



Hertfordshire COMET: 2036 Local Plan Run 4.

St Albans District Council Output Analysis

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1. Introduction

1.1 Background

- 1.1.1 The development of the COMET model suite was commissioned by Hertfordshire County Council (HCC) in February 2015 in order to provide a structured evidence base for assessing transport policies and strategies on a consistent basis across the county. COMET is a multi-modal model with variable demand modelling capability.
- 1.1.2 Following the work to date on developing the COMET Base Year (2014) model, HCC commissioned AECOM to produce a 2031 forecast in 2017 which included the Local Plan aspirations (all employment and dwelling growth, regardless of certainty) for the 10 Hertfordshire districts. This included the growth aspirations in the following neighbouring areas: Luton, Buckinghamshire (all districts), part of Essex (i.e. Epping Forest, Harlow, and Uttlesford), and part of Cambridgeshire (i.e. South Cambridgeshire and Cambridge)¹.
- 1.1.3 AECOM was later commissioned to repeat the exercise, to include Local Plan aspirations (all employment and dwelling growth, regardless of certainty) for the 10 Hertfordshire districts in 2036. The growth aspirations in the following neighbouring areas were also updated: Central Bedfordshire, Luton, Buckinghamshire (all districts), part of Essex (i.e. Epping Forest, Harlow, and Uttlesford), and part of Cambridgeshire (i.e. South Cambridgeshire and Cambridge)². This test is known as the COMET 2036 Local Plan Run 4 (LP4). In St Albans District, LP4 includes more development sites in addition to the sites included for the strategic local plan modelled in the previous 2031 forecast.
- 1.1.4 LP4 includes the proposed transport schemes agreed with Hertfordshire districts in autumn 2018, and aligns with the Infrastructure Delivery Plans and Transport Strategies at that time. A full list of all transport schemes included in LP4 is detailed in the "*Hertfordshire COMET: Local Plan Run 4 Forecasting Report*" issued to HCC in April 2019. Schemes that fall into St Albans District are in Appendix A. Compared to the COMET Base Year model, over 300 schemes are included in LP4. In the St Albans District Council (SADC) area LP4 contains 39 highways, 5 public transport and 6 mode shift schemes compared to the Base Year model. Section 6 also includes commentary on how the GTP schemes could further influence future traffic impacts. This is as many could not be modelled in COMET therefore a qualitative assessment is provided. Commentary about possible linkages to GTP packages is provided in Sections 5 and 6.
- 1.1.5 LP4 also includes revised light and heavy goods vehicle (LGV/HGV) growth projections detailed in the Department for Transport's Road Traffic Forecast 2018 (RTF 2018). Growth projections of LGV/HGV traffic have significantly dropped in RTF 2018 compared to those used in previous 2031 Local Plan COMET scenarios (from RTF 2015). Similarly, buffer speed changes in RTF 2018 were implemented in LP4. These speed changes simulate changes in speeds on the wider road network outside of Hertfordshire.
- 1.1.6 The forecast is a reflection of the total cumulative growth within the county rather than a test of any specific (set of) developments and/or schemes.

¹ For the rest of Great Britain, the growth in employment and population in the COMET forecast is based on National Trip End Model (NTEM) 7.2 projections.

² For the rest of Great Britain, the growth in employment and population in the COMET forecast is based on National Trip End Model (NTEM) 7.2 projections.

1.2 Purpose of this Document

- 1.2.1 As part of the LP4 run, high-level results for the county will be presented in the form of a user-friendly presentation and supporting Forecasting Report. These results are unlikely to give sufficient detail for evidence to support the updated SADC Local Plan submission. As a result, more detailed analysis is required and is provided in this report.
- 1.2.2 This report reflects the requirements detailed in the “*SADC additional COMET LP4 run interpretation*” Specification Note, issued by AECOM on 3 December 2018.

1.3 Previous Local Plan COMET Forecasting

- 1.3.1 In summer 2018 AECOM issued SADC specific analysis of the results from the COMET 2031 Local Plan Run 3 (LP3). This modelling scenario was based on outdated housing and employment projections across all Districts in Hertfordshire. LP4 is based on updated housing and employment projections. Comparisons to results from LP3 are made in this report, however the caveats in the following section should be noted.
- 1.3.2 Planning data in St Albans District in LP4 comprised of 17,750 dwellings and 6,210 jobs. This was an increase of 8,930 dwellings and a reduction of 7,670 jobs compared to planning data used in LP3.

1.4 Caveats

- 1.4.1 Caution should be exercised when comparing the results of the LP4 and LP3. Primarily, the forecast years, transport networks and spatial distribution of developments are considerably different. LP4 includes a number of updates compared to LP3, such as the inclusion of planning data for Central Bedfordshire, updates from RTF 2015 to RTF 2018 and over 160 additional transport schemes. A comparison however can give high-level indication of the impacts of developments and schemes in the area.
- 1.4.2 As detailed in the Specification Note, it has not been possible to model some of the transport schemes proposed in strategies (such as the Growth and Transport Plans) covering the St Albans area due to their small localised scale or nature (e.g. pedestrian and cycle measures that do not affect highway capacity). Transport initiatives considered as part of Local Plan 4 and this report are outlined in Appendix C. Analysis in this report highlights the possible interactions with these schemes at a qualitative level. Section 6 also includes more detailed commentary. Schemes modelled as part of LP4 are presented in Appendix A.
- 1.4.3 HCC requested that the forecast scenario should include an element of modal shift (from highway to other modes) in selected areas to represent the district's proposals to encourage sustainable travel and the impact of sustainable transport measures from the Growth and Transport Plan. Mode shift in St Albans is applied to reflect the high number of internal trips and to reduce the number of external trips on the network. Reflecting this in a more realistic manner would require changes to the VDM which is currently outside the scope of Local Plan forecasting.
- 1.4.4 The modal shift in the forecast scenario is achieved by applying a factor (in COMET's Variable Demand Model) to the cost of highway trips originating in the selected zones. By raising the cost of undertaking a journey by car, this factor encourages trips to be made by alternative means (i.e. public transport or sustainable travel). The level of modal shift specified by HCC and achieved for these zones is approximately 5%.

- 1.4.5 Analysis focuses on results from the AM peak (0800 to 0900) and PM peak (1700 to 1800), however, results will also be produced for the Inter peak (average hour between 1000 and 1600). Results from the Inter peak will only be reported if they vary considerably from those seen in the AM and PM peaks.

1.5 Report Structure

- 1.5.1 This report covers the following areas:

- Town Based Distribution Plots;
- 2036 Traffic Conditions in the SADC Area;
- Journey Time Route Analysis;
- Development Flow Analysis;
- Scheme Mitigation; and
- Summary and Discussion

2. Town Based Distribution Plots

2.1 Introduction

- 2.1.1 To provide a more detailed representation of trips that travel to and from St Albans, Harpenden and Eastern Hemel in LP4, the inbound and outbound town based trip distribution plots for both AM and PM peak periods are detailed in this section. Select link analysis (SLA) of trips to and from zones representing the town centres of the urban areas provides this analysis. The thicker the green bar, the higher the flow. Snapshots of the urban town centres are also shown in the top left hand corner of each figure.

2.2 St Albans

- 2.2.1 Trips into St Albans in the AM and PM peaks show that the majority of traffic uses strategic routes to access the town centre. These include Luton Road and cross country routes along St Albans Road from the north and the A1081 and Watford Road for access to the town centre from the M25 (Junctions 21a and 22). Traffic from Hemel Hempstead uses the A4147, A5183 and minor routes such as Punch Bowl Lane and Hogg End Lane. From the east, the majority of traffic accesses St Albans using the A1057 or Coopers Green Lane.
- 2.2.2 The distribution of traffic from St Albans in the AM and PM peaks follows a similar distribution patterns. Outbound trips have a greater concentration of traffic on strategic routes (including the A414 and A1(m). Northbound trips use the A1081 and A5183. Traffic uses Watford Road and the A1081 for access to the M25. Traffic to Hemel Hempstead uses the A4147 and the A5183. The PM peak shows greater use of strategic routes from the north and east but some evidence of use of minor routes from the west.

