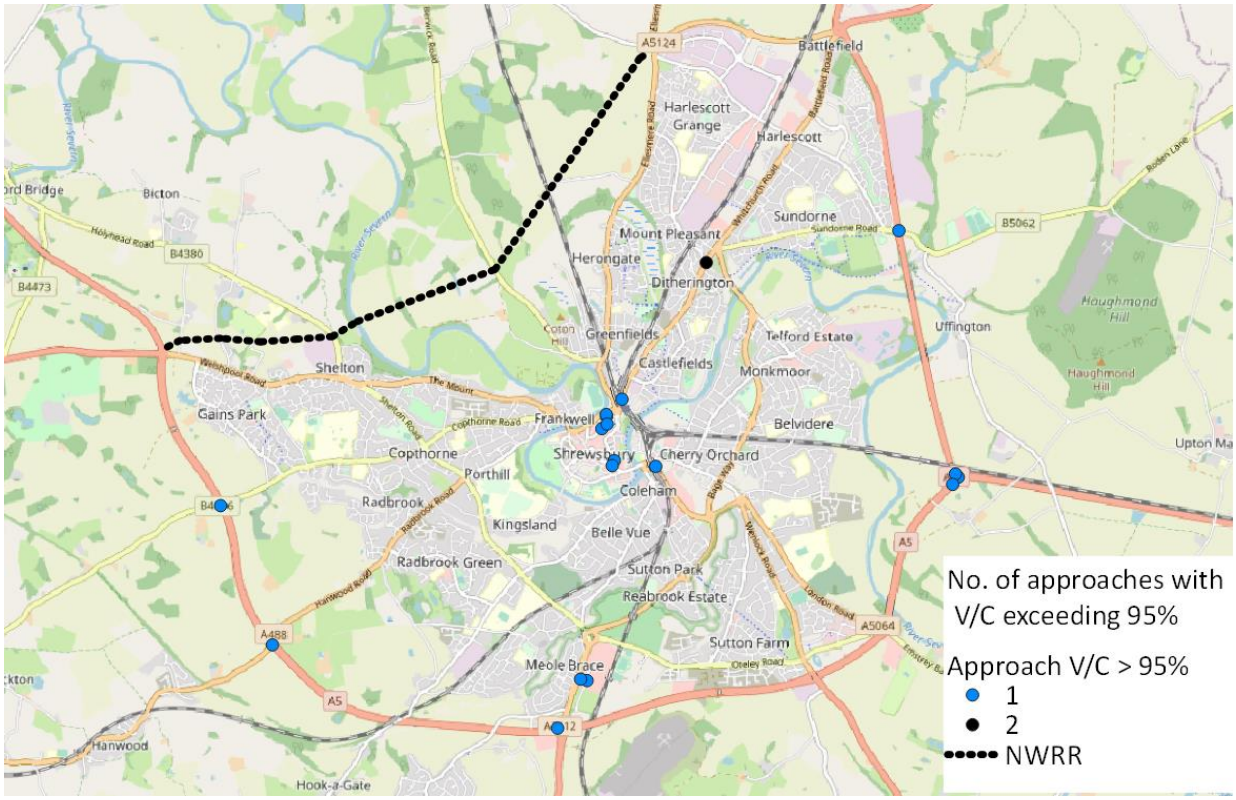


Figure 4-5 Junction approach V/C ratio excess of 95% - Local Plan scenario 2038 PM

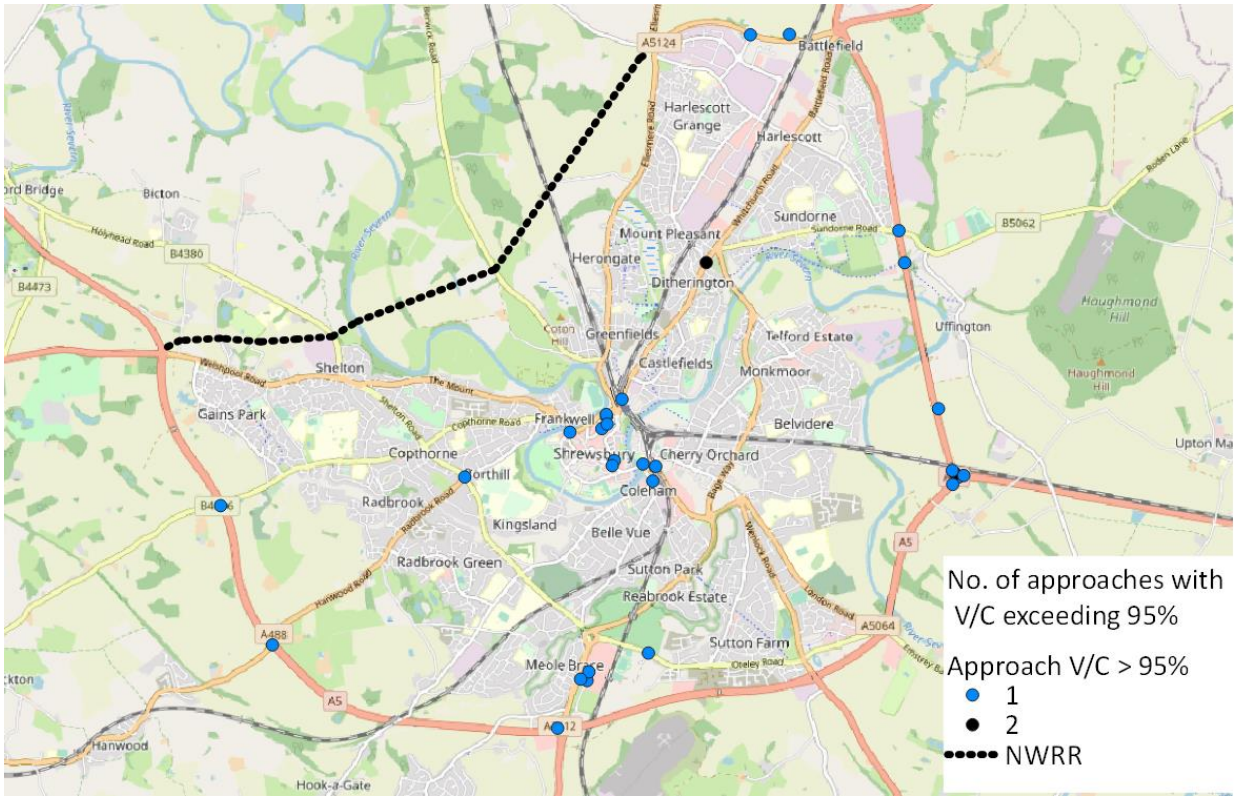
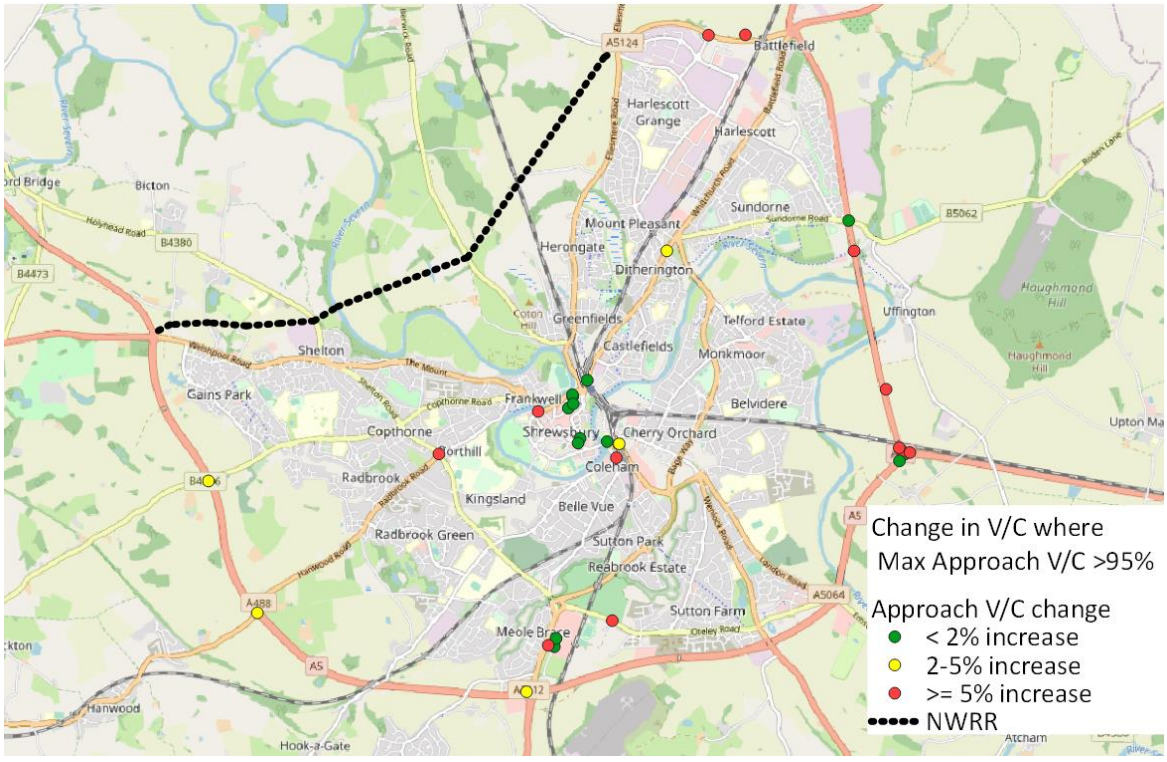


Figure 4-6 Change in V/C ratios - Baseline Vs Local Plan scenarios - 2038 PM



4.3. ANALYSIS - THE SUE SOUTH AREA

OTELEY ROAD CORRIDOR

4.3.1. Without mitigation measures, a significant impact on traffic flows and the operation of junctions along the Oteley Road corridor is forecast. Specifically, it is considered the majority of the 500 PCU through two-way trips in the AM peak across the STFC signalised access junction, will re-route to other routes to avoid congestion at this junction, resulting in a net reduction in eastbound flows along Oteley Road in the AM peak.

4.3.2. The majority of the re-routed trips (circa 200 PCUs) use southbound A5112 Hereford Road and eastbound A5 between Bayston Hill Roundabout and the A5 / A458 junction in order to avoid congestion on the Oteley Road corridor. A smaller proportion of trips are shown to rat run either through the northbound Hazledine Way (or through town centre) to reach Column Roundabout and make their way south along London Road towards their destinations. This is illustrated by green bandwidths denoting flow increases along these routes in Figure 3-5 for AM peak.

4.3.3. Because the signal settings at the STFC access junction provide more capacity for the traffic accessing the site as a left turn from the east and leaving the site as a left turn towards the west, in the PM peak, less congestion at this junction is forecast and fewer trips (less than 40 PCUs in total) are displaced from the Oteley Road corridor, resulting in a net increase in eastbound flows along the corridor. The displaced trips almost exclusively route along the westbound A5 turning right at the Bayston Hill Roundabout to access their destinations.

4.3.4. However, a notable increase in traffic travelling westbound towards Meole Brace Roundabout is observed. This contributes to operational issues at the northbound STFC approach to the signals. A small increase in traffic travelling eastbound from STFC/Lidl toward the A458 / B4380 roundabout can also be observed.

4.3.5. The three junctions along the Oteley Road corridor highlighted as having issues (V/C > 95%) are discussed in turn below.

B4380 Oteley Road / Shrewsbury Town Football Club (STFC)

Figure 4-7 B4380 Oteley Road / STFC, approach/arm description

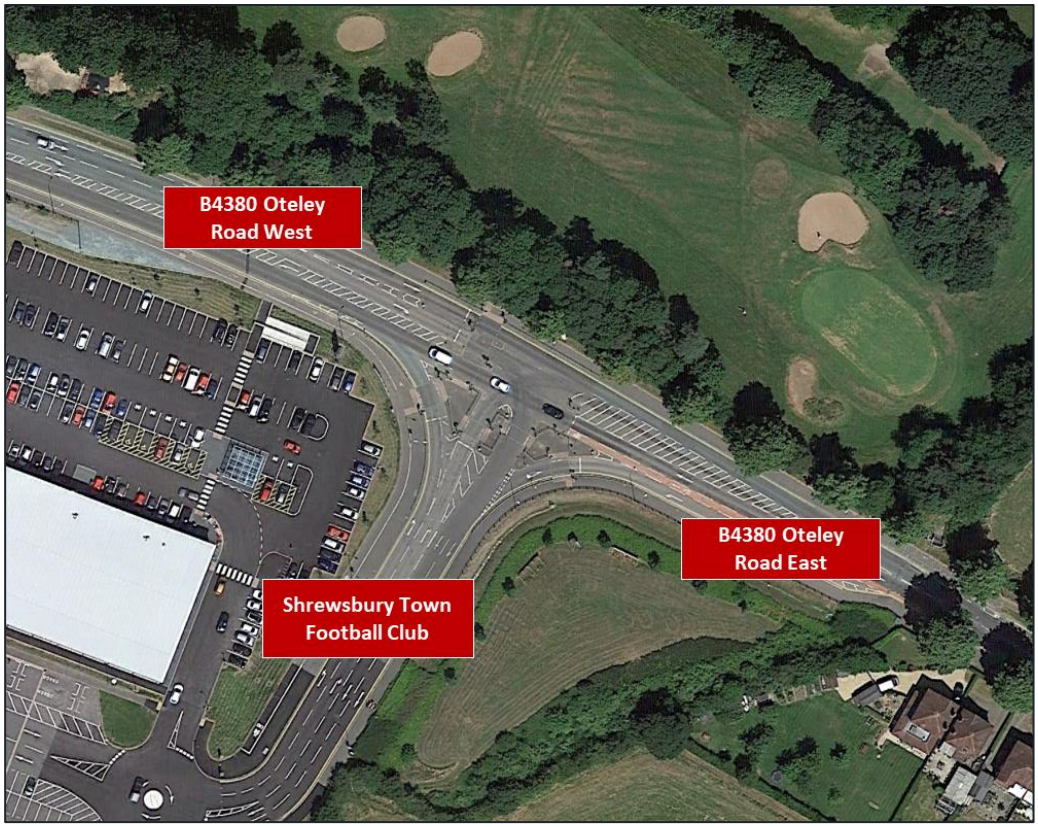


Table 2. Maximum turn V/C ratio - B4380 Oteley Road / STFC

Junction	Approach/ Arm	AM Peak	PM Peak
B4380 Oteley Road / STFC	B4380 Oteley Road East	43% (17%)	21% (23%)
	STFC	28% (9%)	96% (40%)
	B4380 Oteley Road West	133% (91%)	51% (31%)

Note: Baseline values are presented in parentheses (xx%).

4.3.6. The results of this 2038 Local Plan test show that there would be operational issues (V/C > 95%) on the following approaches:

- B4380 Oteley Road / STFC:
  - B4380 Oteley Road West approach (AM peak) due to an increase in development trips turning right into the development site at this location; and
  - STFC approach (PM peak) due to an increase in traffic leaving the development site.

B4380 Oteley Road Retail Park

Figure 4-8 Oteley Road Retail Park, approach/arm description

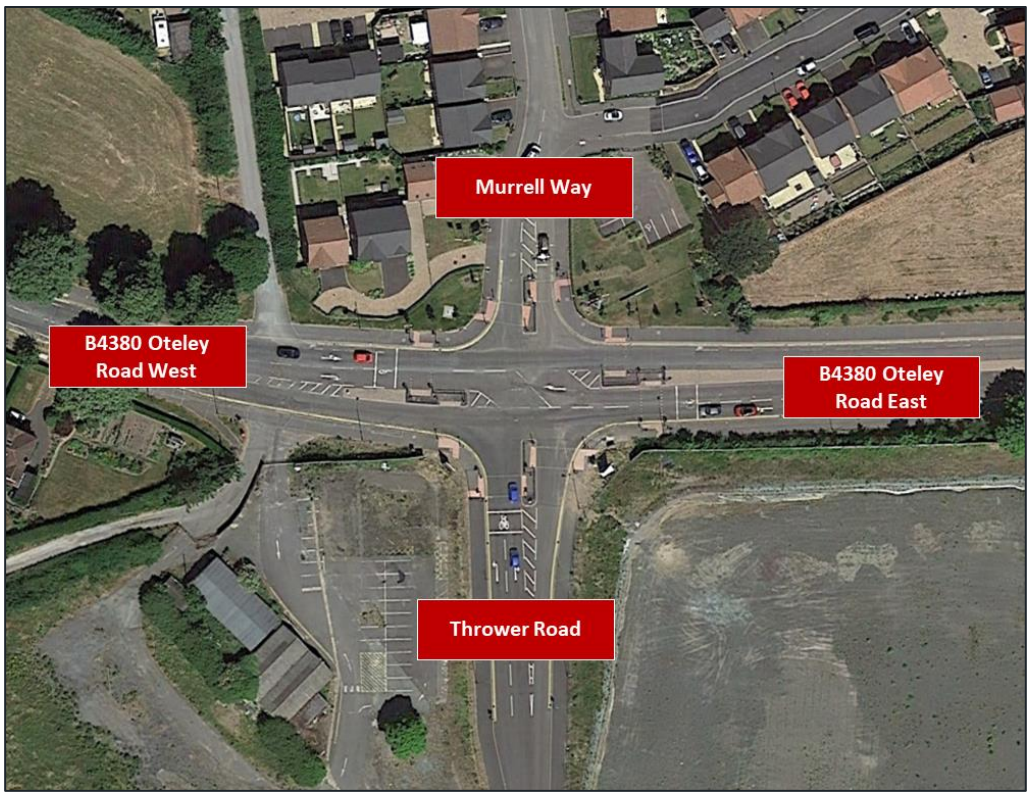


Table 3. Maximum turn V/C ratio - Oteley Road Retail Park,

Junction	Approach/ Arm	AM Peak	PM Peak
Oteley Road Retail Park	B4380 Oteley Road East	121% (47%)	42% (40%)
	Thrower Road	2% (2%)	4% (4%)
	B4380 Oteley Road West	15% (51%)	96% (81%)
	Murrell Way	3% (3%)	2% (2%)

Note: Baseline values are presented in parentheses (xx%).

4.3.7. The results of this 2038 Local Plan test show that there would be operational issues (V/C > 95%) on the following approaches:

- Oteley Road Retail Park:
  - B4380 Oteley Road East approach (AM peak) due to the increase in development trips travelling westbound along Oteley Road in order to access the site at the STFC junction; and
  - B4380 Oteley Road West approach (PM peak) due to the small increase in development trips travelling eastbound on Oteley Road.

B4380 Oteley Road / Sutton Road

Figure 4-9 - B4380 Oteley Road / Sutton Road, approach/arm description

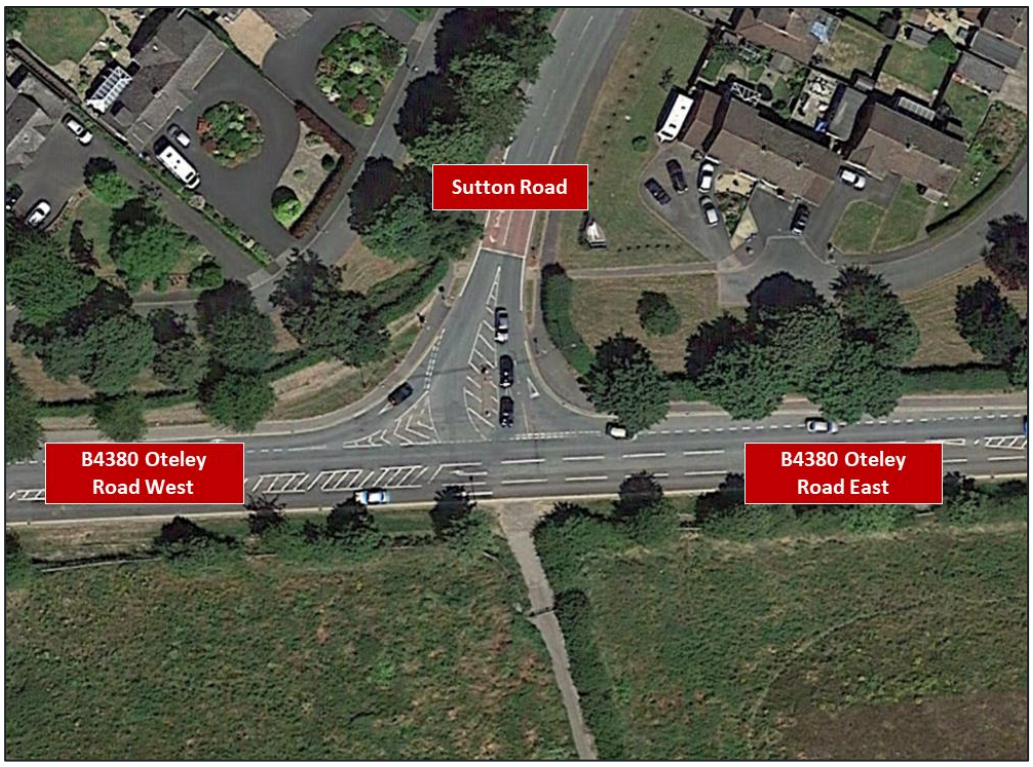


Table 4. Maximum turn V/C ratio - B4380 Oteley Road / Sutton Road

Junction	Approach/ Arm	AM Peak	PM Peak
B4380 Oteley Road / Sutton Road	Sutton Road	104% (17%)	37% (26%)
	B4380 Oteley Road East	98% (14%)	17% (14%)
	B4380 Oteley Road West	5% (15%)	28% (24%)

Note: Baseline values are presented in parentheses (xx%).

4.3.8. The results of this 2038 Local Plan test show that there would be operational issues (V/C > 95%) on the following approaches:

- B4380 Oteley Road / Sutton Road:
  - B4380 Oteley Road East (AM peak) due to an increase in development traffic travelling westbound on Oteley Road in order to reach the site access at the STFC signalised junction; and
  - Sutton Road approach (AM peak) due to the increase in westbound through traffic along Oteley Road leaving fewer gaps for the southbound traffic to join westbound Oteley Road at this junction.

A5112 CORRIDOR BETWEEN MEOLE BRACE AND THE A5

4.3.9. The two junctions along the A5112 corridor highlighted as having issues (V/C > 95%) are discussed in turn below. The impacts of the development traffic on the operation of the A5 junctions, including Bayston Hill (Dobbies) roundabout, is presented in the following section.