Figure 1: Inbound trips to St Albans Town Centre 2036 AM Peak

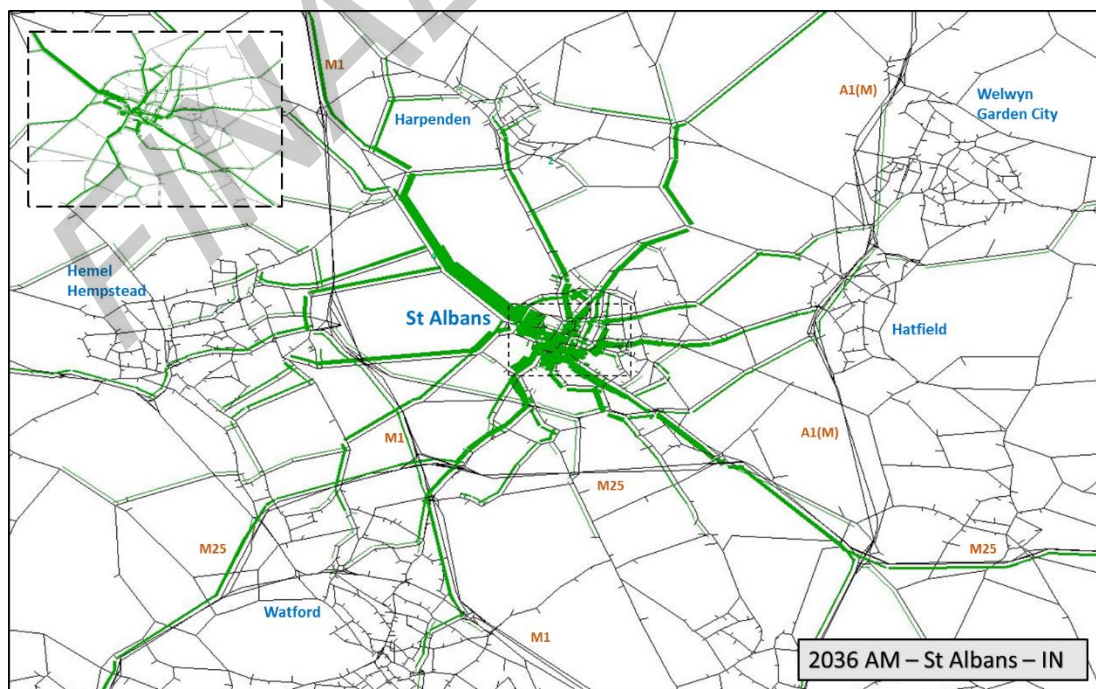


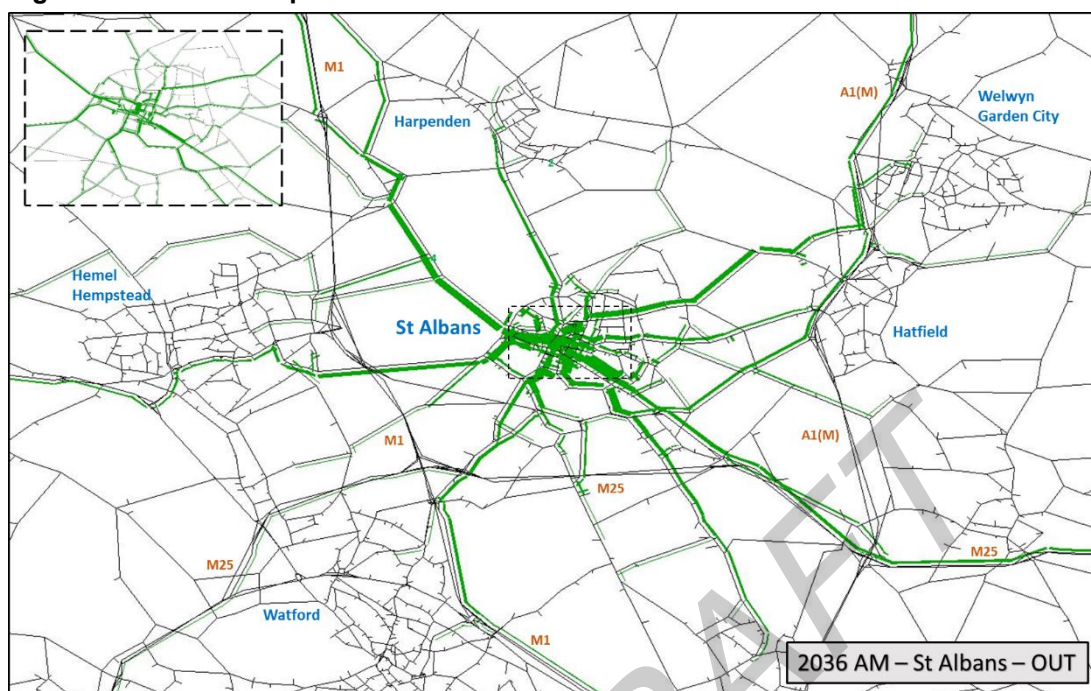
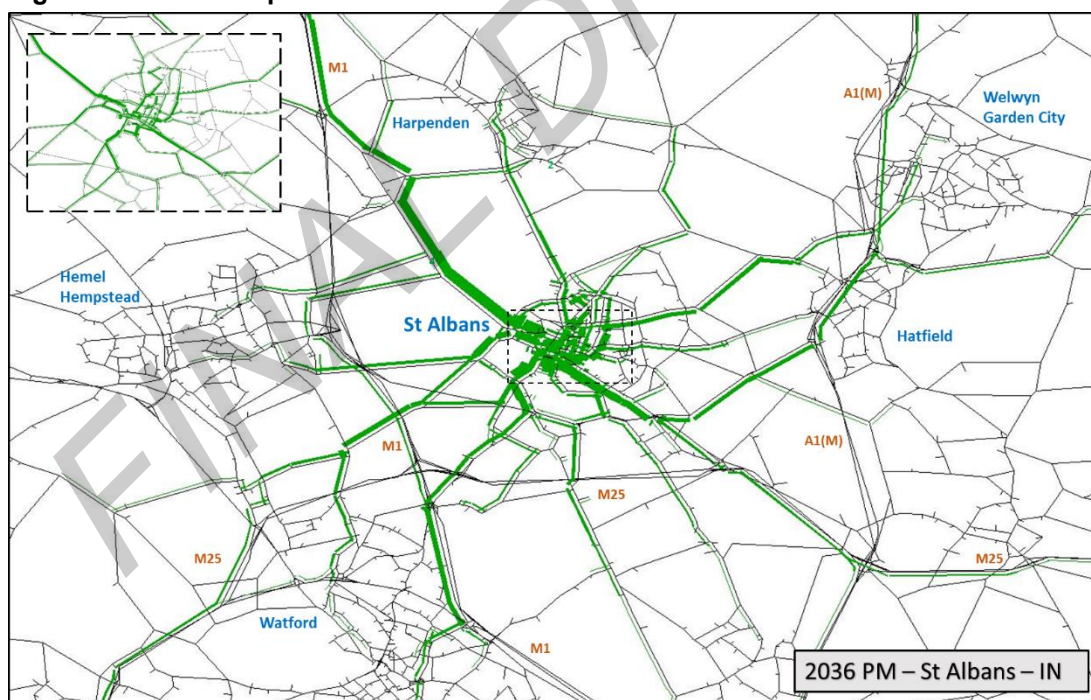
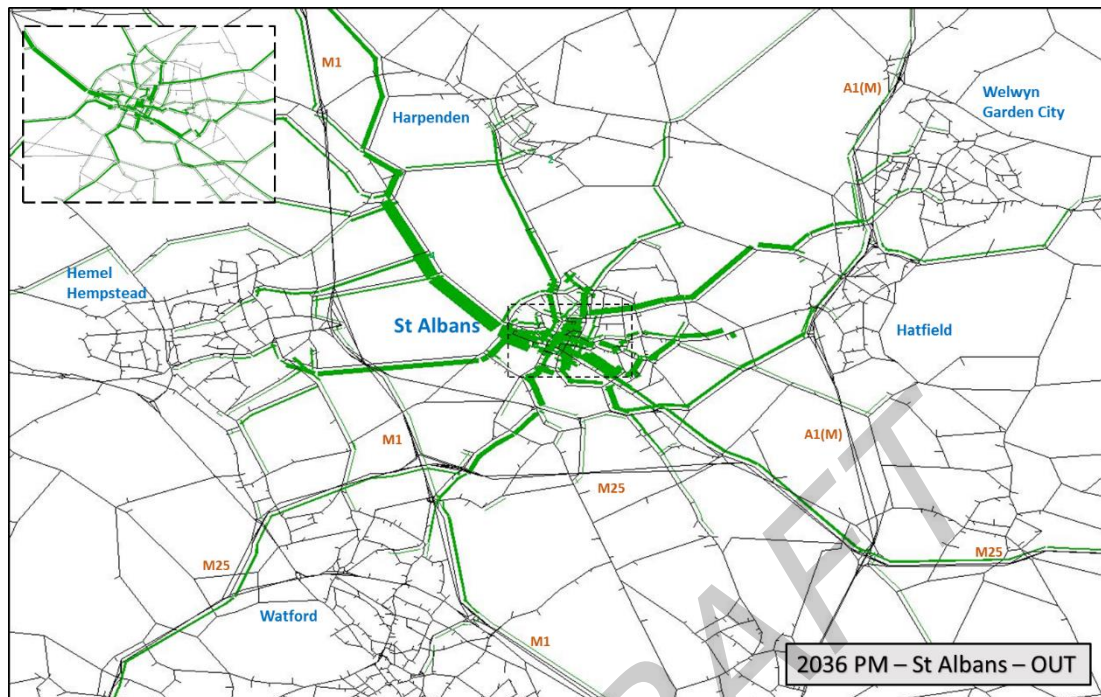
Figure 2: Outbound trips from St Albans Town Centre 2036 AM Peak**Figure 3: Inbound trips to St Albans Town Centre 2036 PM Peak**

Figure 4: Outbound trips from St Albans Town Centre 2036 PM Peak

2.3 Harpenden

- 2.3.1 Trips to/from Harpenden in the AM and PM peaks follow similar patterns. From the south traffic uses the M1 or the A1081 to access the town centre, while from the north traffic uses the M1, B653 or Luton Road. Traffic from Hemel Hempstead accesses the town centre using the B487 while traffic from the east uses the B653 to access Harpenden. Traffic from the west also uses minor roads to access the town.
- 2.3.2 Trips from Harpenden follow similar routing in AM and PM peaks. Traffic accesses the M1 via either Junction 9 or 10 depending on direction. Traffic to Luton uses either Luton Road or the B653. The majority of eastbound traffic uses the B653 cross country to access the A414. Shorter southbound trips use Harpenden Road to travel towards St Albans. East and west bound traffic also use minor routes with larger volumes of traffic travelling through Wheathampstead and Wheathampstead Road from the east.

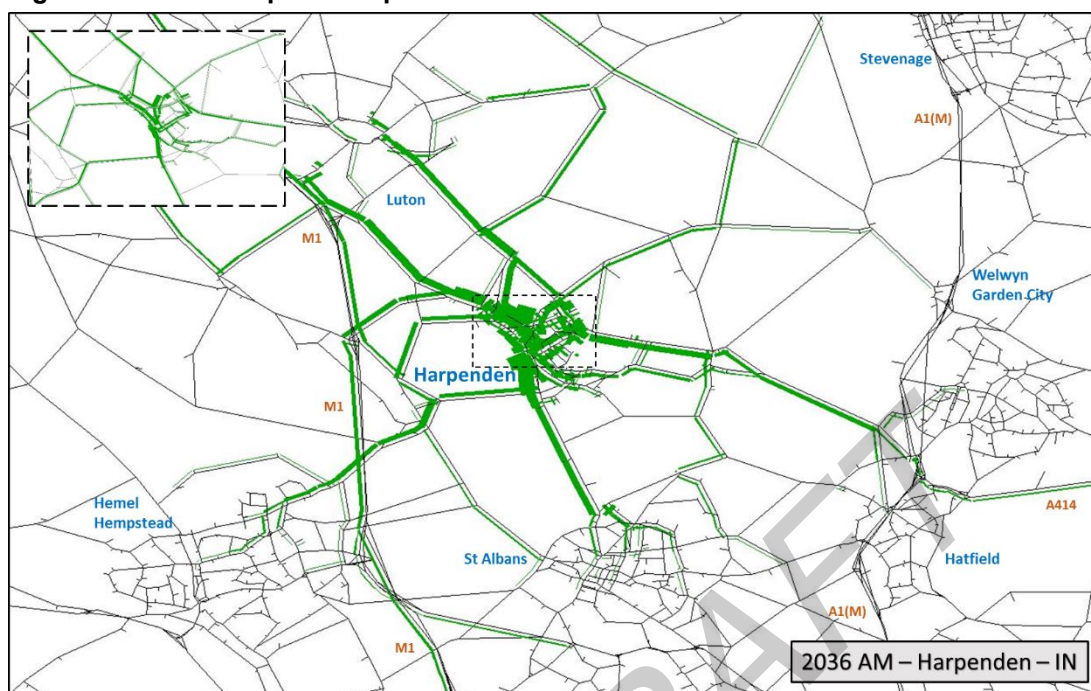
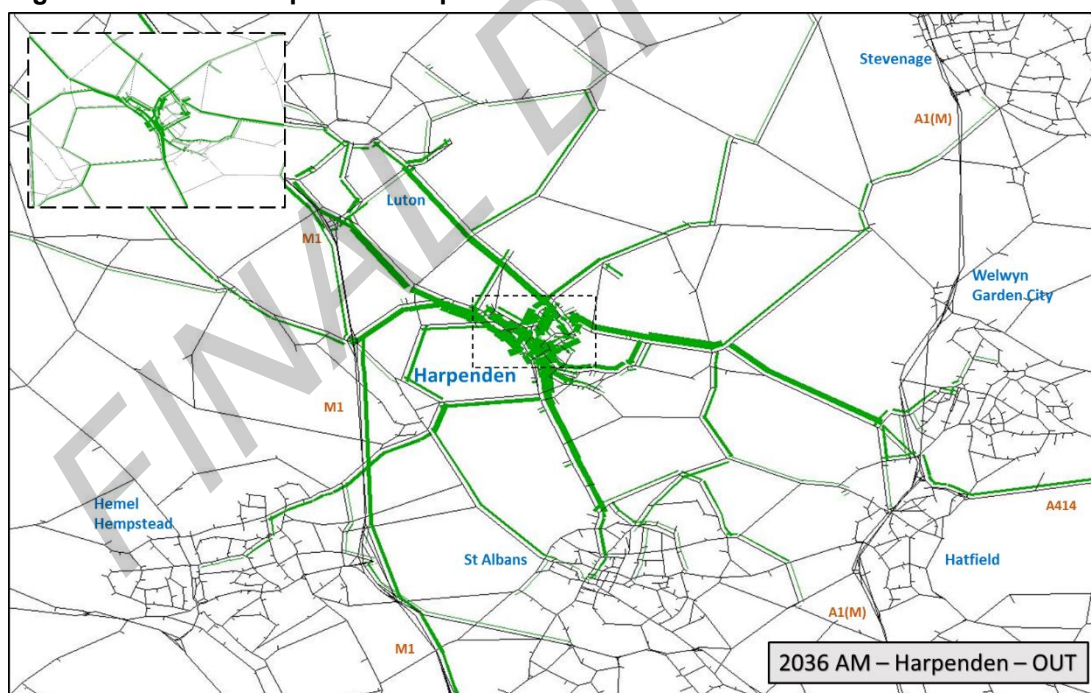
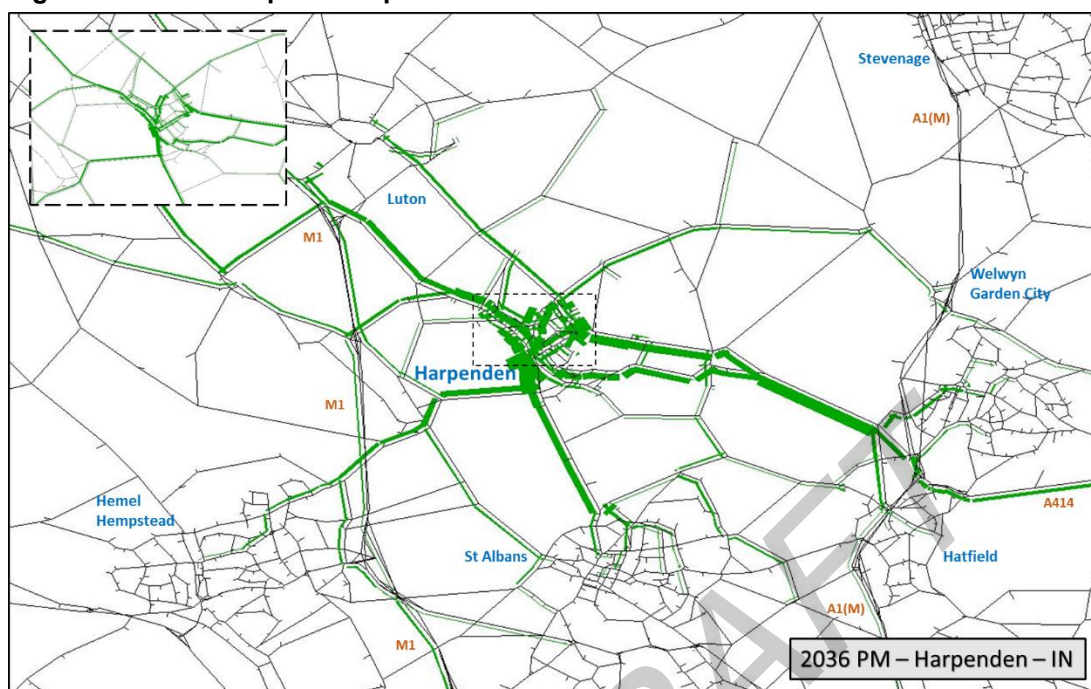
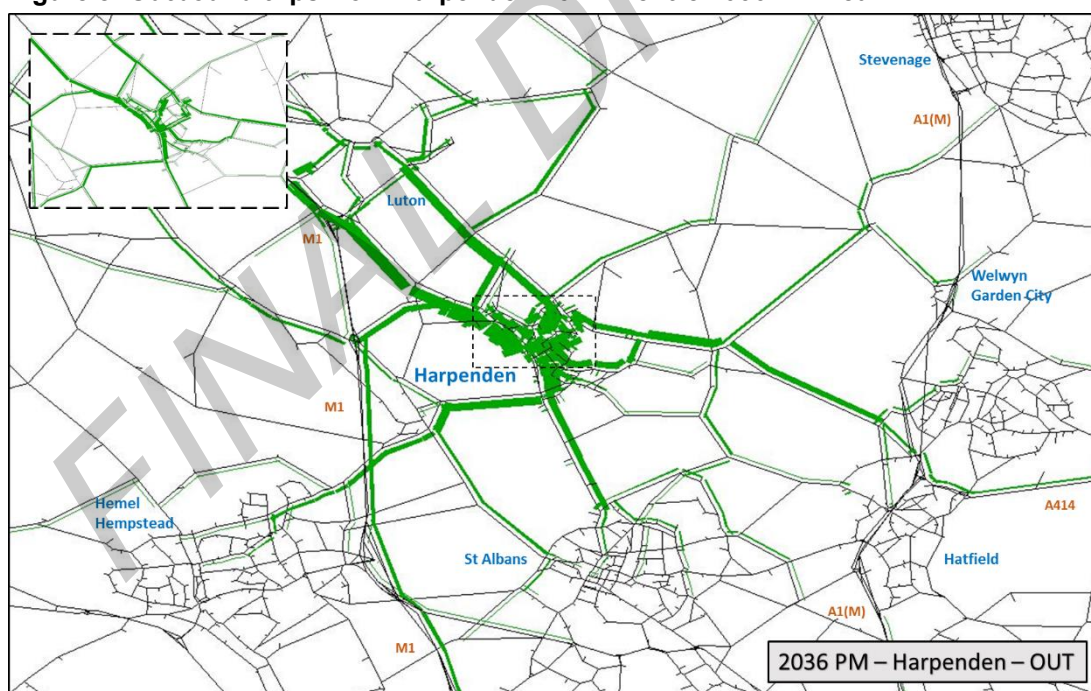
Figure 5: Inbound trips to Harpenden Town Centre 2036 AM Peak**Figure 6: Outbound trips from Harpenden Town Centre 2036 AM Peak**

Figure 7: Inbound trips to Harpenden Town Centre 2036 PM Peak**Figure 8: Outbound trips from Harpenden Town Centre 2036 PM Peak**

2.4 Eastern Hemel Hempstead

- 2.4.1 In both AM and PM peaks, traffic from the north and south use the M1 to access Eastern Hemel Hempstead. Traffic from the east accesses the Eastern Hemel area either via the A414 or the M25 then M1. The A41 is the key route used to access Eastern Hemel from the west. However, traffic from Watford and the M25 west also use alternative routes to the A41 to access the area (Bedmond Road and A4251 Watford Road). From the south, the M1 and M25 are key strategic routes used for access to the area.
- 2.4.2 Similarly, traffic from Eastern Hemel Hempstead use the same routes to access nearby areas. The M1 is used for most strategic trips to and from the developments. More localised traffic uses the A41, A414, and the M25 for east and west movements. Some evidence of alternative routes to the A41 in use for journeys to Watford and the M25. The PM peak shows greater use of B487 Redbourn Road and local routes in the Redbourn area.
- 2.4.3 It can be recognised that trips to and from Eastern Hemel Hempstead have a greater impact on the strategic motorway network which is to be expected given the growth planned in this area and proximity to the M1.
- 2.4.4 It should be noted that even though the zones which represent East Hemel are located in the SADC area, their access points to the highway network are within the Dacorum District.