Meole Brace Roundabout

Figure 4-10 - Meole Brace Roundabout, approach/arm description

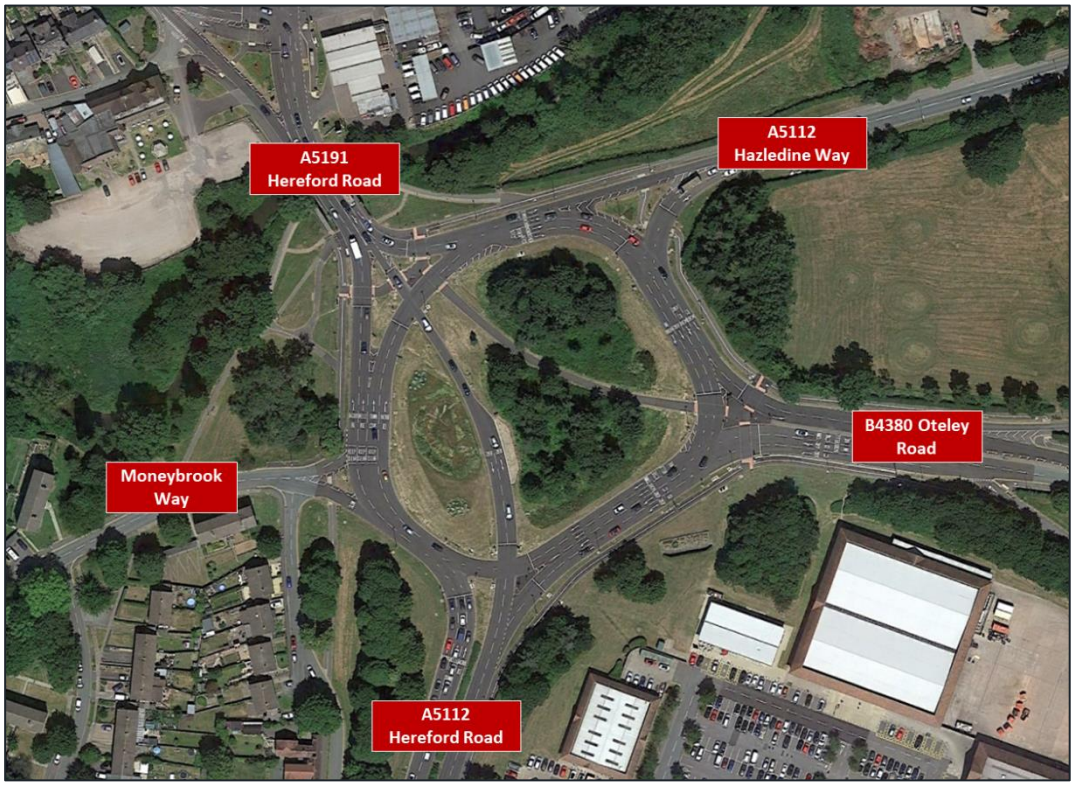


Table 5. Maximum turn V/C ratio - Meole Brace Roundabout

Junction	Approach/ Arm	AM Peak	PM Peak
Meole Brace Roundabout	Hazledine Way	40% (41%)	49% (45%)
	B4380 Oteley Road	9% (11%)	45% (22%)
	A5112 Hereford Road	48% (46%)	39% ($$%)
	Moneybrook Way	18% (14%)	30% (17%)
	A5191 Hereford Road	100% (80%)	79% (73%)
	A5191 Hereford Road (Ahead to A51112 only)	100% (85%)	81% (72%)

Note: Baseline values are presented in parentheses (xx%).

4.3.10. The results of this 2038 Local Plan show that there are issues (V/C > 95%) on the following approaches:

- Meole Brace Roundabout:
  - A5191 Hereford Road approach (AM peak) due to an increase in traffic associated with the Land South of Oteley Road development and its secondary impacts which result in an increase in the straight through movement from this approach as traffic reroutes to avoid congestion in the Oteley Road area. The development traffic associated with the Land South of Meole Brace Retail Park residential site (RES_PA12) is also likely to be having an impact.

A5112 Retail Park Roundabout

Figure 4-11 - A5112 Retail Park Roundabout, approach/arm description

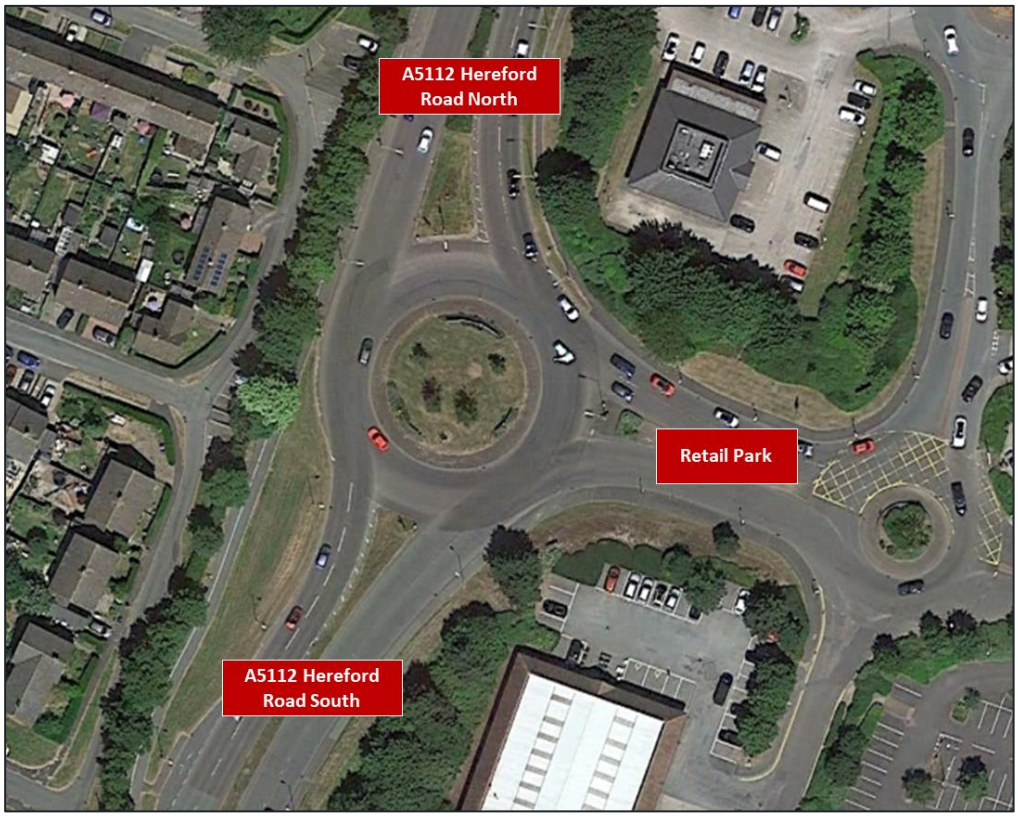


Table 6. Maximum turn V/C ratio - A5112 Retail Park Roundabout

Junction	Approach/ Arm	AM Peak	PM Peak
A5112 Retail Park Roundabout	A5112 Hereford Road North	50% (40%)	55% (44%)
	Retail Park	103% (28%)	131% (109%)
	A5112 Hereford Road South	48% (47%)	41% (45%)

Note: Baseline values are presented in parentheses (xx%).

4.3.11. The results of this 2038 Local Plan show that there are issues (V/C > 95%) on the following approaches:

- A5112 Retail Park Roundabout:
  - Retail Park approach (AM and PM peak) due to an increase in traffic associated with the Local Plan development sites accessing the development zone and/or the retail park in both peak periods. It is also likely that increased through traffic on A5112 is creating more conflicts for traffic trying to exit from this approach.

4.4. ANALYSIS - THE A5 CORRIDOR

4.4.1. The Local Plan proposal likely to impact the section of the A5, more specifically between Woodcote roundabouts and Emstrey Island roundabouts.

4.4.2. Figure 4-1 and Figure 4-4 presented previously, show that in the Baseline case without any of the proposed Local Plan development, Woodcote, Edgebold, Bayston Hill and Emstrey Island roundabouts are forecast to have, at least, one approach to the junction operating above 95% V/C ratio.

4.4.3. Table 4-7 and Table 4-8 below identify, for AM and PM peak hours respectively, all approaches to these junctions which exceed 95% V/C for either Baseline or Local Plan scenario. The tables show how the operation of these junctions are likely to be impacted by the Local Plan developments in the absence of any mitigation measures. Figure 4-12 to Figure 4-15 show the approach arm descriptions for these junctions.

4.4.4. It is noteworthy that, all approaches to the grade separated A5 / A458 junction (Weeping Cross) are forecast to operate within 95% V/C across all scenarios and time periods.

Table 4-7 Junction approaches with V/C higher than 95%, AM peak

Junction	AM peak: Junction Approaches >95% V/C	
	AM peak - Baseline	AM peak - LPA
Woodcote roundabout	A5 West (100%)	A5 West (101%) and Eastbound Mytton Oak Road exit (96%)
Edgebold roundabout	None	A5 East (96%)
Bayston Hill roundabout	A5 West (102%)	A5 West (109%)
Emstrey Island roundabout	Circulatory link conflicting with A5064 London Road (96%)	A5 West (97%) and ped crossing on Northbound A5 exit link (96%)

Table 4-8 Junction approaches with V/C higher than 95%, PM peak

Junction	PM peak: Junction Approaches >95% V/C	
	PM peak - Baseline	PM peak - LPA
Woodcote roundabout	A5 East (96%)	A5 East (100%)
Edgebold roundabout	A5 East (100%)	A5 East (104%)
Dobbies roundabout	A5 West (99%)	A5 West (102%)
Emstrey Island roundabout	None	None