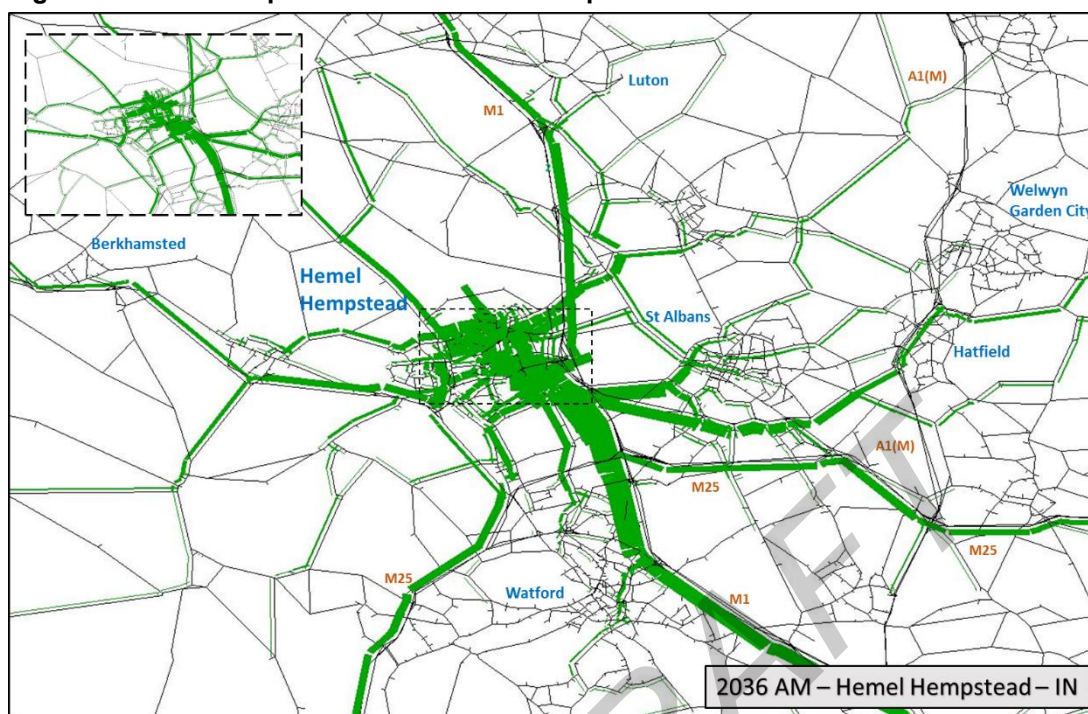
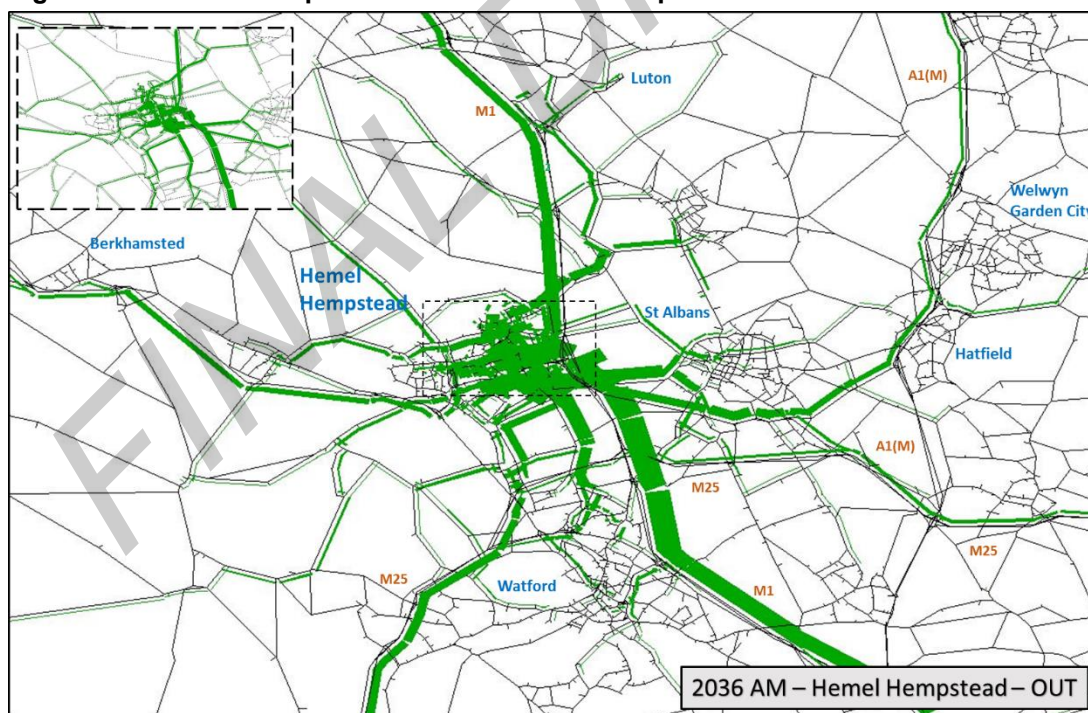
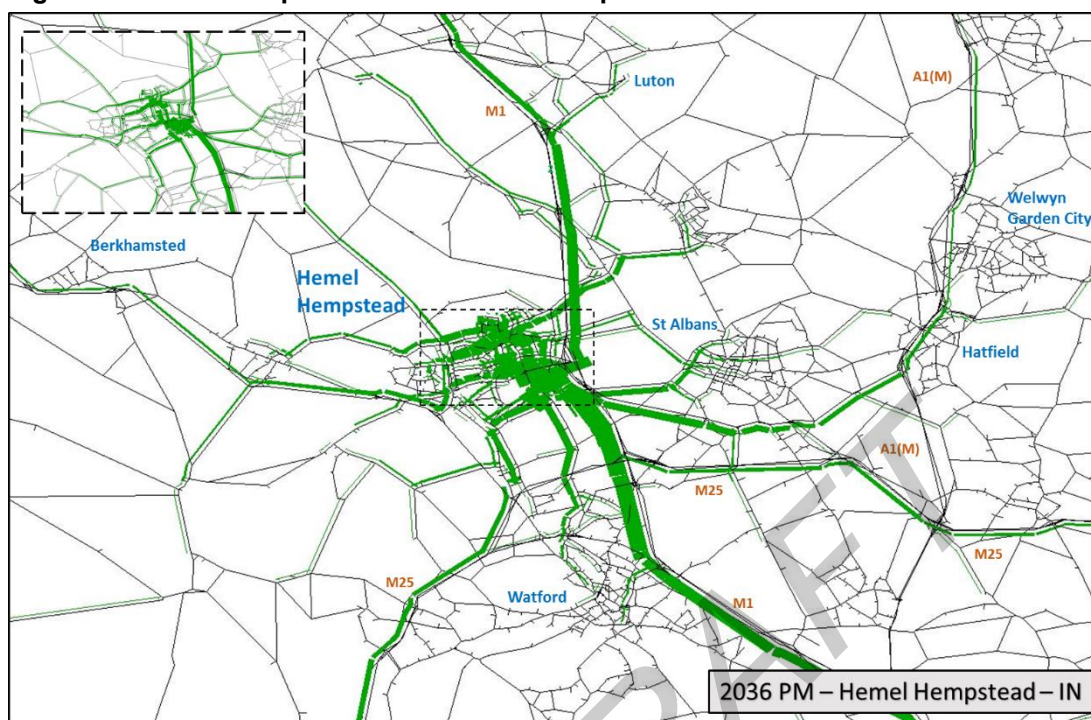
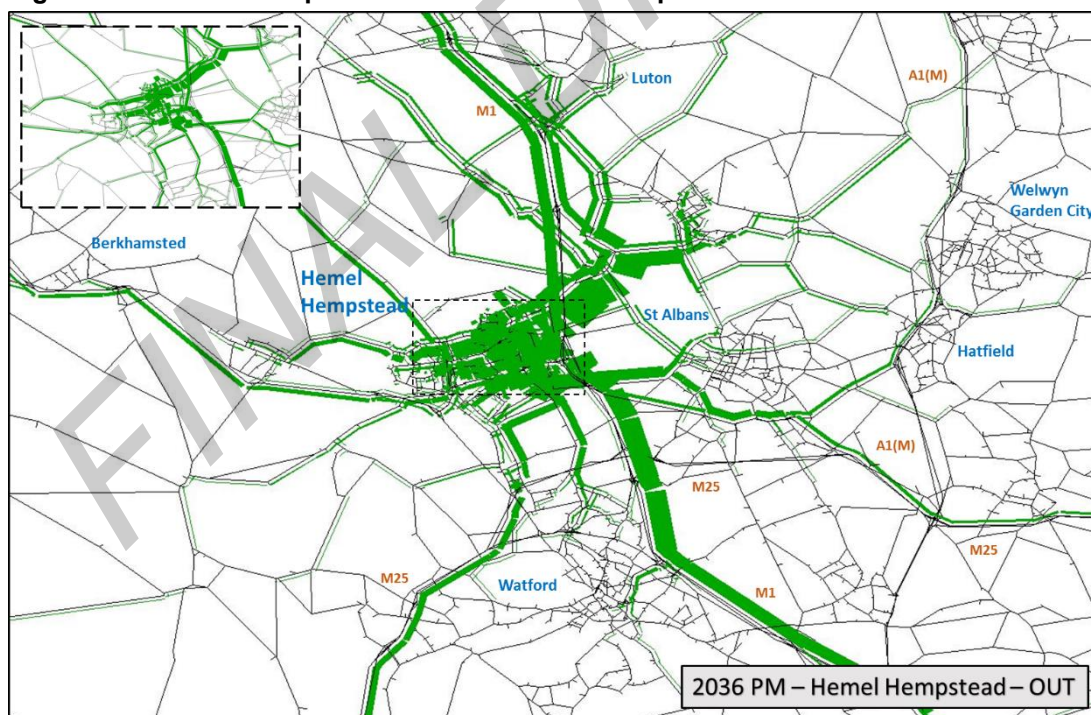
Figure 9: Inbound trips to eastern Hemel Hempstead 2036 AM Peak**Figure 10: Outbound trips from eastern Hemel Hempstead 2036 AM Peak**

Figure 11: Inbound trips to eastern Hemel Hempstead 2036 PM Peak**Figure 12: Outbound trips from eastern Hemel Hempstead 2036 PM Peak**

3. 2036 Traffic Conditions in the SADC Area

3.1 Introduction

3.1.1 SADC is keen to understand the LP4 traffic conditions at 24 key junctions detailed below:

- Peahen, King William IV, Ancient Britton, Sandpit Lane / Beechwood Avenue, King Harry junctions in St Albans
- A1081 Luton Road /Station Road, A1081 / The Common and A1081 Luton Road / Redbourn Road – Harpenden
- A414 corridor junctions (A414 / A1081 London Colney), A414 /A405, Park Street), A414 / Shenley Lane, Napsbury.
- A1057 Hatfield Road junction with Station Road, Smallford
- A405 / Watford Road junction (the Noke) and A405 /Tippendell Lane
- Harper Lane / Shenley Road junction and Harper Lane / Watling Street junction
- A414 / M1 junction 8
- A414 / Green Lanes Junction, Hemel Hempstead.
- Redbourn Road junctions, Hemel Hempstead.
- Leverstock Green Road / Bedmond Road, Hemel Hempstead.
- B653 Cory Wright Way / Marford Road junction, Wheathampstead
- M25 junctions 21, 21a & 22.

3.2 LP4 Results

3.2.1 To assess traffic conditions in the SADC area, the following plots illustrate node (junction) delay and link (road) stress (also known as V/C, volume over capacity) across the SADC network:

- Node delay is the average delay a vehicle will experience at a junction, regardless of the direction of approach or movement made. It is averaged across all movements at junctions and weighted by flows; and
- Link stress (or V/C) represents the level of congestion along a link (road). Below 80% roads are expected to be relatively free-flowing with minimal delays. Between 80% and 90% roads will begin to show signs of congestion, speeds will lower and delays will occur at junctions. Over 90% the road will be very congested with low average speeds and delays expected at junctions.

3.2.2 The key junctions listed in paragraph 3.1.1 are annotated on the following figures using the legend detailed in Table 1.