Figure 4-12 - Woodcote Roundabout, approach/arm description

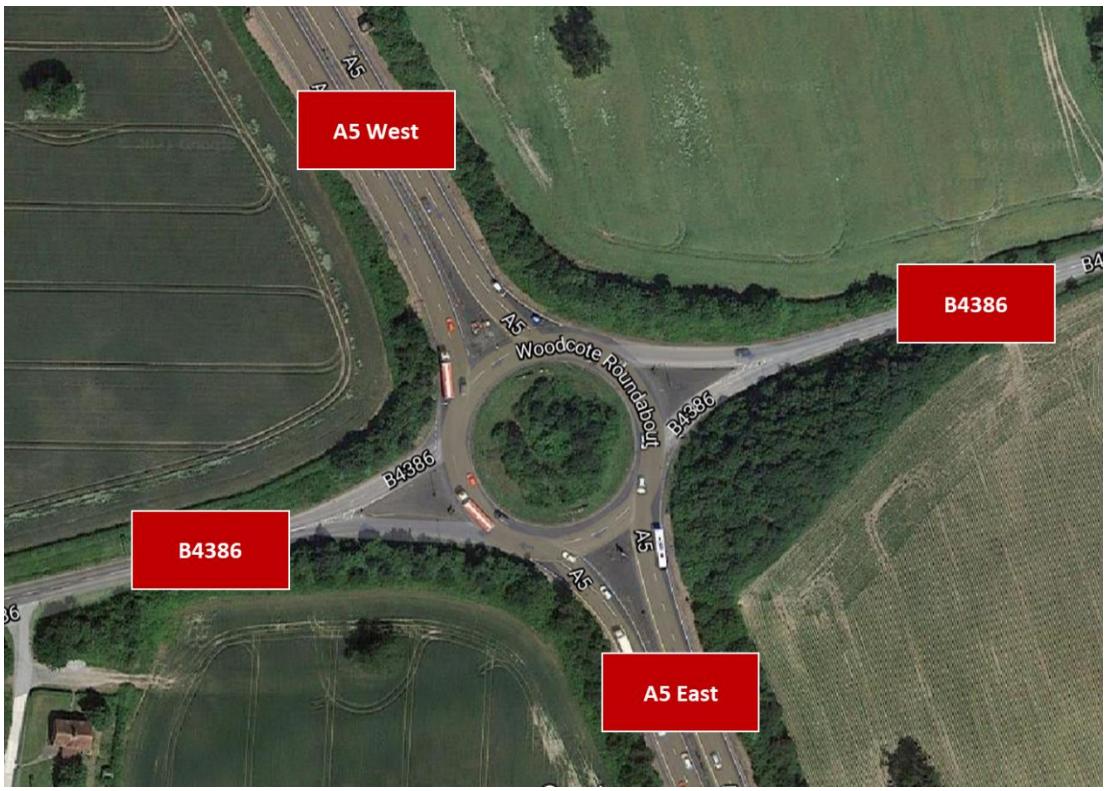


Figure 4-13 - Edgebold Roundabout, approach/arm description

Figure 4-14 - Bayston Hill Roundabout, approach/arm description

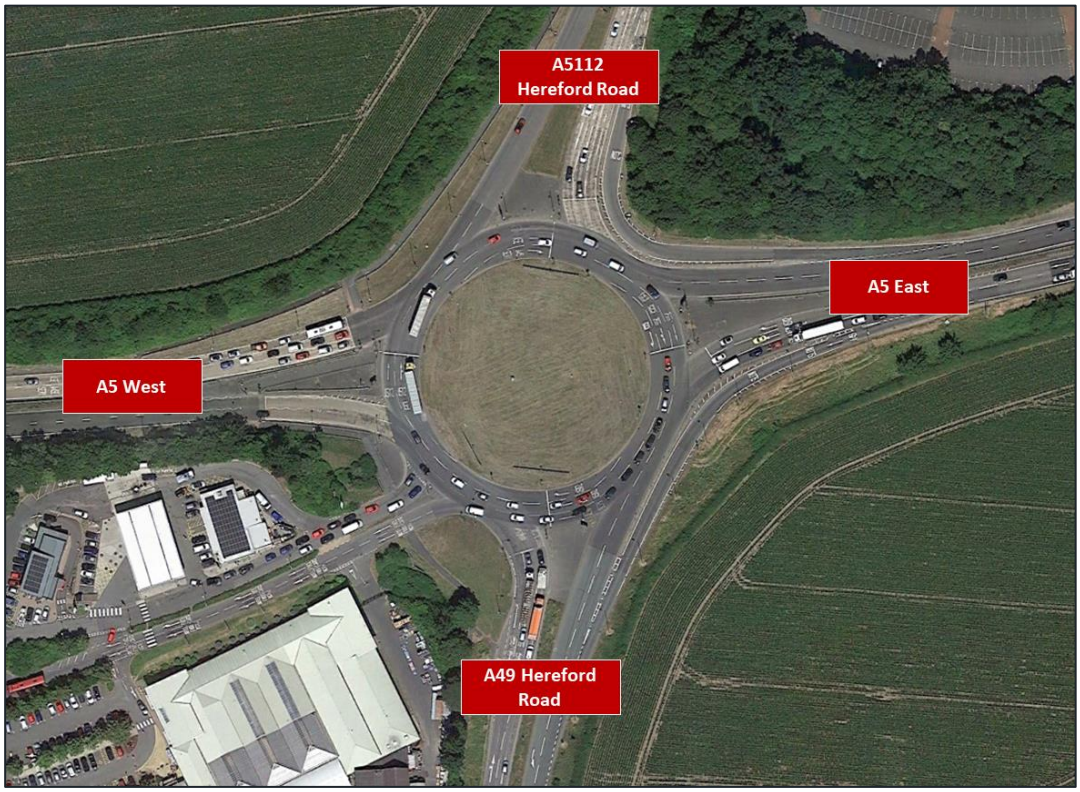
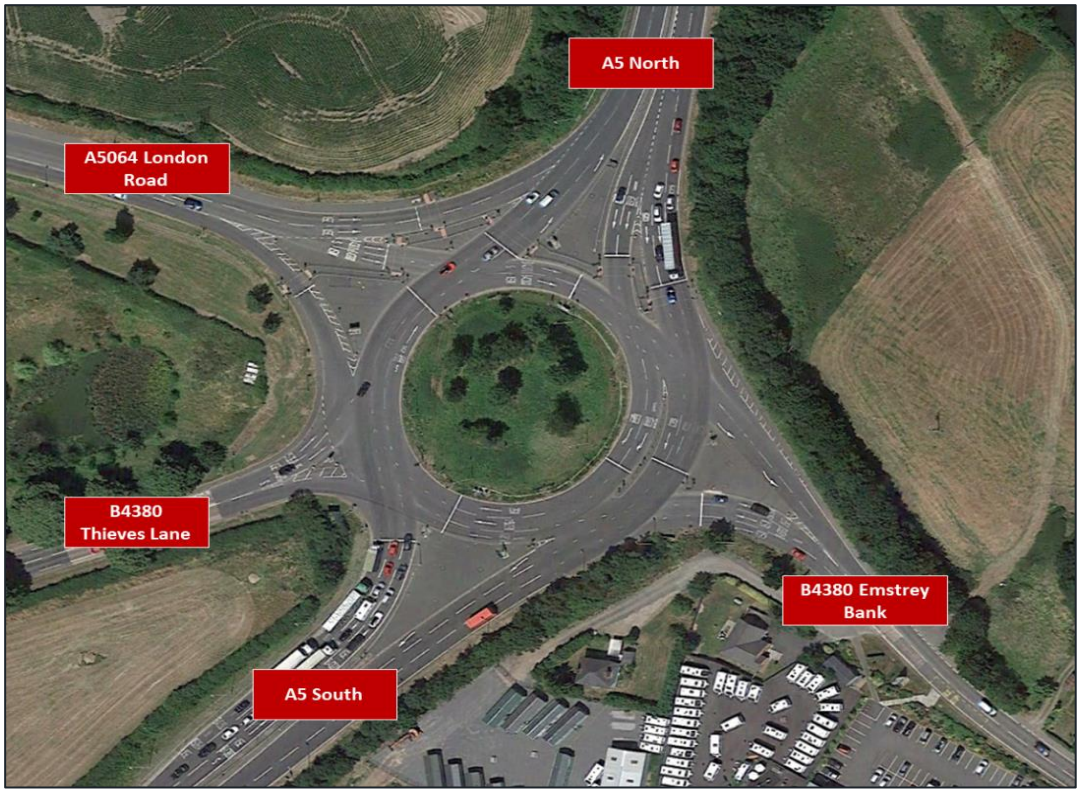


Figure 4-15 - Emstrey Island roundabout, approach/arm description



4.4.5. The results of this 2038 Local Plan test show that there are existing operational issues on at least one approach to the A5 junctions in the Baseline Case (Figure 4-1 and Figure 4-4, AM and PM peak respectively) which degrade with the inclusion of the Local Plan development.

4.4.6. In the PM peak, the Local Plan developments are forecast to only affect the approaches which are already at or close to capacity. In the AM peak, there are additional junction approaches which are highlighted as a result of the Local Plan developments, albeit the biggest increase is on the A5 West approach to Bayston Hill (Dobbies) roundabout which increases from 102% V/C in Baseline to 109% V/C in the Local Plan test. This approach is particularly impacted by the increased flows generated by the development traffic going to the proposed Land West of A49 employment site and further impacted by the displaced non-development traffic re-routeing away from the Oteley Road corridor.

4.5. ANALYSIS – THE A49 ROAD

4.5.1. The Local Plan proposal likely to impact the section of the A49, between Preston Island and Battlefield roundabouts, where the new proposed employment site SHR166 (Land to the West of A49) is located.

4.5.2. In AM peak, the employment site attracts an important number of trips that uses mainly the A49 (trips from the northern area of the Shrewsbury), London Rd via Preston Island roundabout (collecting trips from centre part of the city) and the southern part of the A5 (the main route for trips from the south and south-west areas of Shrewsbury). In PM peak scenario,

the inverse traffic pattern is generated as trips leaving the employment site use the A49 and A5 to reach their destinations.

4.5.3. The large number of trips generated by the employment site have a direct impact on the operation of the access junction, causing congestion and delays as development traffic attempts to either enter or leave the site. Another junction impacted directly by the site is the Preston Island roundabout with V/C ratio above capacity on the A5 approach arms, as traffic tries to access the A49 (in AM peak) and the A49 approach arm in the opposite direction in the PM peak.

4.5.4. An indirect impact of the traffic issues on the A49 is the rerouting traffic. In AM peak, A49 southbound traffic flows (towards Preston Island roundabout) diverts their route with flows with a destination in the east (i.e. Telford) chose alternatives such as the A53, the B5062 or local roads; whilst flows with a western destination divert via the A51512 corridor (Telford Way, Robertson Way, Bage Way). Similarly, still in AM peak, northbound traffic flows (towards Battlefield roundabout) modify their usual route via the middle of Shrewsbury (Bage Way, Robertson Way, Telford Way towards Heathgates roundabout) or local roads in Upton Magna and Uffington used by traffic from the east.

4.5.5. Rerouting traffic in the PM peak is related with traffic leaving the site towards Preston Island or Battlefield roundabout. The alternative routes are similar to AM peak and, in particular affect the A5112 corridor (Bange Way, Robertson Way, Telford Way).

PRESTON ISLAND

The impacts of the Local Plan developments, notably of the employment site at the Land West of A49, on the operation of this junction are described in the previous section.

Figure 4-16 - Preston Island, approach/arm description

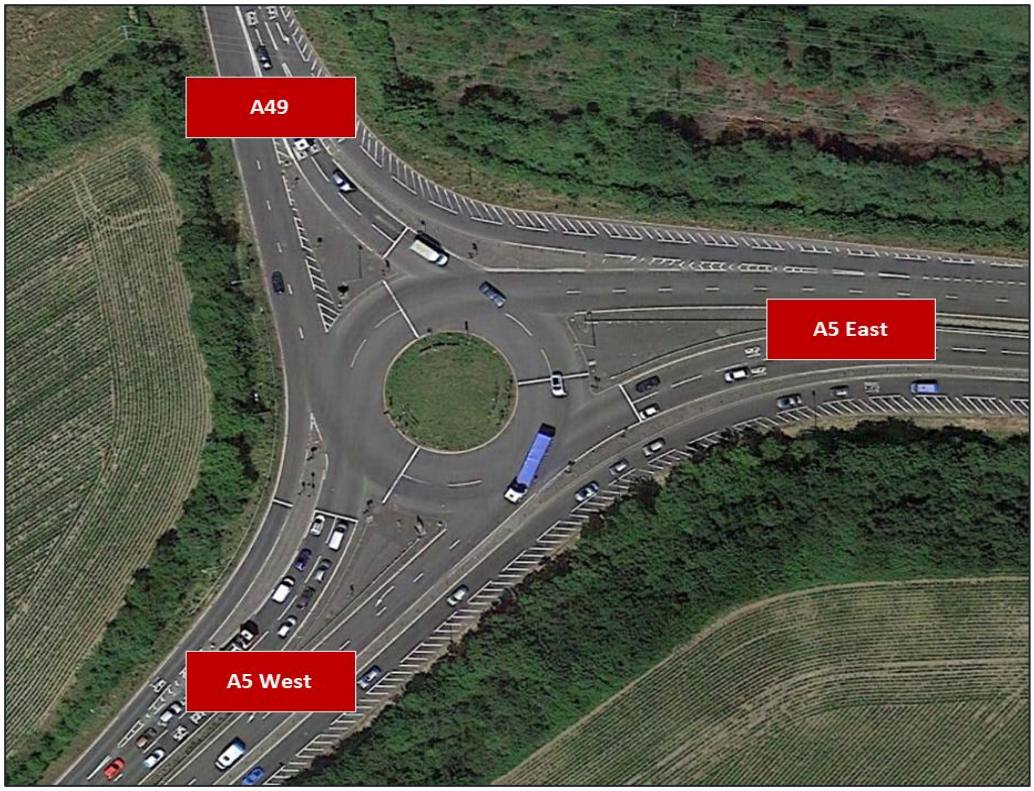


Table 9. Maximum VOC (%) per approach and time period, Preston Island

Junction	Approach/ Arm	AM Peak	PM Peak
Preston Island	A49	55% (102%)	103% (70%)
	A5 East	106% (102%)	100% (106%)
	A5 West	100% (75%)	75% (76%)

Note: Baseline values are presented in parentheses (xx%).

4.5.6. The results of this 2038 Local Plan show that there are issues (V/C > 95%) on the following approaches:

- Preston Island:
  - A49 approach (PM peak) due to an increase in traffic travelling southbound on A49;
  - A5 East approach (AM and PM peak) due to an increase in traffic on this approach in the AM peak and an increase in conflicting traffic travelling southbound on A49 in the PM peak; and
  - A5 West approach (AM peak) due to a significant increase in traffic on this approach towards the employment site on the A49.

4.6. ANALYSIS - THE NWRR LINKS

4.6.1. The impact of the Local Plan proposals on the operation of NWRR has been assessed using a combination of the strategic model (Baseline and Local Plan scenarios) to inform the changes to forecast traffic flows along the NWRR, together with the existing junction models to inform the likely level of junction operation for each of the assessed junctions along the NWRR.

4.6.2. Results of the detailed junction modelling showed that, in both the Baseline and Local Plan scenarios, none of the NWRR junction approaches are forecast to exceed the 95% V/C threshold. The Local Plan proposals are therefore not expected to have a material detrimental impact on the operation of the NWRR.

4.7. JUNCTION IDENTIFICATION

4.7.1. A key objective of this assessment is to identify future congestion levels and potential capacity issues specifically due to the Local Plan proposals, which would be taken forward for investigation as part of the identification of potential mitigation measures. Earlier sections of the report have highlighted junctions where there are likely to be operational issues in either Baseline (without the Local Plan developments) or the Local Plan scenarios, and where existing Baseline issues are likely to get worse as a result of the Local Plan proposals. This section brings together that analysis but shift the focus to identification of the junctions which are likely to be most adversely affected specifically by the Local Plan proposals. Since junctions are typically the key pinch points, this section identifies the most impacted junctions as a result of the Local Plan proposals.

4.7.2. Previous analysis has shown that there are some junctions with turn specific operational issues on one arm and in one single time period only and others with issues on multiple approaches or in multiple time periods. In order to identify the most adversely affected junctions, the following approach was used:

- Calculate a metric for both Baseline and Local Plan scenarios, based on the number of turns at a junction throughout the three modelled time periods weighted by the V/C which they exceed (based on the V/C thresholds of 85%, 95% or 100%).
- For each junction where at least one turn exceeds 85% V/C, compare the Local Plan metric against the corresponding Baseline scenario metric.
- Rank the junctions based on the greatest increase in the Local Plan metric relative to the Baseline metric.

4.7.3. This approach means that junctions are ranked based on their operational performance relative to the Baseline case, taking into account: junction performance across the day by considering all three modelled time periods; and the number of occurrences as well as the severity of the operational impacts by considering the number of turns and the V/C threshold which is exceeded. This also means that some junctions where there are existing operational issues highlighted in the Baseline scenario, would not rank as highly as those junctions where there are new operational issues identified as a result of the Local Plan proposals. This analysis should therefore be considered in conjunction with the analysis presented earlier within this chapter.

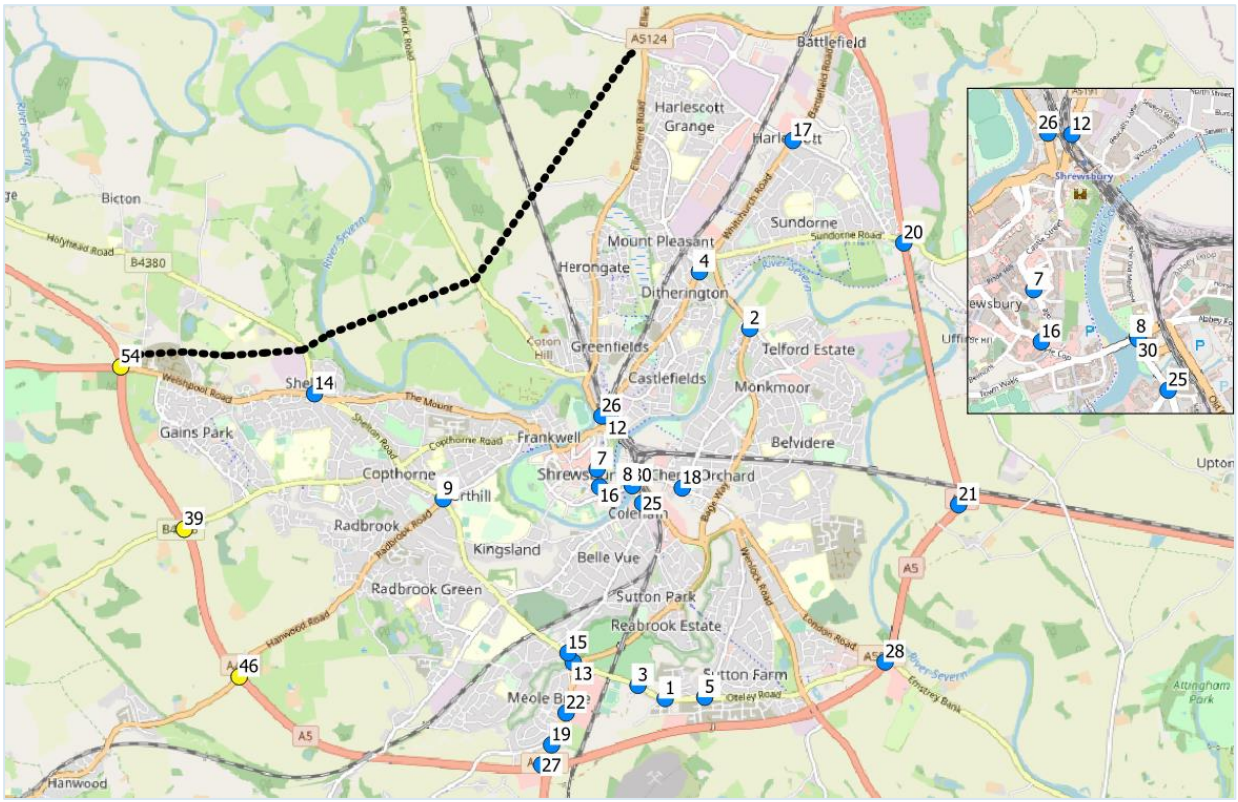
4.7.4. It should also be noted that the ranking is based on a combined metric which can produce a different result depending of the type of the junction defined in the strategic model. A simple 4-arm junction is defined as a single junction whereas a large roundabout, say Meole roundabout, is defined as a "collection of single junctions". In the first case, additional traffic may have an impact on all the turns or movements due to the way it is represented in the strategic model, whereas, in the second case, the impact can be focused on a specific approach or turn and not across all the turns of the large junction.Figure 4-17 lists and Figure 4-17 shows the locations of the 30 highest ranked junctions where the Local Plan proposals are likely to have the greatest detrimental impacts on junction operation. It should be noted that a few of the junctions are beyond the focus area of the image and are therefore not shown on Figure 4-17. At these (not shown) locations the model coverage is generally quite sparse, and the model performance is not as rigorously tested, hence the identified traffic impacts are very likely to be due to the relatively coarse model structure and potential model noise rather than any specific Local Plan proposals. The one exception to this is the A49 junction with Lythe Hill Road which could be impacted by the proposed Local Plan development, as discussed further below.

4.7.5. Additionally, the three A5 junctions that fall outside of the top 30 rank have also been depicted in Figure 4-17, in yellow, along with their rank.

Table 4-10 Ranking of junctions most affected by the Local Plan proposals

Rank	Location	SRN?	Rank	Location	SRN?
1	B4380 Oteley Road / Thrower Road/Murrell Way	N	16	A5191 Wyle Cop / Dogpole	N
2	A5112 Telford Way Roundabout	N	17	Whitchurch Rd (A5112) / Harlescott Ln	N
3	B4380 Oteley Road / Shewsbury Town Football Club	N	18	Abbey Foregate / Monkmoor Rd	N
4	A5191 Heathgates / Mount Pleasant Road	N	19	A5112 Hereford Road/Pulley Lane	N
5	B4380 Oteley Road / Sutton Road	N	20	A49 Sundorne Roundabout	N
6	B5061 / B4380 (near Norton)	N	21	A5 / A49 Preston Island Roundabout	Y
7	St Mary's Street / St Mary's Place	N	22	A5112 Hereford Road / Meole Brace Retail Park roundabout	N
8	English Bridge / A5191 Coleham Head/A458 Abbey Foregate	N	23	A5 / B4397 near Shotatton	Y
9	A488 / B4380 Porthill Roundabout	N	24	Buildwas Rd (A4169) / Much Wenlock Rd	N
10	A49 (Hereford Rd) / Lyth Hill Rd	Y	25	A5191 Moreton Crescent / Old Coleham / Longden Coleham / A5191 Coleham Head	N
11	Holyhead Rd (B5061) / Roman Rd	N	26	A528 Cross Street / A528 Chester Street	N
12	A5191 Castle Foregate / A528 Cross Street	N	27	A5 Bayston Hill Roundabout	Y
13	Meole Brace Roundabout	N	28	A5 Emstrey Island Roundabout	Y
14	A458 Welshpool Road / B4380 Shelton Road / B4380 Holyhead Road	N	29	A49 / Stapleton Road near Stapleton	Y
15	A5191 Hereford Road / B4380 Roman Road	N	30	A5191 Coleham Head ahead-only signal	N

Figure 4-17 - Location of junctions most affected by Local Plan proposals



4.7.6. Figure 4-17 shows that the worst affected junctions are concentrated in the east part of Shrewsbury, generally bounded by the Whitchurch Road corridor in the north part of the town and Hereford Road and the A5 Bayston Hill junction in the south part.

4.7.7. The A5 junctions Bayston Hill, Emstrey Island and Preston Boats are all highlighted among the top 30 most affected junctions by the Local Plan proposals. This is likely to be due to the proposals for the large employment site at Land west of A49 which increase traffic demands along this route, however affected also by the existing operational issues at these junctions in the Baseline case which result in the limited scope to accommodate additional traffic and subsequent rerouting of traffic across the local Shrewsbury highway network, as discussed earlier within this report.

4.7.8. Elsewhere on the Strategic Road Network (SRN), Table 10 highlights two locations on the A49 south of Shrewsbury: at its junctions with Lyth Hill Road and near Stapleton. The impacts on the operation of the junction of Lyth Hill Road could be affected by the proposed residential developments in Bayston Hill and this would require further investigation, however the A49 junction near Stapleton is less likely to be directly impacted by any proposed Local Plan development and it is more likely that the impacts at this location are due to model noise as the model granularity and accuracy decreases towards the edge of the fully modelled area where this junction is located.