Table 1: Key junctions assessed around SADC

1	St Albans	A	Peahen
		B	King William IV
		C	Ancient Britton
		D	Sandpit Lane/Beechwood Avenue
		E	King Harry
2	Harpenden	A	A1081 Luton Road/Station Road
		B	A1081/The Common
		C	A1081 Luton Road/Redbourn Road
3	London Colney	A	A414/A1081 London Colney
	Park Street	B	A414/A405
	St Albans	C	A414/Shenley Lane, Napsbury
4	Smallford	-	A1057 Hatfield Road/Station Road
5	St Albans	A	A405/Watford Road (the Noke)
		B	A405/Tippendell Lane
6	Radlett	A	Harper Lane/Shenley Road
		B	Harper Lane/Watling Street
7	Westwick Row	-	A414/M1 junction 8
8	Hemel Hempstead	-	A414/Green Lanes
9	Hemel Hempstead	A	Redbourn Road/Queensway
		B	Redbourn Road/Link Road
		C	Redbourn Road/Shenley Road
		D	Redbourn Road/Cherry Tree Lane
10	Hemel Hempstead	-	Leverstock Green Road/Bedmond Road
11	Wheathampstead	-	B653 Cory Wright Way/Marford Road
12	St Albans	A	M25 junction 21
		B	M25 junction 21a
		C	M25 junction 22

3.2.3 The following plots (figures 13 to 15) detail areas of stress / junction delay in LP4.

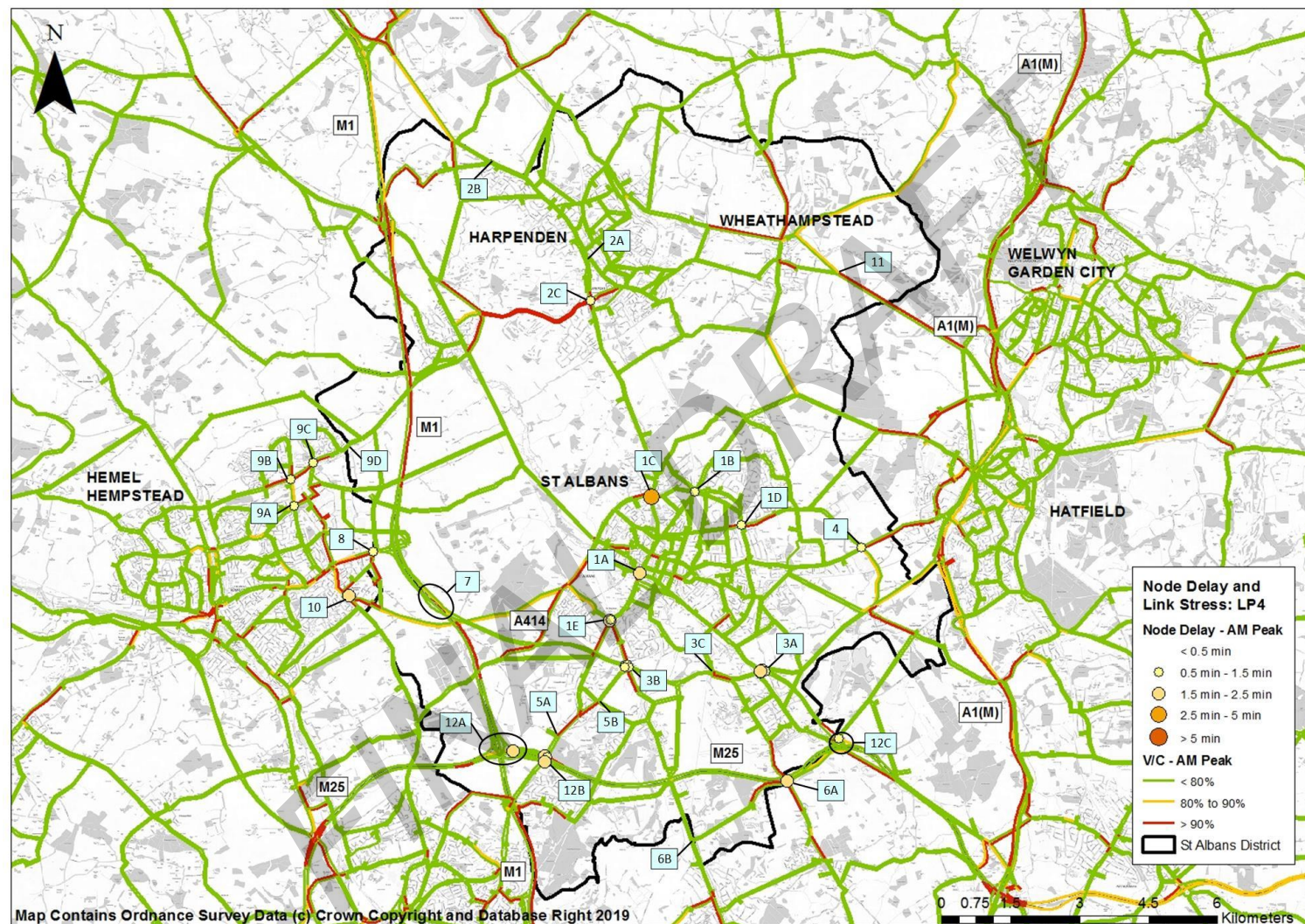
Figure 13 Map showing congestion and node delay at key junctions in 2036 Local Plan v4 AM Peak

Figure 14 Map showing congestion and node delay at key junctions in 2036 Local Plan v4 Inter Peak

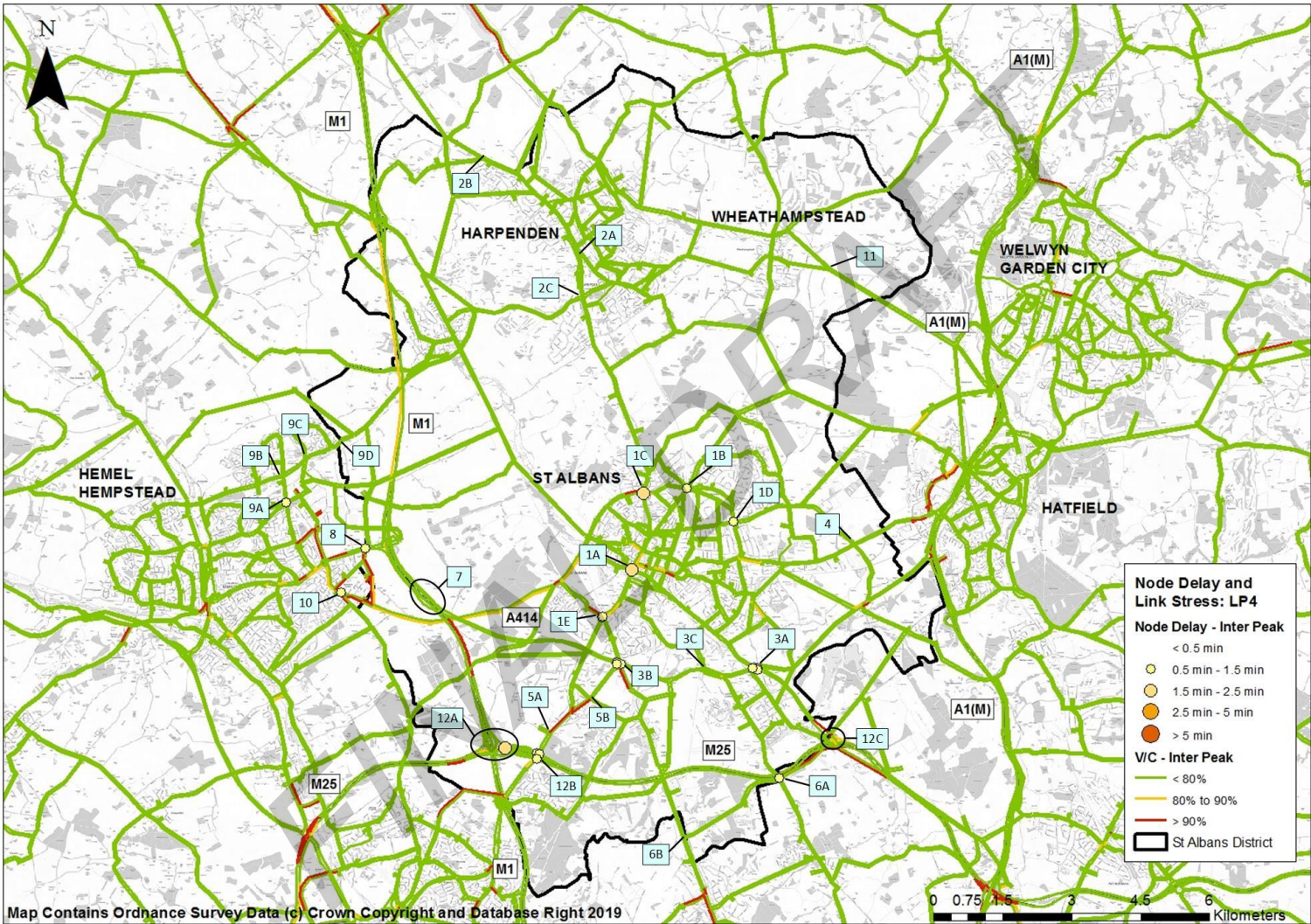
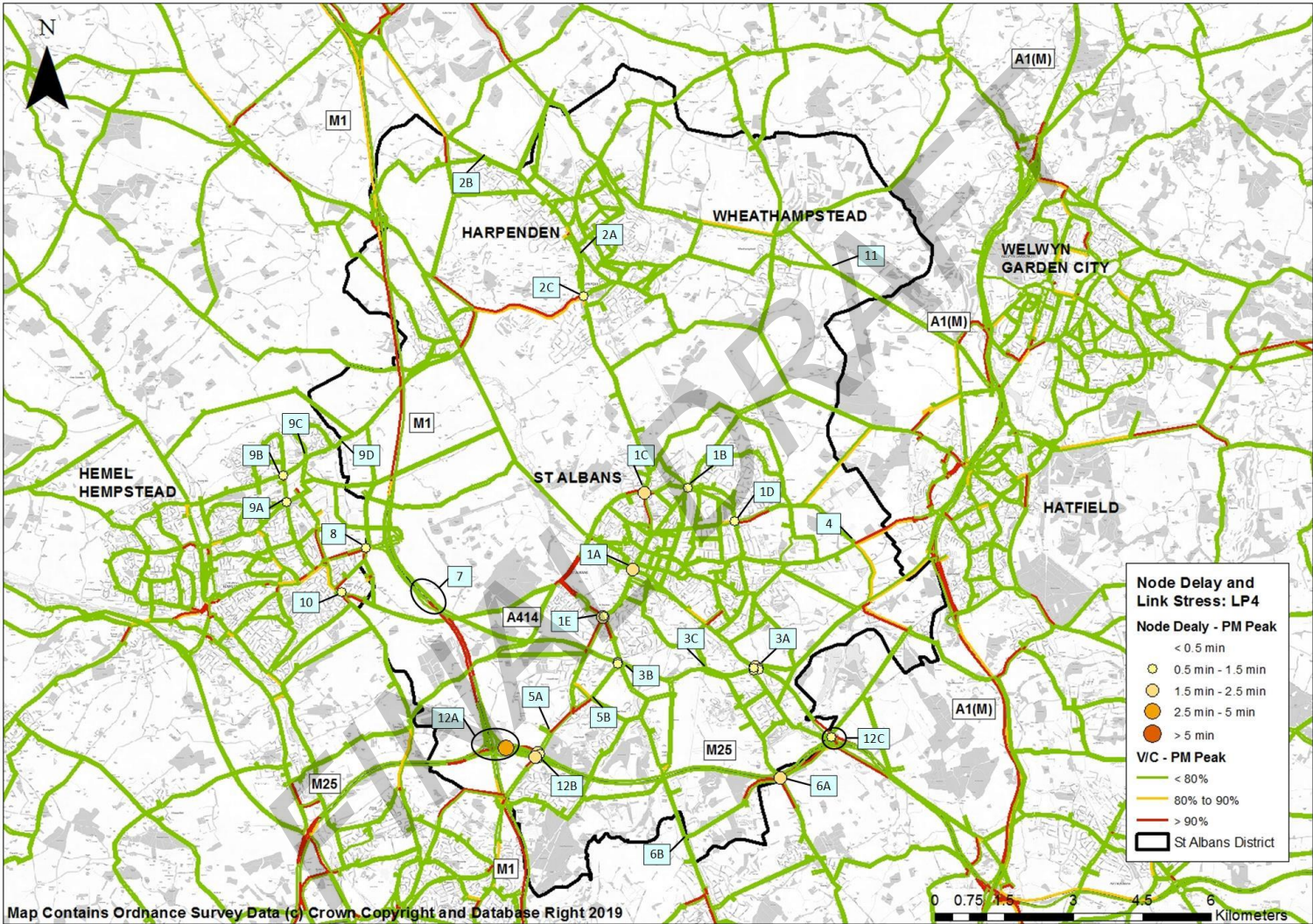


Figure 15 Map showing congestion and node delay at key junctions in 2036 Local Plan v4 PM Peak



3.3 2036 Conditions and comparison to COMET Base Year (2014) and LP3 (2031)

3.3.1 The following table details the traffic conditions at the junctions identified in Table 1. Analysis is descriptive as there are many fundamental differences between the scenarios assessed (see the Caveats section 1.4).

Table 2: 2036 Traffic conditions at key junctions in the SADC area

ID	Junction Name	LP4 Traffic Conditions	Comparison LP4 vs LP3	Comparison LP4 vs BY
1A	Peahen Junction	Maximum average delays of 1.5 minutes. Greatest congestion on London Road, Chequer Street and Holywell Hill in the AM peak with largest delays of 2 minutes on the London Road arm.	Slight increase in delays at Peahen junction due to signal timings.	Increase in junction delays by approximately 30 seconds due to flow increases on the High Street.
1B	King William IV Junction	Delays of 30 seconds in AM and PM peaks.	Increase in flows at the junction but no significant change in delays.	Increase in flows at the junction but no significant change in delays.
1C	Ancient Britton Junction	Average delays at the junction of up to 3.5 minutes with congestion on all arms of the junction. Batchwood Drive observed to have greatest delays of 5 minutes.	Delay differences < 30 seconds Increase in traffic approaching junction on Batchwood Drive.	Delays increase by up to a minute. Greatest increases observed for Batchwood Drive.
1D	Sandpit Lane/Beechwood Avenue	Average delays of up to 1 minute for all arms.	Delays remain similar in all time periods. Small increases in flows on Beechwood Avenue.	Flows increase for all arms. Delays remain similar in AM and IP but show marginal reductions in the PM.
1E	King Harry Junction	Average maximum delays of up to 2 minutes. Watford Road and St Stephens Hill arms have the largest delays of 3 and 2 minutes respectively (AM Peak).	Flows increase on King Harry Lane and Watling Street but reductions on Watford Rd and St Stephen's Hill.	Overall flows through the junction increase. Delays reduced by up to 1 minute.