4.7.9. To the west of Shrewsbury, the A5 / B4397 junction near Stapleton is highlighted as being affected by the Local Plan proposals but similarly, due to its location towards the edge of the modelled area, these impacts are more likely to be associated with model limitations due to its decreased granularity away from the detailed modelled area, rather than any specific Local Plan proposals.

4.7.10. Within Shrewsbury, a number of town centre locations have been identified as worst affected by the Local Plan proposals. As discussed earlier in this report, this is likely to be due to secondary impacts of traffic being diverted away from the more strategic routes as these approach capacity in the Baseline case and traffic seeks to reroute to other less congested alternative routes.

4.7.11. On the whole, the locations highlighted in Figure 4-17 align well with the analysis presented earlier within this report for each of the most affected corridors. It is worth reiterating that the impacts presented here are the future congestion levels and potential capacity issues specifically due to the Local Plan proposals, assessed without any mitigation on either network capacity or demand management and should be used as a starting point for discussions and development of a potential mitigation strategy as appropriate.

5. SUMMARY AND CONCLUSIONS

5.1. SUMMARY

5.1.1. This report describes the approach adopted for the identification of the likely traffic impacts related to the Shropshire Local Plan proposals.

5.1.2. The traffic forecasts have been developed from a 2017 Base Year traffic model that was built using a series of data sources including mobile phone network data.

5.1.3. The Baseline analyses presented in the report have been developed based on the 2020 North West Relief Road (NWRR) model for forecast year 2038 which assumes that the NWRR scheme will be in place by the end of the Local Plan period 2038.

5.1.4. The 2038 baseline forecasts take account of the most recent projections of future traffic growth derived from TEMPro that take account of the latest forecasts of population and employment and car ownership to provide estimates of trip ends.

5.1.5. The forecast model considers the changes in travel costs resulting from the changes in demand as a result of the proposed Local Plan developments. This forecast procedure utilises a variable demand methodology, that takes account of the change in demand in response to the change in the costs of travel.

5.2. CONCLUSIONS

5.2.1. The traffic forecast results presented in Chapter 3 and 4 demonstrate that, without any mitigation measures, the Local Plan proposal would increase the stress on the overall network performance and have some visible impact on the key junctions and corridors.

5.2.2. The Local Plan proposals, are forecast to have a significant impact on traffic flows and the operation of junctions in east Shrewsbury.

5.2.3. The developments proposals are also forecast to affect the performance of some of the A5 junctions which are already at or close to capacity in the baseline scenario. Preston Island, Bayston Hill (Dobbies) and Emstrey Island roundabouts are particularly impacted by the increased flows generated by the development traffic going to the proposed Land West of A49 employment site and further impacted by the displaced non-development traffic re-routeing away from the Oteley Road corridor.

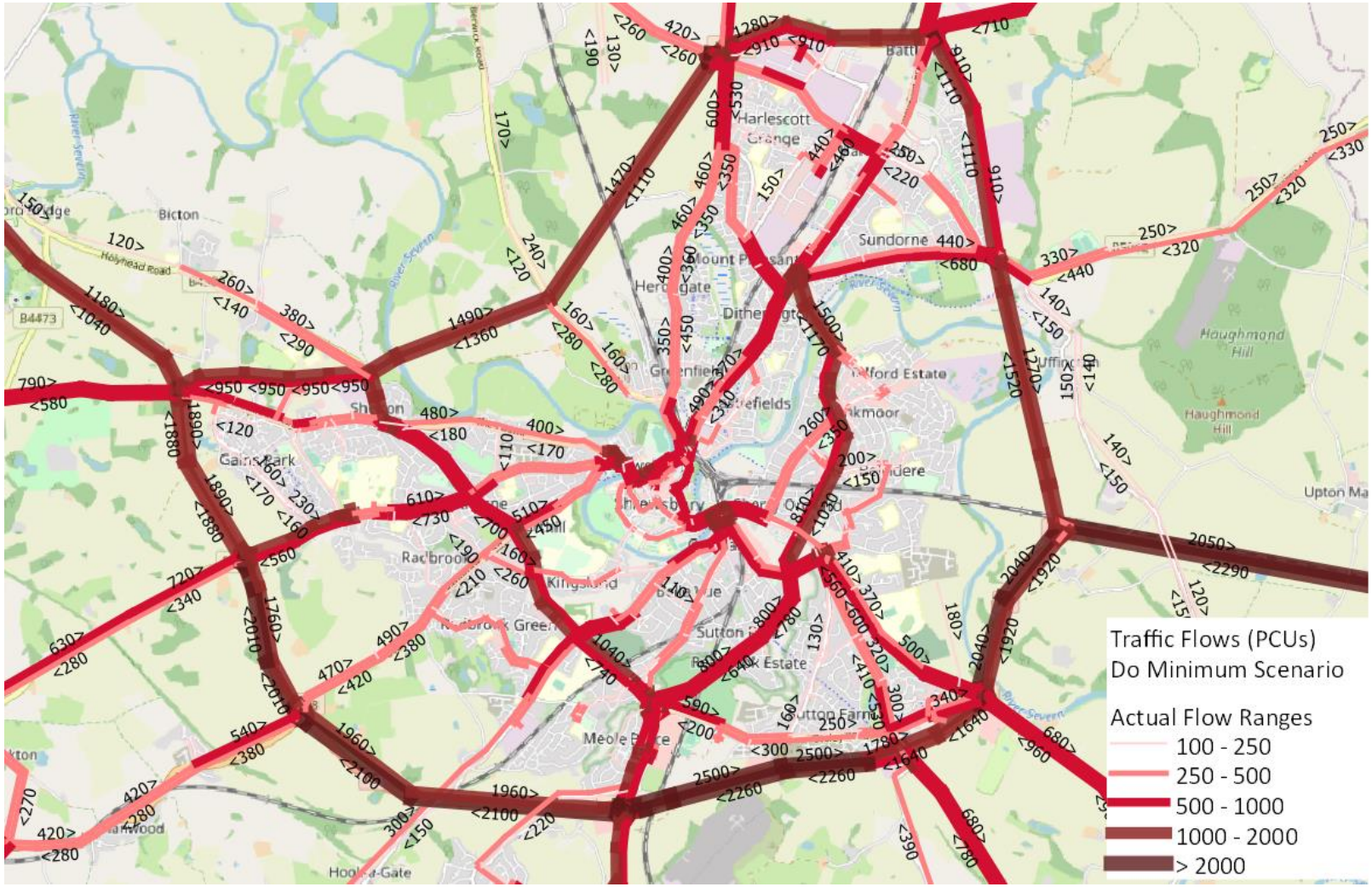
5.2.4. The Local Plan proposals are also likely to impact the section of the A49, between Preston Island and Battlefield roundabouts, where the proposed employment site SHR166 (Land to the West of A49) is located.

5.2.5. The is the first stage of the assessment for the identification of networkwide pinch points with a low level of service due to the additional housing and employment requirements of the Local Plan. It is recommended that, a detailed junction and corridor specific assessment to be undertaken at the next stage to understand the impacts more clearly and to identify possible mitigation measures.