2A	A1081 Luton Road/Station Road	No significant delays or congestion observed.	Reduction in traffic on A1081 through Harpenden.	Increase in traffic on A1081 but small reduction on Station Road.
2B	A1081/The Common	No significant delays or congestion observed.	No change in delays. Increase in flows on The Common in all time periods.	No change in delays. Increase in flows on The Common and A1081 in all time periods.
2C	A1081 Luton Road/Redbourn Road	Maximum average delays of 1 minute. Congestion on all arms approaching the roundabout.	Increase in flows along Redbourn Road and Walkers Road. Delays remain similar in all time periods.	Flows increase on all arms in AM and increases in delays by 1 minute.
3A	A414/A1081 London Colney	Delays of 1 to 2 minutes at all arms of the roundabout. Greatest delays on the A1081 southbound arm with some congestion.	Increase in flows on North Orbital Road eastbound arm and A1081 in AM, but reduction in PM. Traffic reroutes onto strategic route from London Colney High street. Delays increase seconds in AM peak but delays remain similar in IP and PM.	Increase in flows along North Orbital and A1081. Traffic reroutes onto strategic route from London Colney High street. Increase in delays of up to 1 minute at the A1081 southbound arm.
3B	A414/A405	Congestion on Watling Street in both directions. Delays of up to 1 minute for A414 eastbound traffic.	Increase in flows using Watling Street, North Orbital and A414 westbound. Delays remain similar.	Delays increase by up to 1 minute. Increase in flows on A414, North Orbital and Watling Street southbound.
3C	A414/Shenley Lane, Napsbury Lane	Congestion on Napsbury Lane to join North Orbital westbound in AM peak. No significant delays.	Reduction in traffic on Napsbury Lane and Shenley Lane but increase on North Orbital. No significant delays.	Increase in flows using North Orbital in both directions. Some traffic uses A414/Shenley Lane/Napsbury Lane instead of A414/A1081 London Colney. No significant delays.
4	A1057 Hatfield Road/Station Road	Average maximum delays of up to 1 minute. Congestion on A1057 westbound arm with delays up to a minute.	Reduction in flows on Oaklands Lane and Station Road. Delays remain similar.	Reduction in delays in all time periods. Overall increase in volume of traffic using the junction in all time periods.

5A	A405/Watford Road (the Noke)	Congestion on approach to signalised junction on all arms. Average delays of up to 2.5 minutes with 2 minutes for all approaches.	Reduction in flows on all roads approaching junction. Increase in delays on approach to junction.	Reduction in flows on Watford Road and increase in flows along North Orbital approach to junction. No significant delays.
5B	A405/Tippendell Lane	No significant delays or congestion.	Reduction in traffic approaching junction on North Orbital but increase on Tippendell Lane. No significant delays.	Increase in flows on all arms on approach junction. No significant delays.
6A	Harper Lane/Shenley Road	Congestion on all arms with maximum average delays up to 1.5 minutes.	Reduction in delays up to a minute caused by reduction in flows through the junction. Marginal increases in traffic using the B556 (Harpers Lane, Bell Lane) westbound.	Increase in flows approaching from Harpers Lane, Bell Lane and Shenleybury.
6B	Harper Lane/Watling Street	No delays or congestion observed.	Reduction in flows using the junction at all arms.	Reduction in flows on Harper Lane but increases on Watling Road. No significant delays observed.
7	A414/M1 junction 8	Some congestion on approach to slip roads in both directions.	Increase in flows joining the M1 from the A414 westbound. Increase in flows on M1 with flow reductions for A414 eastbound.	Increase in flows using M1 and A414 in both directions.
8	A414/Green Lanes	Congestion on Breakspear Way on approach to junction in all time periods. Average delays of up to 30 seconds.	Increase in eastbound flows on Breakspear Way, Green Lane and westbound flows on the M1 off slip. No significant change in delays.	Increase in eastbound flows on Breakspear Way and westbound flows on the M1 off slip. No significant change in delays.
9A	Redbourn Road/Queensway	No significant congestion at junction. Maximum average delays of up to 30 seconds.	No significant change in delays. Increase in flows on Redbourn Road in all time periods. Decrease in flows on Swallowdale Lane, Queensway and High Street Green.	Increase in flows on all arms on approach to junction. No significant delays.

9B	Redbourn Road/Link Road	Congestion on approach from all arms. No significant delays.	Increase in flows on both arms of Redbourn Road. No significant changes in delays.	Increase in flows on Link Road and Redbourn Road. No significant changes in delays.
9C	Redbourn Road/Shenley Road	Some congestion on Redbourn Road westbound in AM peak. No significant delays.	Increase in flows on all arms. No significant change in delays.	Reduction in flows on Three Cherry Trees Lane, but increase in flows on Redbourn Road in both directions. No significant changes to delays.
9D	Redbourn Road/Cherry Tree Lane	No significant delays or congestion observed.	Increase in flows on all arms. No significant change in delays.	Increase in flows on all arms on approach to junction. No significant delays.
10	Leverstock Green Road/Bedmond Road	Congestion on all arms approaching the junction. Maximum average delays of up to 1 minute.	Increases in flows from the south on Leverstock Green Road and Bedmond Road. Delays remain similar in all time periods.	Increases in flows on all arms. Delays remain similar in all time periods.
11	B653 Cory Wright Way/Marford Road	Some congestion on approach from Cory Wright Way in AM peak. No significant delays in any time period.	Increase in flows on Cory Wright Way southbound and Marford Road westbound. Delays reduced in AM and PM peaks from 1 minute to < 30 seconds.	Increase in flows on Cory Wright Way southbound and Marford Road westbound. No significant change in delays.
12A	M25 Junction 21	Congestion westbound on M25 and northbound on M1 as traffic merges with mainline traffic flows. Congestion eastbound through the junction with delays where diverging traffic crosses over for next junction.	Increase in westbound flows on M25 through the junction. Reduction in westbound flows on slip to M1, and on M1 flows in either direction. Increase in traffic using eastbound slip M25 to M1 northbound and M1 south to M25 eastbound. Reduction in flows on M1 southbound to M25 westbound and M25 westbound to M1 northbound.	Reduction in flows using M25 eastbound to M1 northbound slip and M1 south to M25 westbound slip. Increase in flows westbound M25 slip to M1 northbound and M1 southbound to M25 eastbound slips. Increase in mainline flows on both M25 and M1.

12B	M25 Junction 21a	Average maximum delays up to 3.5 minutes observed for M25 off slips. Congestion on eastbound M25 on and off slips and on parts of elevated roundabout. No congestion on mainline M25 flows.	Increase in mainline M25 flows in both directions. Overall increase in flows joining M25 for both directions. No significant change in delays.	M25 mainline flows increase. Flows on M25 on slip roads on and off M25 increase except for westbound off slip. Increase in delays up to 2 minutes at off slips.
12C	M25 Junction 22	Congestion on Barnet Road, both A1081 arms, Coursers Road and M25 eastbound on slip for merging traffic. Delays of up to 30 seconds at junction.	Increase in flows on A1081, M25 mainline and off slips. No significant changes in delay.	Increase in flows on all arms A1081, M25 mainline and off slips. Increases in delay of up to 30 seconds.

4. Journey Time Route Analysis

4.1 Zone to Zone Analysis

- 4.1.1 'Zone to Zone Analysis' of journey time changes between the key urban areas in St Albans District and other urban areas in Hertfordshire in LP4 are detailed in this section. This includes the urban areas of St Albans, Harpenden, Redbourn, Wheathampstead and East Hemel. Journey times are averaged across all possible routes that traffic may use to travel between town centres.
- 4.1.2 The journey time analysis includes comparisons with conditions against the 2014 base year and LP3 COMET models for both AM and PM peak periods. Figure 16 and Figure 17 detail the journey times in the LP4 AM and PM peak periods between the key urban areas in Hertfordshire. In SADC, the urban areas of St Albans, East Hemel, Harpenden, Redbourn and Wheathampstead are included. Conditional formatting has been applied to the following tables where the highest figures or differences are highlighted in red and the lowest figures or differences are highlighted in green.
- 4.1.3 Figure 16 and Figure 17 illustrate that journey times in the AM peak are marginally longer than those in the PM peak. Across all routes, journey times average 32 minutes in the AM peak and 31 minutes in the PM peak.
- 4.1.4 St Albans experiences journey times of approximately 35 minutes to reach most other major towns within the HCC area. The longest journey time is to reach Cheshunt or Bishops Stortford. East Hemel, Redbourn, Harpenden and Wheathampstead experience similar journey time patterns to St Albans.

Figure 16: Journey time analysis – 2036 LP4 AM peak

Town	Bishop's Stortford	Cheshunt	Borehamwood	Rickmansworth	Watford	Hertford	Welwyn Garden City	Stevenage	Hitchin	St Albans	Hemel Hempstead	East Hemel	Redbourn	Harpenden	Wheathampstead
Bishop's Stortford	0	34	62	74	78	29	38	38	43	60	71	65	65	59	50
Cheshunt	37	0	29	41	46	21	25	34	42	39	41	35	39	47	36
Borehamwood	57	30	0	36	29	34	31	35	38	33	35	29	33	40	32
Rickmansworth	76	49	40	0	22	50	49	53	55	38	23	27	31	40	45
Watford	71	44	25	20	0	46	45	48	48	31	24	18	22	31	36
Hertford	29	18	35	50	52	0	10	20	25	34	45	38	37	31	21
Welwyn Garden City	37	21	29	44	47	10	0	17	19	26	38	32	28	23	12
Stevenage	40	32	39	54	57	21	23	0	11	33	45	39	35	28	19
Hitchin	44	43	44	58	60	31	31	13	0	34	45	39	35	27	20
St Albans	57	40	33	35	35	31	25	31	32	0	19	11	11	13	13
Hemel Hempstead	65	47	36	30	32	40	37	40	41	22	0	9	11	21	25
East Hemel	58	40	29	28	25	33	29	33	35	13	9	0	5	15	19
Redbourn	63	44	34	32	29	37	35	34	32	13	11	5	0	11	15
Harpenden	61	47	42	41	38	37	30	30	27	16	20	14	10	0	10
Wheathampstead	52	37	35	43	44	29	21	20	20	14	26	20	16	11	0

Figure 17: Journey time analysis – 2036 LP4 PM Peak

Town	Bishop's Stortford	Cheshunt	Borehamwood	Rickmansworth	Watford	Hertford	Welwyn Garden City	Stevenage	Hitchin	St Albans	Hemel Hempstead	East Hemel	Redbourn	Harpenden	Wheathampstead
Bishop's Stortford	0	34	57	69	64	29	38	39	44	60	68	62	63	59	50
Cheshunt	38	0	29	41	36	22	25	35	44	37	39	33	38	46	37
Borehamwood	64	40	0	43	28	41	37	43	45	38	38	32	36	46	38
Rickmansworth	79	54	41	0	19	56	53	59	61	37	30	29	34	43	47
Watford	82	58	37	24	0	60	56	62	62	40	34	28	32	42	45
Hertford	31	19	29	47	42	0	10	21	28	32	40	34	37	33	24
Welwyn Garden City	39	23	23	41	36	10	0	20	22	24	34	28	27	24	15
Stevenage	39	32	32	50	44	21	21	0	11	31	41	35	32	28	19
Hitchin	43	40	32	50	42	27	21	12	0	32	39	33	30	26	20
St Albans	61	40	29	35	26	34	25	32	32	0	19	11	11	14	13
Hemel Hempstead	70	45	31	24	22	44	36	42	41	19	0	8	10	20	23
East Hemel	64	38	24	26	15	37	30	37	36	12	9	0	5	14	18
Redbourn	64	42	28	30	19	37	28	33	32	12	10	5	0	11	14
Harpenden	60	45	36	37	27	33	24	29	27	15	19	13	10	0	10
Wheathampstead	51	35	27	41	31	23	14	19	20	13	22	17	14	10	0

4.1.5 Figure 18 and 19 detail the journey time changes observed in LP4 compared to the 2014 base year model. On average journey times have increased by 4 minutes in the AM peak and 3 minutes in the PM peak. There are small reductions and negligible changes in some areas. This will be due to rerouting in the assignments generated by the planning data, infrastructure schemes and forecasting process through the variable demand model. On average, journey times to and from St Albans increase by approximately 2 minutes in the AM peak and 1.5 minutes in the PM peak. There are also some reductions in journey times to and from Hemel Hempstead due to the significant infrastructure changes in the forecast scenarios.

4.1.6 It can be recognised that the greatest increases are predominantly in south west Hertfordshire around the towns of Watford, Rickmansworth and Borehamwood. Journeys to/from the towns in SADC and Cheshunt, Rickmansworth and Watford show the greatest increases.