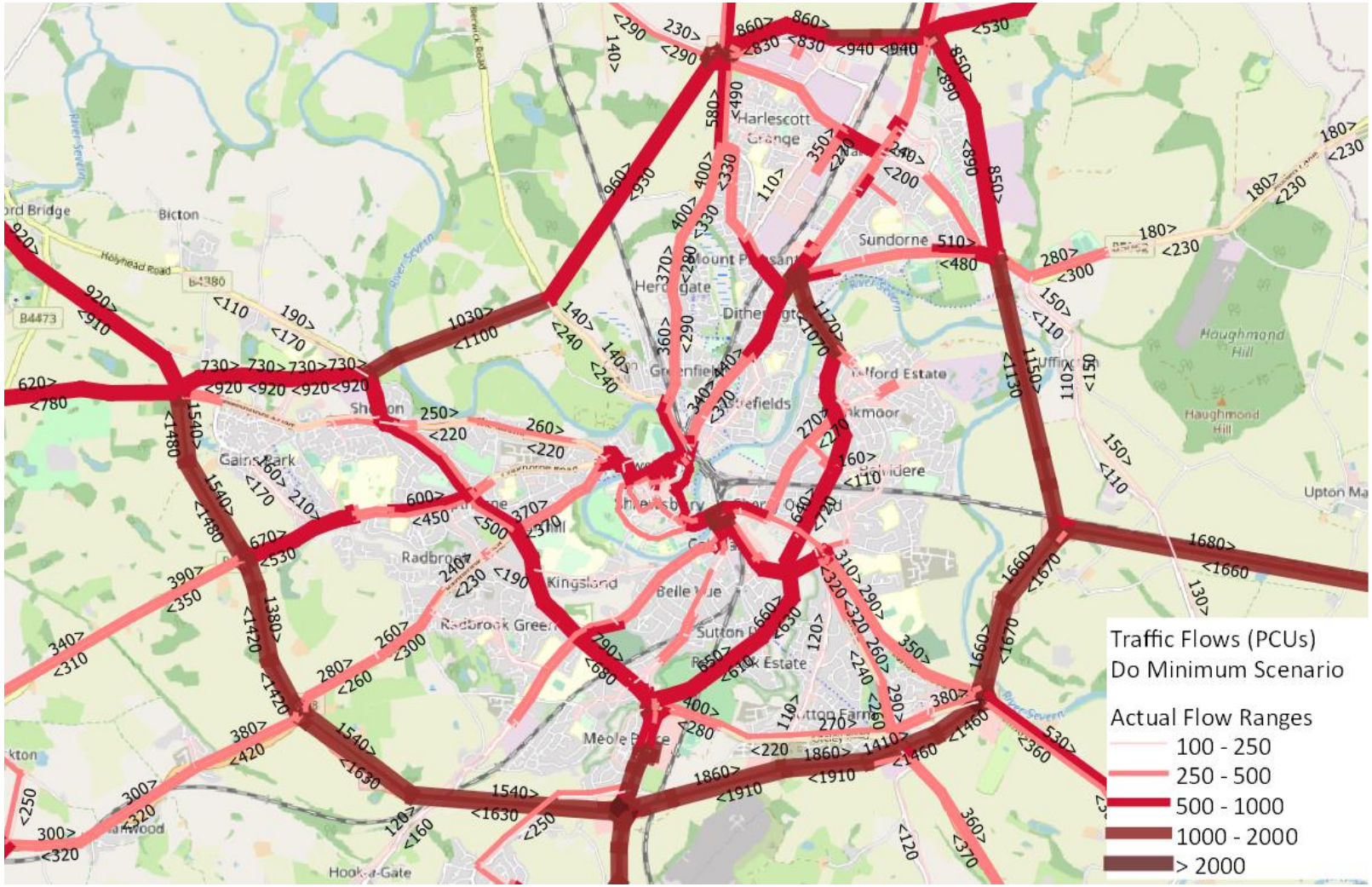
Appendix A

MODEL RESULTS – DETAILED PLOTS

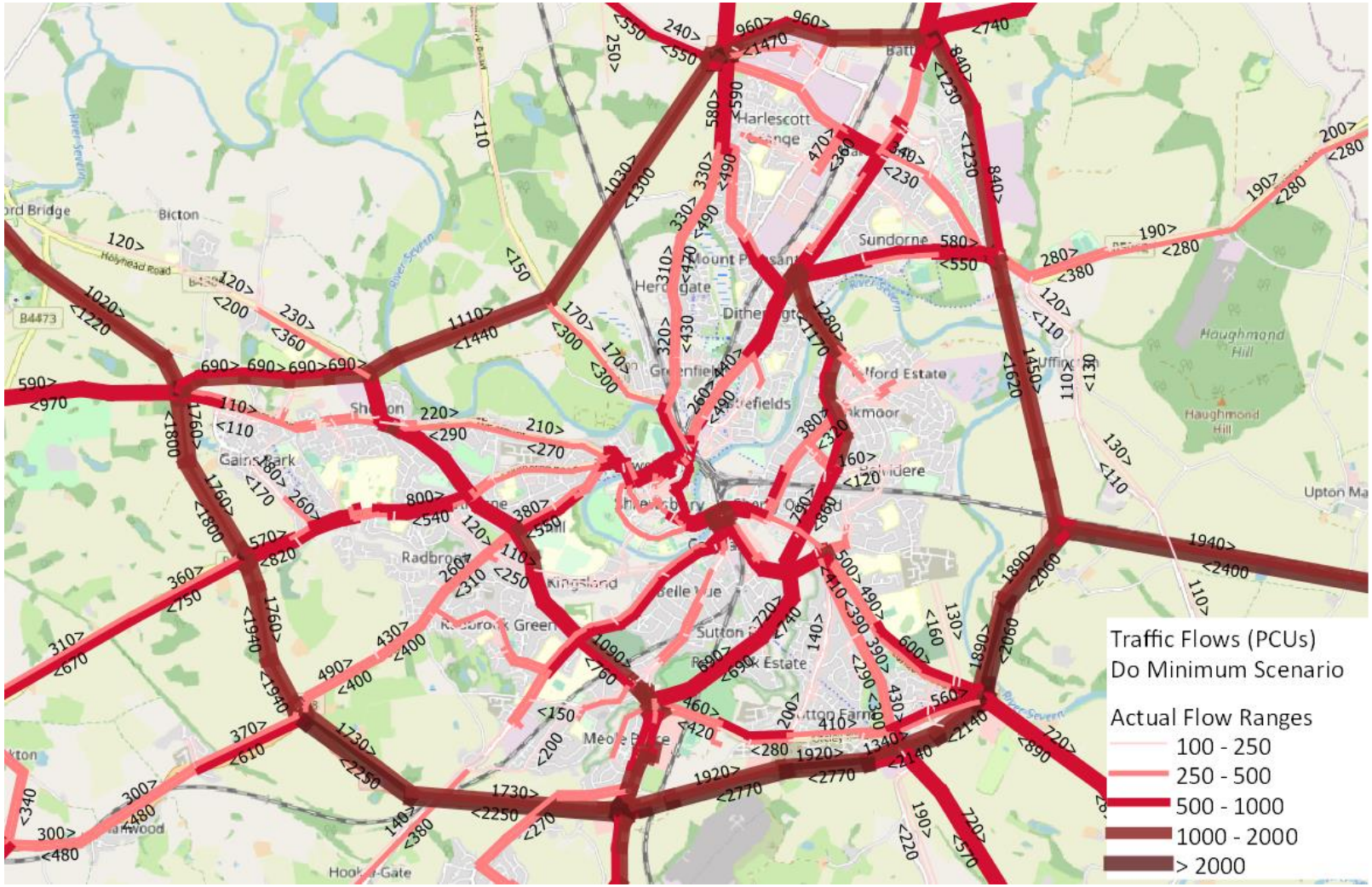
BASELINE 2038 - AM



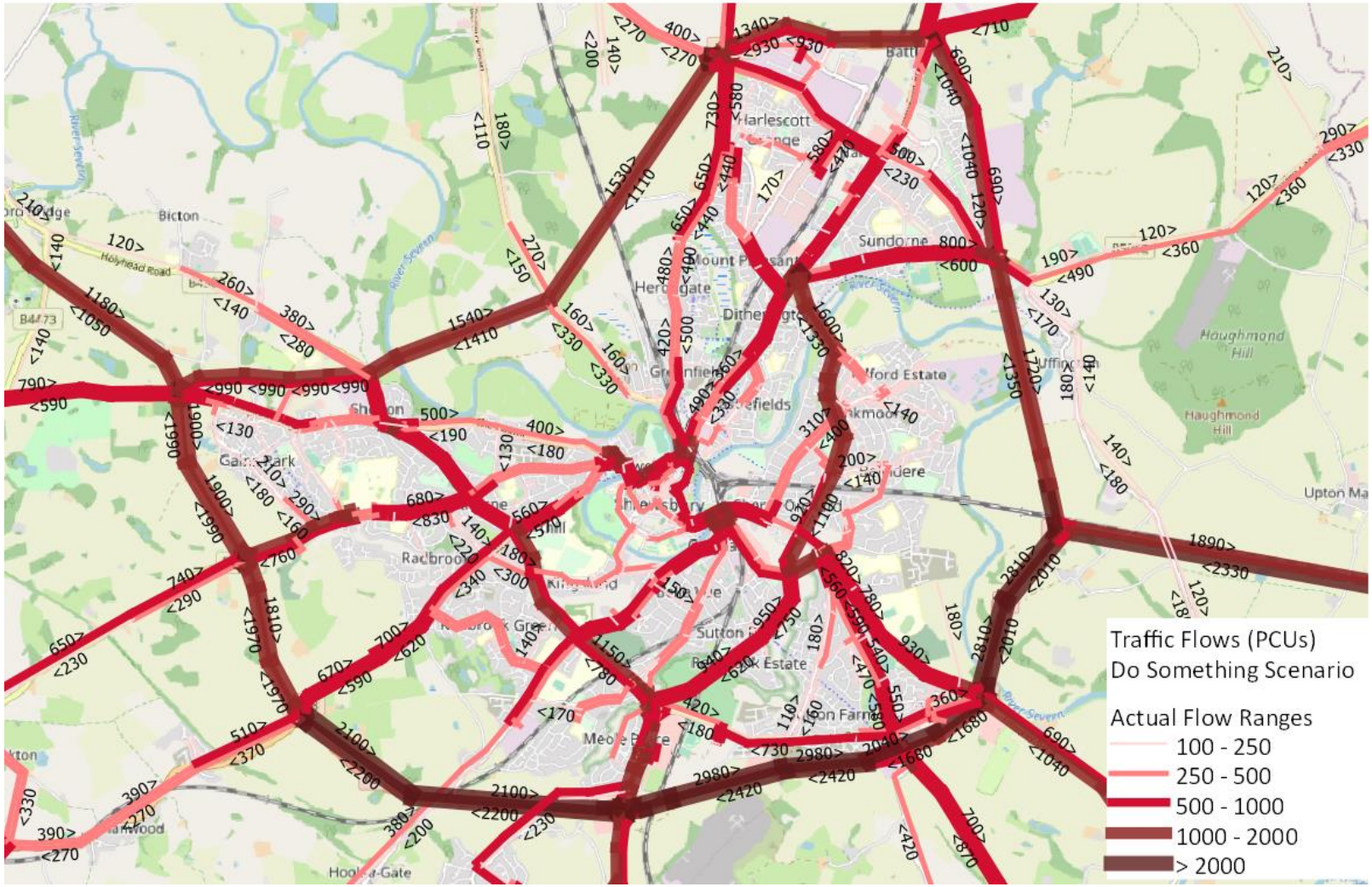
BASELINE 2038 - IP



BASELINE 2038 - PM



LOCAL PLAN TEST 2038 - AM



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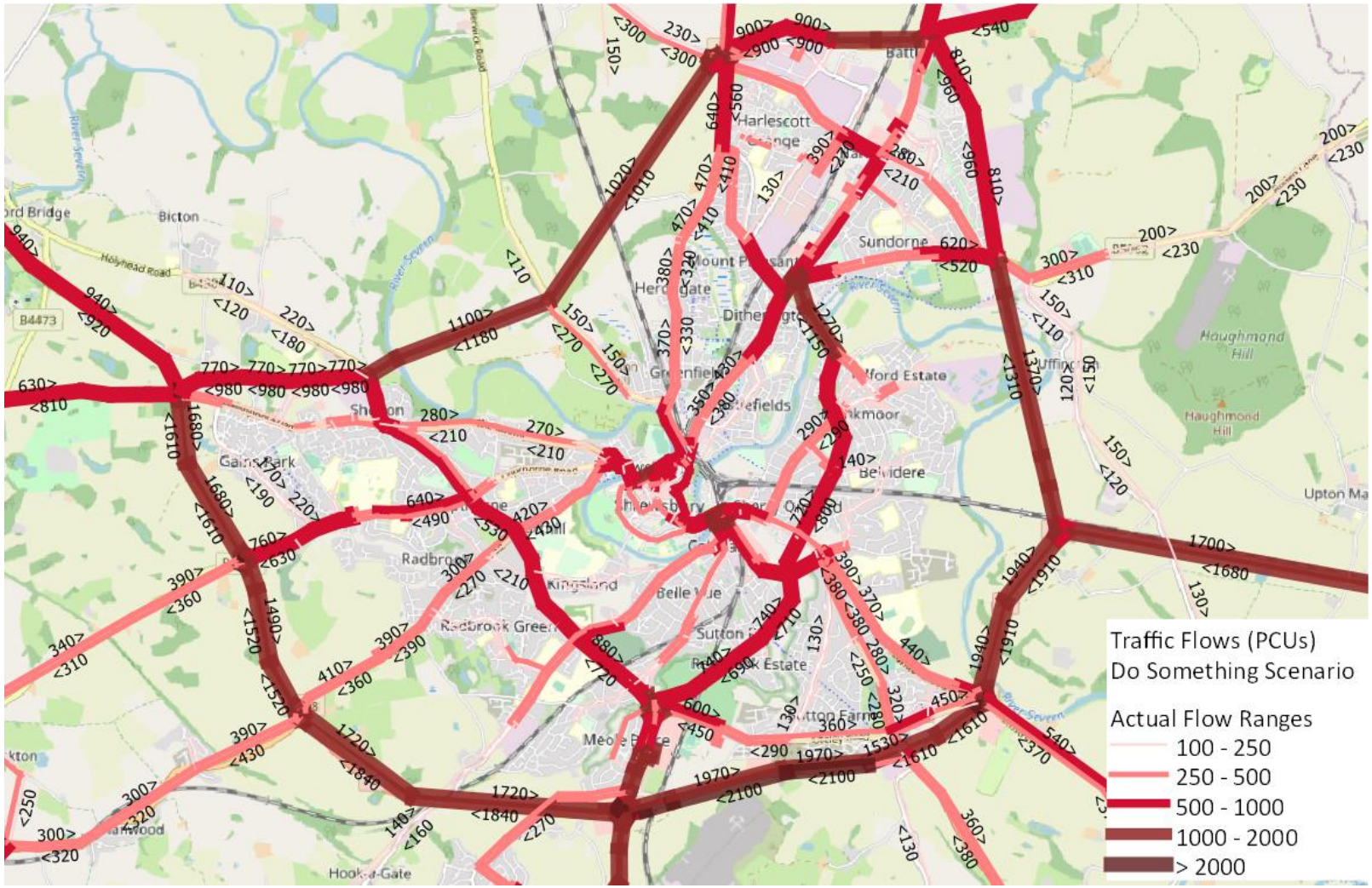

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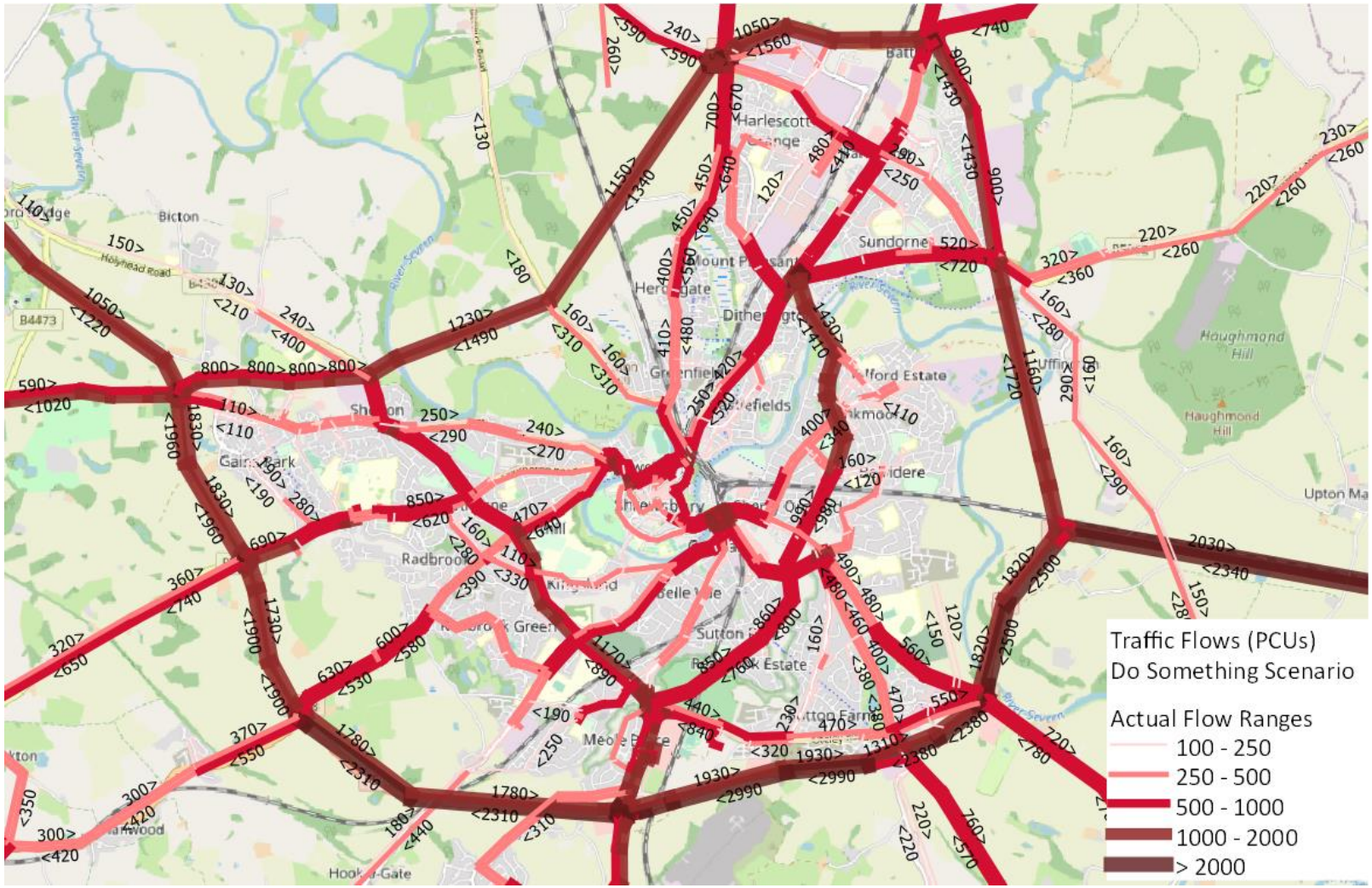
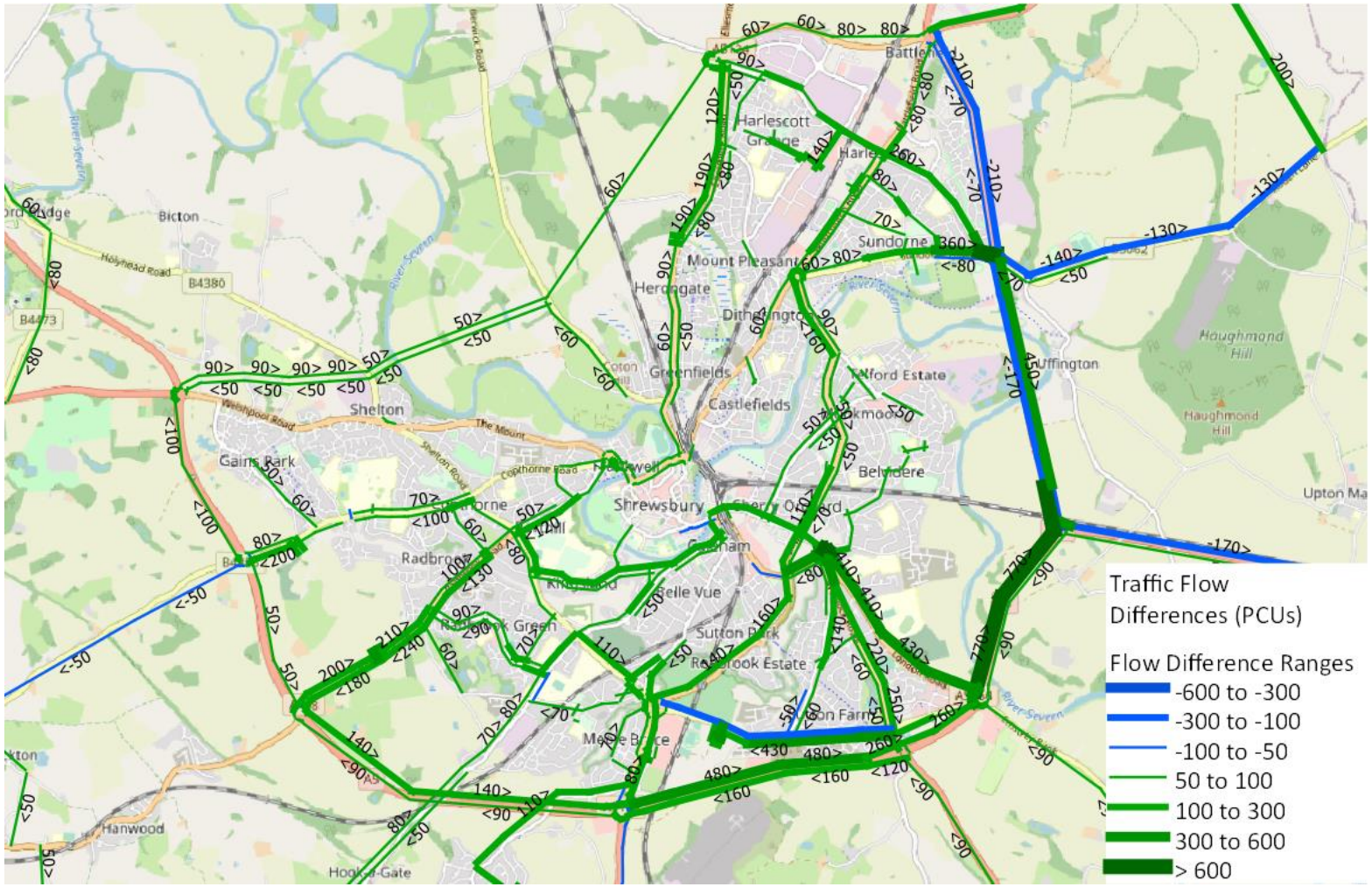


DIFFERENCE: BASELINE VS LOCAL PLAN TEST 2038 – AM



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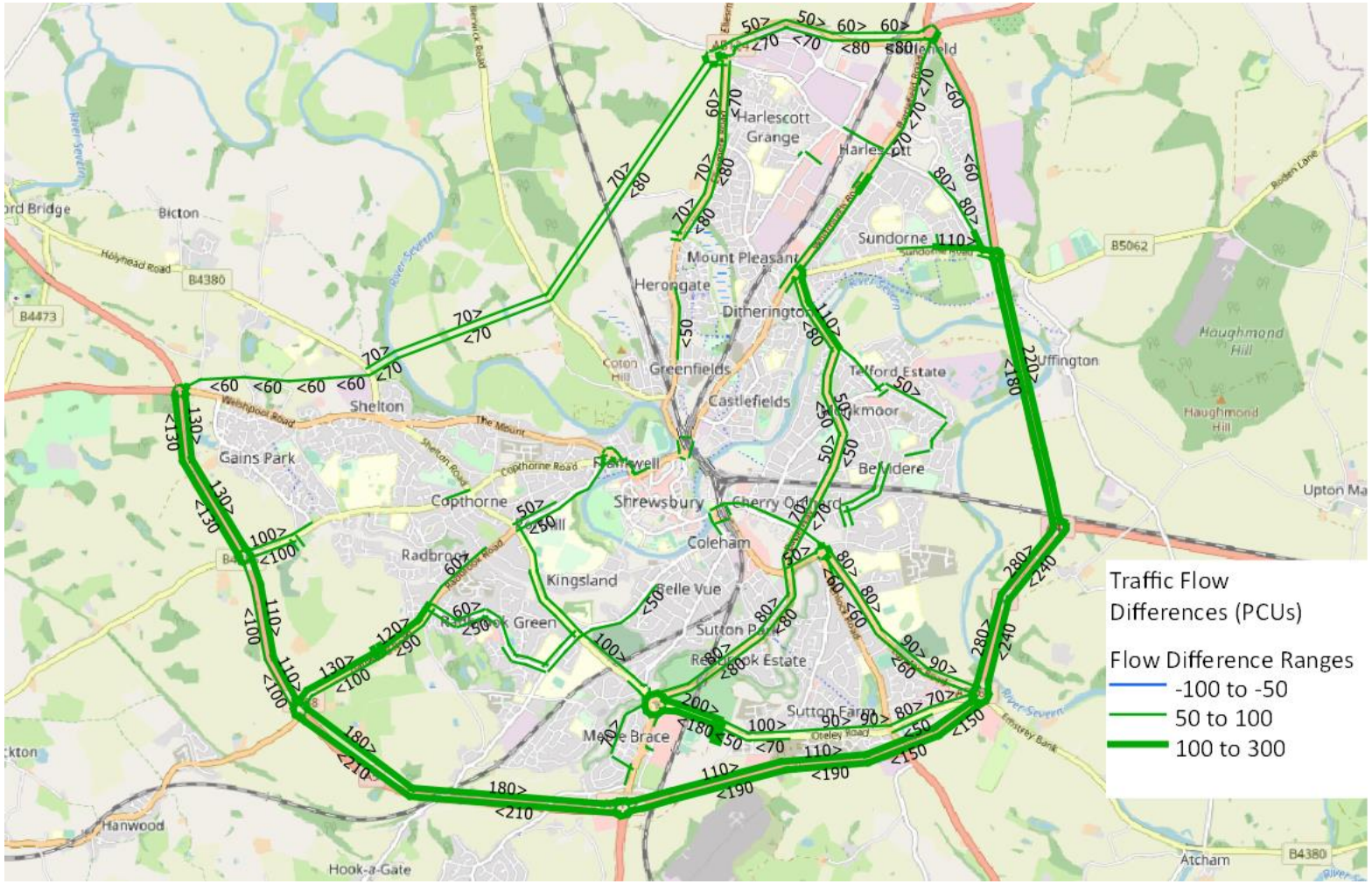

DIFFERENCE: BASELINE VS LOCAL PLAN TEST 2038 – PM