Figure 18: Journey time analysis – 2036 LP4 compared to the 2014 base year- AM peak

2036 LP4 - BY AM (min)

Town	Bishop's Stortford	Cheshunt	Borehamwood	Rickmansworth	Watford	Hertford	Welwyn Garden City	Stevenage	Hitchin	St Albans	Hemel Hempstead	East Hemel	Redbourn	Harpenden	Wheathampstead
Bishop's Stortford	0	1	5	8	13	0	0	1	2	2	5	2	5	3	2
Cheshunt	4	0	3	6	12	2	0	4	4	4	6	3	5	3	2
Borehamwood	11	10	0	8	8	8	7	8	8	6	8	4	6	8	7
Rickmansworth	12	11	8	0	7	7	7	8	6	4	3	4	4	6	8
Watford	14	13	5	2	0	9	10	10	6	6	4	1	3	5	6
Hertford	0	-1	4	10	13	0	0	0	0	4	7	4	3	1	0
Welwyn Garden City	-1	-4	3	9	13	0	0	0	0	3	5	2	4	1	1
Stevenage	1	2	5	11	15	1	2	0	1	0	5	2	3	1	1
Hitchin	2	3	2	9	13	2	1	1	0	0	7	5	6	1	1
St Albans	1	5	2	6	8	4	2	1	1	0	2	-3	0	1	0
Hemel Hempstead	5	13	6	5	9	8	6	7	4	4	0	3	1	3	3
East Hemel	2	10	2	6	6	4	3	3	2	-1	3	0	-2	0	1
Redbourn	2	11	3	7	7	3	6	3	3	2	1	-1	0	2	2
Harpenden	4	7	4	8	8	5	4	1	1	2	2	0	1	0	0
Wheathampstead	4	2	4	6	10	6	3	1	1	-1	4	1	3	0	0

Figure 19: Journey time analysis – 2036 LP4 compared to the 2014 base year- PM peak

2036 LP4 - BY PM (min)																
Town	Bishop's Stortford	Cheshunt	Borehamwood	Rickmansworth	Watford	Hertford	Welwyn Garden City	Stevenage	Hitchin	St Albans	Hemel Hempstead	East Hemel	Redbourn	Harpenden	Wheathampstead	
Bishop's Stortford	0	2	3	4	5	0	1	2	3	2	6	3	3	3	3	
Cheshunt	2	0	5	6	6	2	0	3	4	5	6	3	5	3	3	
Borehamwood	16	16	0	14	9	12	13	12	13	10	8	6	7	13	12	
Rickmansworth	13	13	8	0	4	9	11	9	11	3	4	3	5	6	6	
Watford	13	13	6	0	0	10	10	9	8	2	2	0	1	3	3	
Hertford	-4	-4	3	7	6	0	0	0	0	2	5	3	3	2	2	
Welwyn Garden City	-4	-3	1	4	4	0	0	-2	-1	0	3	0	2	2	2	
Stevenage	1	0	4	8	7	1	4	0	1	1	5	3	1	1	1	
Hitchin	1	-1	1	5	2	1	1	1	0	1	2	-1	1	0	1	
St Albans	-1	5	2	2	2	5	3	1	1	0	1	-3	0	0	0	
Hemel Hempstead	12	11	5	2	3	10	7	3	2	1	0	2	1	2	2	
East Hemel	6	5	-1	-2	-2	4	1	-1	-1	-4	1	0	-3	-2	-1	
Redbourn	3	9	2	1	1	5	3	2	2	0	1	-1	0	1	2	
Harpenden	2	4	4	3	2	4	2	1	0	2	1	-1	1	0	0	
Wheathampstead	2	3	4	4	2	4	2	1	0	0	1	-1	1	0	0	

- 4.1.7 Figure 20 and 21 detail the journey time changes observed in LP4 compared to LP3. On average journey times have increased by 1 minute in both the AM and PM peaks. There are small reductions and negligible changes in some areas. This will be due to rerouting in the assignments generated by the planning data, infrastructure schemes and the forecasting process through the variable demand model. The greatest changes compared to LP3 are for journeys to/from Watford, Rickmansworth and Borehamwood.
- 4.1.8 On average, journey times from the towns in SADC increase by approximately 1 minute in the AM peak with negligible changes in the PM peak. However it should also be noted that journeys to St Albans town centre do display some reductions compared to LP3. This is partly due to the revised planning assumptions which locate a lot of largest developments outside the existing condensed town centre area.

Figure 20: Journey time analysis – 2036 LP4 compared to LP3- AM peak**2036 LP4 - 2031 LP3 AM (min)**

Town	Bishop's Stortford	Cheshunt	Borehamwood	Rickmansworth	Watford	Hertford	Welwyn Garden City	Stevenage	Hitchin	St Albans	Hemel Hempstead	East Hemel	Redbourn	Harpenden	Wheathampstead
Bishop's Stortford	0	1	2	2	4	1	1	1	1	0	2	1	3	3	3
Cheshunt	0	0	0	1	2	-1	0	0	0	-1	0	-1	-1	0	-1
Borehamwood	3	1	0	2	2	2	2	1	2	2	0	-1	-1	1	0
Rickmansworth	1	1	2	0	-2	0	1	0	0	0	0	-1	0	-1	0
Watford	-1	-1	-1	-3	0	-1	-1	-2	-2	-3	-1	-3	-3	-3	-2
Hertford	0	0	2	4	3	0	0	0	0	-1	2	1	1	0	0
Welwyn Garden City	0	0	1	3	4	0	0	-1	0	0	0	0	0	-1	-1
Stevenage	1	0	1	3	4	0	0	0	1	-2	1	1	1	0	0
Hitchin	1	1	0	2	5	0	-1	1	0	-1	3	3	3	0	0
St Albans	2	1	3	4	5	1	0	0	0	0	0	0	0	0	0
Hemel Hempstead	2	3	3	2	3	1	2	1	1	0	0	0	0	0	1
East Hemel	1	3	2	2	2	1	1	0	1	0	0	0	0	0	1
Redbourn	1	3	2	2	2	1	2	1	1	0	0	0	0	0	1
Harpenden	1	0	2	2	3	0	-1	1	1	0	1	0	0	0	0
Wheathampstead	0	-2	-1	0	3	0	-2	0	0	-2	1	1	1	0	0

Figure 21: Journey time analysis – 2036 LP4 compared to LP3- PM peak

2036 LP4 - 2031 LP3 PM (min)

Town	Bishop's Stortford	Cheshunt	Borehamwood	Rickmansworth	Watford	Hertford	Welwyn Garden City	Stevenage	Hitchin	St Albans	Hemel Hempstead	East Hemel	Redbourn	Harpenden	Wheathampstead
Bishop's Stortford	0	3	3	0	1	1	1	3	3	5	5	5	3	3	3
Cheshunt	0	0	2	1	2	0	0	0	1	2	2	1	2	1	1
Borehamwood	3	1	0	1	0	1	1	0	2	0	-2	-2	-2	1	1
Rickmansworth	4	3	4	0	1	3	3	2	4	1	3	1	1	1	1
Watford	3	1	2	-3	0	2	3	2	1	1	1	1	1	1	1
Hertford	0	0	-1	1	3	0	0	0	0	2	1	1	2	1	1
Welwyn Garden City	-1	-1	-1	1	2	0	0	-2	0	0	1	1	2	2	1
Stevenage	0	-1	0	2	3	0	1	0	0	0	0	0	0	0	0
Hitchin	0	-1	-1	1	0	0	-1	0	0	0	0	-1	0	0	0
St Albans	0	1	1	1	1	0	1	0	0	0	0	0	0	0	0
Hemel Hempstead	4	2	2	0	1	1	2	0	0	0	0	0	0	0	0
East Hemel	3	1	1	-2	1	1	1	0	0	0	0	0	0	0	0
Redbourn	2	1	1	-2	1	0	0	0	0	0	0	0	0	0	0
Harpenden	2	-1	0	-2	0	-1	-1	0	0	1	0	0	0	0	0
Wheathampstead	2	-2	-1	-1	0	-1	-1	0	0	0	0	0	0	0	0

4.2 Selected Journey Time Route Analysis

- 4.2.1 Figure 22 shows the selected routes. There are 21 routes predominantly limited to within the St Albans district boundary. Route names starting with “HPD” are located in the vicinity of Harpenden whereas routes that begin with “STA” travel through the St Albans city area.
- 4.2.2 Table 3 presents the results of the journey time routes for the following scenarios:
- 2014 Base Year – “BY”
 - 2031 Local Plan Run 3 – “LP3”
 - 2036 Local Plan Run 4 – “LP4”
- 4.2.3 The values in Table 3 are presented in seconds. For each time period, there is a comparison between Local Plan 4 relative to the previous Local Plan (Run 3) and to the Base Year. Shading is used to indicate the following:
- Green – a relative decrease in journey time
 - Grey Shading – relatively minimal journey time changes
 - Red – a relative increase in journey time
- 4.2.4 The text following the results table below provides commentary on notable/significant changes in modelled journey times along selected routes. The caveats listed in section 1.4 should be considered when comparing results between scenarios. Links to locations highlighted in Table 2 as journey times with the greatest differences often pass through critical junctions around the St Albans District network.

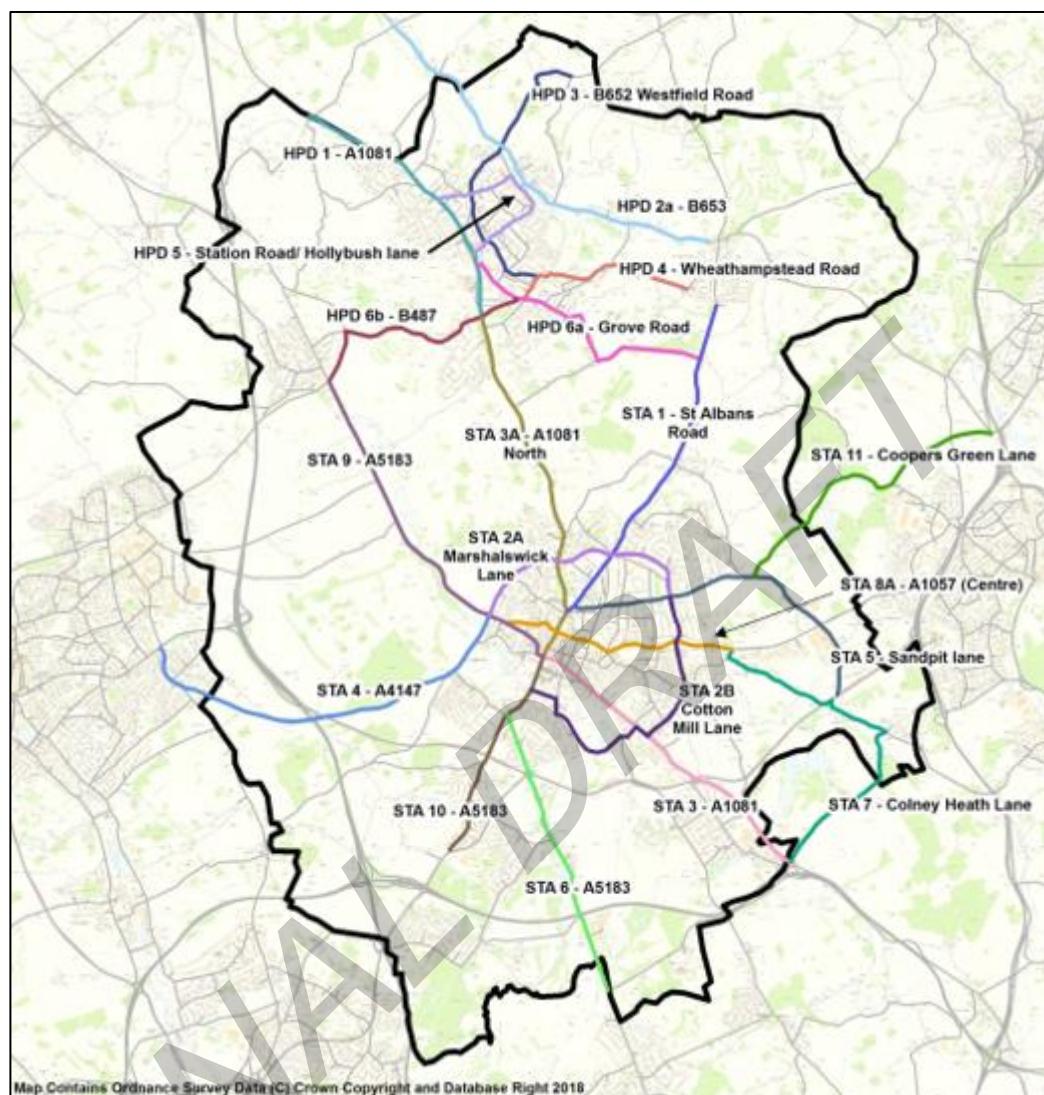
Figure 22: Selected Journey Time Routes

Table 3: Journey Times on Selected Routes (values are in seconds)

Route	Direction	AM Peak					Inter Peak					PM Peak				
		BY	LP3	LP4	LP4 vs BY	LP4 vs LP3	BY	LP3	LP4	LP4 vs BY	LP4 vs LP3	BY	LP3	LP4	LP4 vs BY	LP4 vs LP3
HPD 1: A181 Luton Road	Northbound	519	514	515	-1%	0%	514	501	501	-3%	0%	581	565	558	-4%	-1%
HPD 1: A181 Luton Road	Southbound	531	556	557	5%	0%	504	538	538	7%	0%	531	560	561	6%	0%
HPD 2A: B653/ Lower Luton road	Northbound	582	596	623	7%	4%	576	578	580	1%	0%	596	600	606	2%	1%
HPD 2A: B653/ Lower Luton road	Southbound	468	456	461	-1%	1%	437	445	410	-6%	-8%	455	454	420	-8%	-7%
HPD 3: B652	Northbound	643	647	647	1%	0%	625	627	627	0%	0%	640	643	642	0%	0%
HPD 3: B652	Southbound	565	570	596	5%	5%	560	562	562	0%	0%	565	567	568	1%	0%
HPD 4: Wheathampstead	Westbound	271	274	274	1%	0%	266	267	267	0%	0%	269	271	270	0%	-1%
HPD 4: Wheathampstead	Eastbound	277	277	277	0%	0%	279	280	280	0%	0%	278	278	278	0%	0%
HPD 5: Station Road	Northbound	513	516	519	1%	1%	497	498	500	1%	0%	521	524	526	1%	0%
HPD 5: Station Road	Southbound	588	588	587	0%	0%	495	497	498	1%	0%	592	593	595	0%	0%
HPD 6A: Grove Road	Northbound	489	491	492	1%	0%	449	451	451	0%	0%	454	459	459	1%	0%
HPD 6A: Grove Road	Southbound	479	485	480	0%	-1%	473	474	474	0%	0%	476	480	481	1%	0%
HPD 6B: B487	Eastbound	323	420	432	34%	3%	280	296	303	8%	2%	306	389	388	27%	0%
HPD 6B: B487	Westbound	320	424	445	39%	5%	272	286	288	6%	1%	292	317	316	8%	0%
STA 1: St Albans Road	Northbound	564	571	570	1%	0%	535	535	536	0%	0%	527	531	533	1%	0%
STA 1: St Albans Road	Southbound	600	619	622	4%	1%	524	526	526	1%	0%	537	541	542	1%	0%
STA 2A: Marshalswick Lane	Westbound	682	694	693	1%	0%	591	623	628	6%	1%	569	620	621	9%	0%
STA 2A: Marshalswick Lane	Eastbound	773	777	768	-1%	-1%	691	719	734	6%	2%	651	686	691	6%	1%
STA 2B: CottonMill Lane	Northbound	877	898	888	1%	-1%	833	869	867	4%	0%	834	874	858	3%	-2%
STA 2B: CottonMill Lane	Southbound	856	919	845	-1%	-8%	784	796	796	2%	0%	791	814	807	2%	-1%
STA 2: Ring Road St Albans	Northbound	1,559	1,592	1,581	1%	-1%	1,423	1,492	1,495	5%	0%	1,403	1,494	1,479	5%	-1%
STA 2: Ring Road St Albans	Southbound	1,629	1,695	1,613	-1%	-5%	1,475	1,515	1,530	4%	1%	1,442	1,500	1,499	4%	0%
STA 3A: A1081 North	Northbound	741	766	775	5%	1%	734	746	745	1%	0%	897	919	903	1%	-2%
STA 3A: A1081 North	Southbound	829	928	927	12%	0%	730	737	734	1%	0%	819	835	905	11%	8%
STA 3: A1081	Northbound	718	752	679	-5%	-10%	649	677	661	2%	-2%	600	632	637	6%	1%
STA 3: A1081	Southbound	775	883	944	22%	7%	680	736	767	13%	4%	754	808	809	7%	0%
STA 4: A4147	Westbound	530	526	571	8%	8%	449	464	498	11%	7%	574	535	568	-1%	6%
STA 4: A4147	Eastbound	642	662	796	24%	20%	443	466	500	13%	7%	478	495	516	8%	4%
STA 5: Sandpit lane	Northbound	698	637	638	-9%	0%	583	561	563	-3%	0%	667	623	627	-6%	1%
STA 5: Sandpit lane	Southbound	646	604	609	-6%	1%	595	536	540	-9%	1%	663	625	601	-9%	-4%
STA 6: A513	Northbound	760	796	567	-25%	-29%	546	513	523	-4%	2%	782	726	556	-29%	-23%
STA 6: A513	Southbound	477	539	632	33%	17%	405	441	438	8%	0%	430	496	463	8%	-7%
STA 7: Colney Health Lane	Northbound	563	597	670	19%	12%	554	543	556	0%	2%	561	560	613	9%	9%
STA 7: Colney Health Lane	Southbound	515	591	587	14%	-1%	512	547	567	11%	4%	521	587	615	18%	5%
STA 8A: A1057 (Centre)	Westbound	790	781	784	-1%	0%	739	755	753	2%	0%	765	769	778	2%	1%
STA 8A: A1057 (Centre)	Eastbound	723	725	743	3%	2%	719	712	722	0%	1%	855	886	881	3%	-1%
STA 9: A5183	Northbound	484	490	494	2%	1%	469	473	474	1%	0%	499	497	501	0%	1%
STA 9: A5183	Southbound	493	600	610	24%	2%	475	445	452	-5%	2%	443	421	441	-1%	5%
STA 10: A5183	Northbound	792	685	685	-14%	0%	478	468	495	4%	6%	718	464	505	-30%	9%
STA 10: A5183	Southbound	456	538	623	36%	16%	469	493	539	15%	9%	493	531	545	11%	3%
STA 11: Coopers Green lane	Northbound	353	435	406	15%	-7%	337	378	385	14%	2%	396	391	433	9%	11%
STA 11: Coopers Green Lane	Southbound	344	655	621	81%	-5%	330	363	364	10%	0%	342	384	399	17%	4%

4.2.5 Relative to the LP3 and Base Year scenarios, the results of the LP4 forecast shows relatively low (<10%) changes in overall journey times along the following routes for all time periods and directions:

- HPD 1 - A1081
- HPD 2a - B653
- HPD 3 - B652 Westfield Road
- HPD 4 - Wheathampstead Road
- HPD 5 - Station Road/ Hollybush lane
- HPD 6a - Grove Road
- STA 1- St Albans Road
- STA 2A - Marshalswick Lane
- STA 2B- Cotton Mill Lane
- STA 2- Ring Road St Albans
- STA 3A- A1081 North
- STA 5- Sandpit lane
- STA 8A - A1057 (Centre)
- STA 9- A5183

4.2.6 The minor journey time variation on these routes is attributable to the change in planning data patterns which lead to flow differences and differences in junction delays. Rerouteing also occurs between the scenarios.

4.2.7 The following routes show journey time changes greater than 10% and are accompanied with a brief explanation.

4.2.8 **HPD 6b - B487** – this route has high levels of congestion in both AM and PM peaks. Increases in journey times are most noticeable when compared to the Base Year. Compared to LP3 journey times are similar. Delays at junctions at either end of Redbourn Lane generate much of this journey time increase. Mitigation schemes are suggested and detailed in section 6.4.

4.2.9 **STA 3 - A1081** – Delays at the new London Colney hamburger roundabout (A414/A1081 junction) and the increase in flows using A414 result in increases in journey times. Journey times show greatest increases compared to the Base Year, while differences compared to the LP3 are minimal. The London Colney roundabout is included in a mitigation scheme in section 6.3.

4.2.10 **STA 4 - A4147** – Increase in journey times compared to both Base Year and LP3. This is attributable to general increased congestion between East Hemel Hempstead and St Albans. The A4147 has a series of junctions with delays up to 30 seconds including the Bedmond Lane and King Harry Lane junctions. Section 6.7 discusses congestion and delays observed on this route west of St Albans as part of potential mitigation measures.

4.2.11 **STA 6 - A5183** – Park Street Garden Village also introduces additional infrastructure and alternative routes, leading to greater route choice and rerouteing. This leads to improved journey times northbound along the A5183 compared to both the Base Year and the LP3.

- 4.2.12 **STA 7- Colney Heath Lane** – Increases in journey times compared to the Base Year. These are the result of generalised increase in congestion on routes between St Albans and Hatfield. The congestion on these east west routes is discussed as part of mitigation schemes in section 6.6.
- 4.2.13 **STA 9 - A5183** – This route has high levels of congestion in both the AM and PM peaks. Increases in journey times are most noticeable when compared to the Base Year. Compared to LP3 journey times are similar. A mitigation scheme for east west routes between St Albans and Hemel Hempstead is detailed in section 6.4.
- 4.2.14 **STA 10 - A5183** - Junction delays at Noke roundabout and nearby signalised junctions contributes to increases in journey times southbound. Reduction in journey times northbound are due to rerouteing and changes in flow distributions around St Albans. Section 6.5 discusses delays and associated congestion on sections of the A5183 as part of mitigation schemes near M25 junction 21a.
- 4.2.15 **STA 11- Coopers Green Lane** – Increases in journey times mostly observed compared to the Base Year. These are the result of generalised increase in congestion on routes between St Albans and Hatfield. The congestion on these east west routes is discussed as part of mitigations in section 6.6.

4.3 Individual Route Analysis

- 4.3.1 Provided in separate document "SADC_Detailed_JT_v4.pdf"

5. Development Flow Analysis

5.1 Introduction

5.1.1 To understand the impacts of the new site allocations, a series of select link analyses (SLAs) have been undertaken to provide supplementary evidence in terms of overall impact of traffic flow 'to' and 'from' each of the key developments in SADC. The SLAs have been extracted from the LP4 AM and PM peaks for the new site allocations listed below:

- East Hemel Hempstead (new north and south allocations plus site in total)
- Hemel Hempstead (north) – include commentary on interaction with East Hemel
- North of St Albans
- West of London Colney
- West of Chiswell Green
- Park Street Garden Village
- North East Harpenden – include consideration of interaction with NW Harpenden site

5.1.2 Additional commentary below provides context as to whether there are any particular issues with the location of the new site allocations and where they are close to sites already allocated in the Strategic Local Plan. This includes further commentary on how these sites influence the key strategic junctions. Flows are represented by green lines and the thicker the bar, the greater the flow. Specific development related trip rates or distributions have not been included in LP4. Instead generic trip rates and distribution patterns based on the size of the developments have been applied by the COMET forecasting process. These are based on neighbouring zones with similar characteristics.

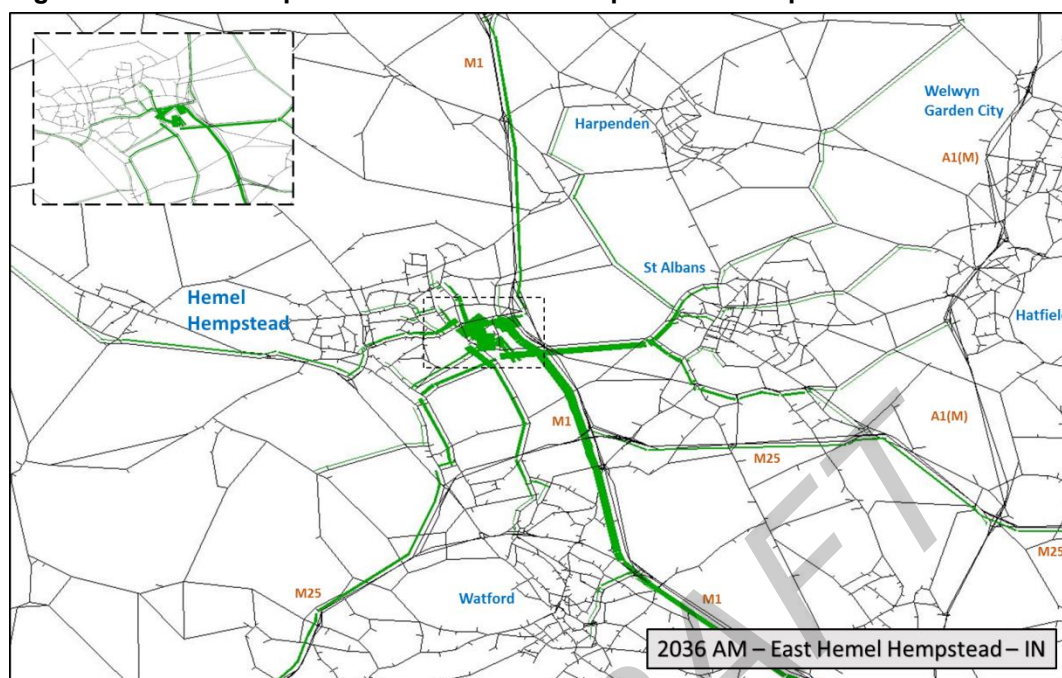
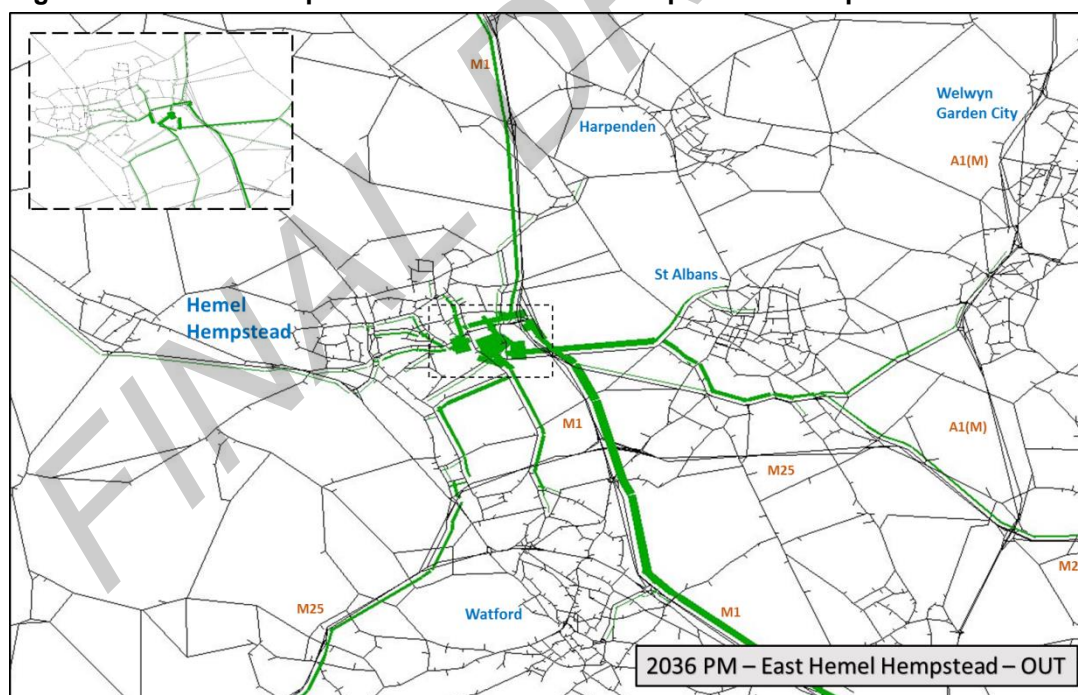
5.1.3 A range of sustainable travel initiatives are proposed as part of the GTP work but not all of these can be modelled in COMET. The transport initiatives are detailed and discussed in Section 6 and are presented in Appendix C which shows the schemes included in modelling. The interpretation of the modelling results includes commentary regarding these sustainable travel initiatives. The sustainable travel initiatives under consideration by SADC were submitted by HCC³:

5.1.4 Development flow analysis from each 2036 time period and direction is included in Appendix B. Key headlines from a selection of inbound/outbound are detailed in this section.

³ Email entitled "COMET model LP4 additional St Albans analysis" dated 15 November 2018

5.2 East Hemel Hempstead

- 5.2.1 Trips to and from the East Hemel developments are heavily linked to the M1 which is to be expected given the proximity of the development to the motorway network via junction 8. Figure 23 and Figure 24 illustrate routeing to and from the developments.
- 5.2.2 There is limited interaction with central Hemel Hempstead as southbound traffic uses either the M1 or A41 to access the M25. Trips travelling towards Watford and the M25 are using Bedmond Lane and the A4251 rather than the A41 (due to delays on the A41 approach to M25 junction 20). There is some interaction with the A4147 towards St Albans and onwards towards the A414 and Hatfield. It is noted there is a lot of development planned around the Maylands area of Hemel Hempstead. Consideration of how these developments interact should be made (possibly using the Hemel Paramics Model).
- 5.2.3 Examining the GTP schemes in Section 6, these schemes will have limited impact on the East Hemel development as the development links strongly to the motorway network and other strategic routes. There may be interactions with the St Albans Green Ring (PK25). A cycle scheme is planned along the A4147 which would help facilitate these movements, and cycling provision is also planned parallel to the A414 corridor which would help promote travel by bicycle. Further sustainable measures could be considered between Hemel Hempstead and St Albans.

Figure 23: Inbound trips to the East Hemel Hempstead development – 2036 AM**Figure 24: Outbound trips from the East Hemel Hempstead development – 2036 PM**

5.3 Hemel Hempstead (north)

- 5.3.1 Trips to and from the Hemel Hempstead (north) development are heavily linked with the M1 which is to be expected given proximity of the development to the motorway network via junction 8. Figure 25 and Figure 26 illustrate routing to and from the development.

Figure 25: Outbound trips from the Hemel Hempstead (north) development – 2036 AM

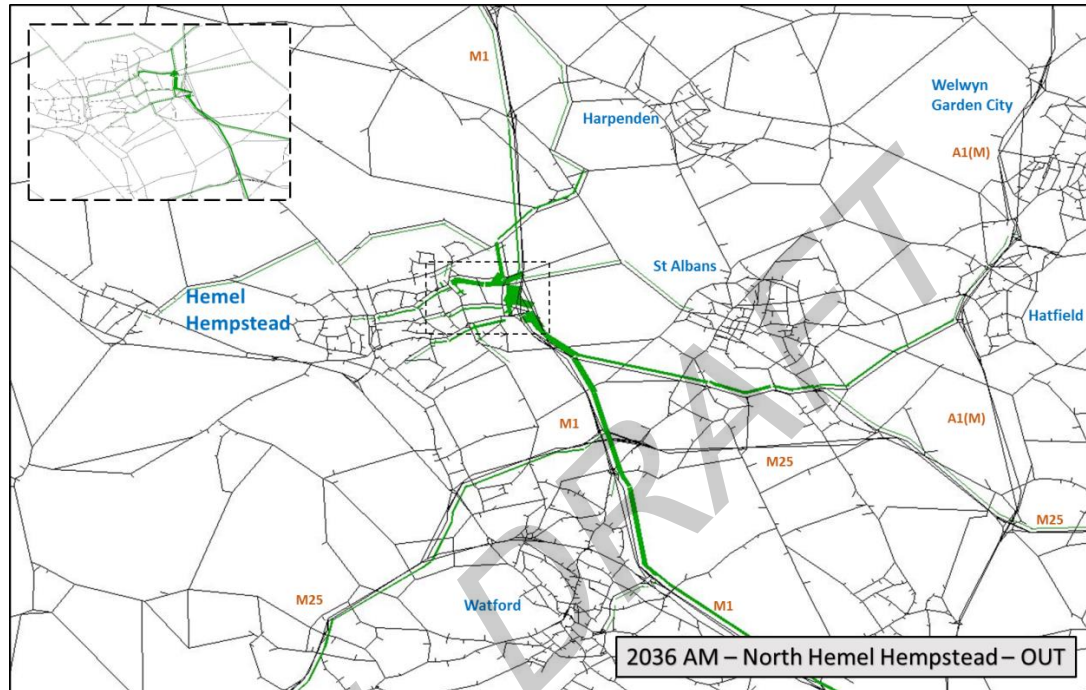
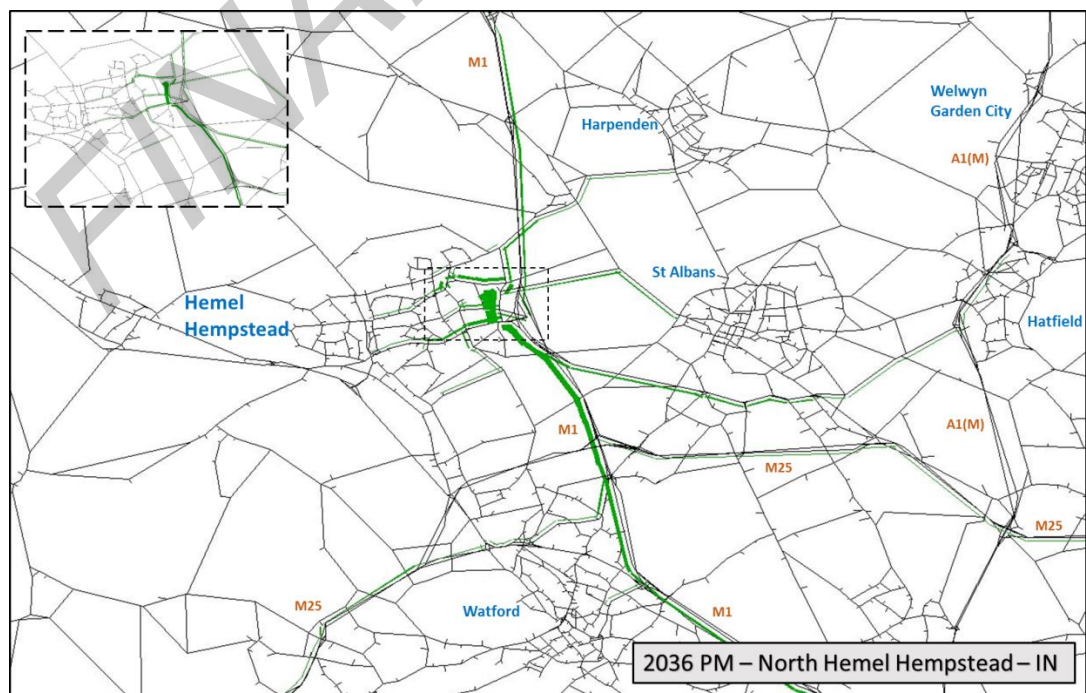


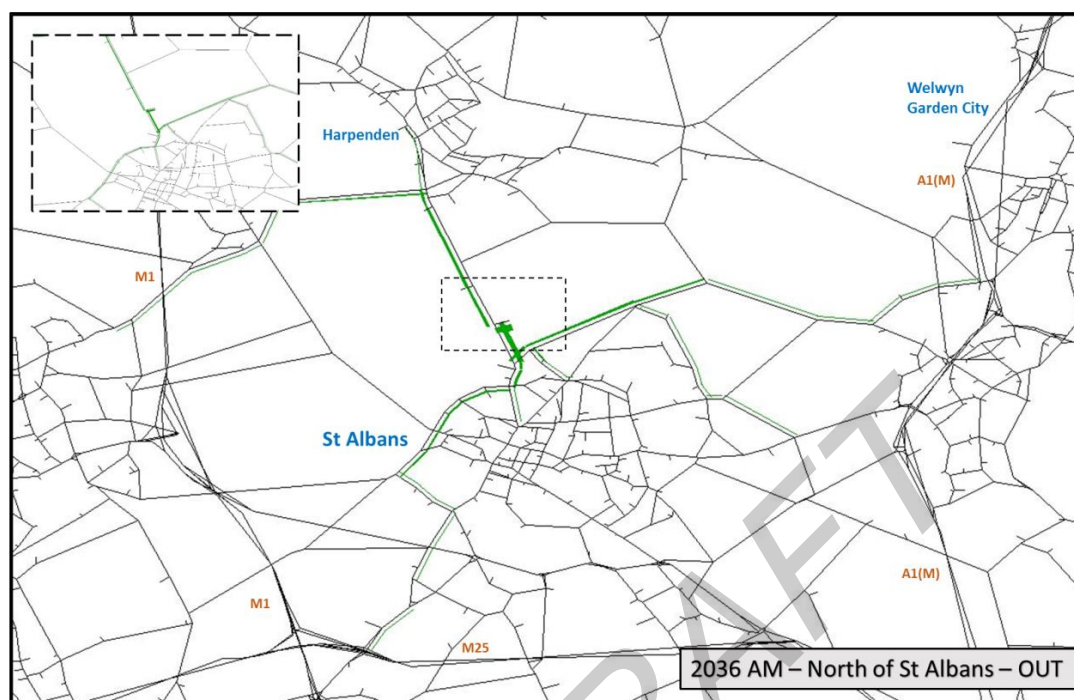
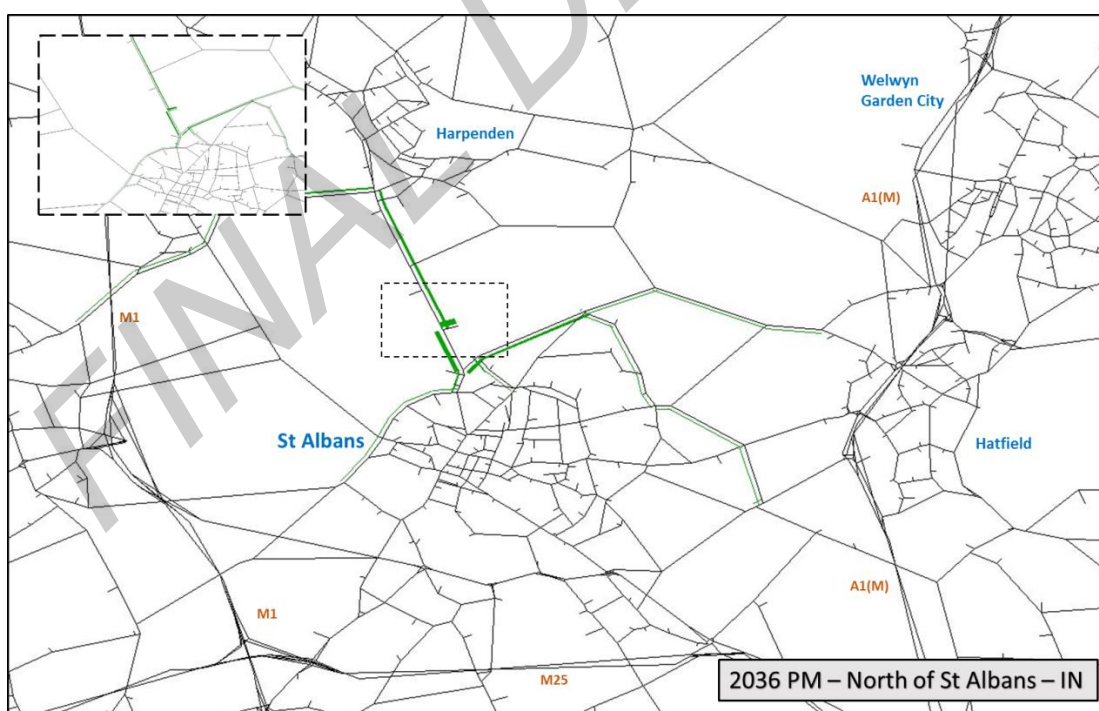
Figure 26: Inbound trips to the Hemel Hempstead (north) development – 2036 PM



- 5.3.2 Given the developments location there is more interaction with the Maylands Area of Hemel Hempstead and routes west of the development to and from the town centre. The interaction with the M1 via junction 8 is clearly illustrated. Compared to the East Hemel Hempstead developments, there is further interaction with the A414 south of St Albans and across to A1(M) junction 3 in south Hatfield. Consideration should also be given with interaction with development planned around Maylands (possibly using the Hemel Paramics Model).
- 5.3.3 There are delays at the revised Green lane A414 junction which dissuade traffic from using this route. The downgraded A414 is no longer a popular east-west route and any traffic travelling north of the development does not utilise the new distributor road. Trip distribution from this development zone does not generate much traffic which travels north via local roads
- 5.3.4 Examining the GTP schemes in Section 6, the schemes will have limited impact on the Hemel Hempstead (north) development as the development links strongly to the motorway network and more strategic routes. There may be interactions with the St Albans Green Ring (PK25). A cycle scheme planned along the A4147 which would help facilitate these movements, and proposed further cycling provision parallel to the A414 corridor would help promote travel by bicycle. Further sustainable measures could be considered between Hemel Hempstead and North of St Albans.

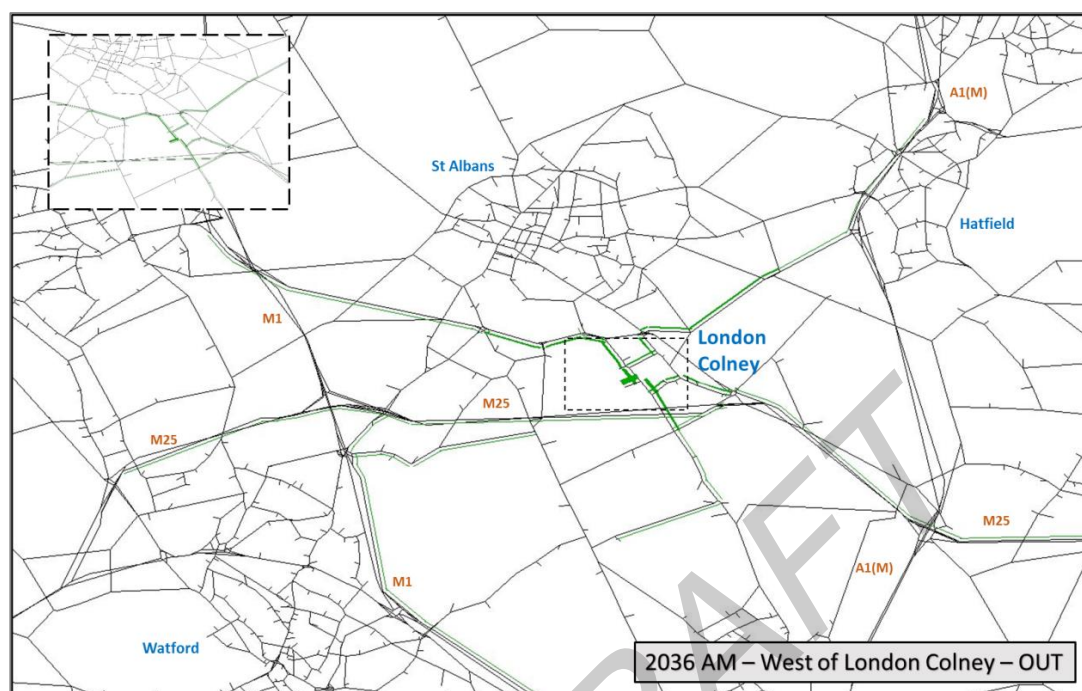
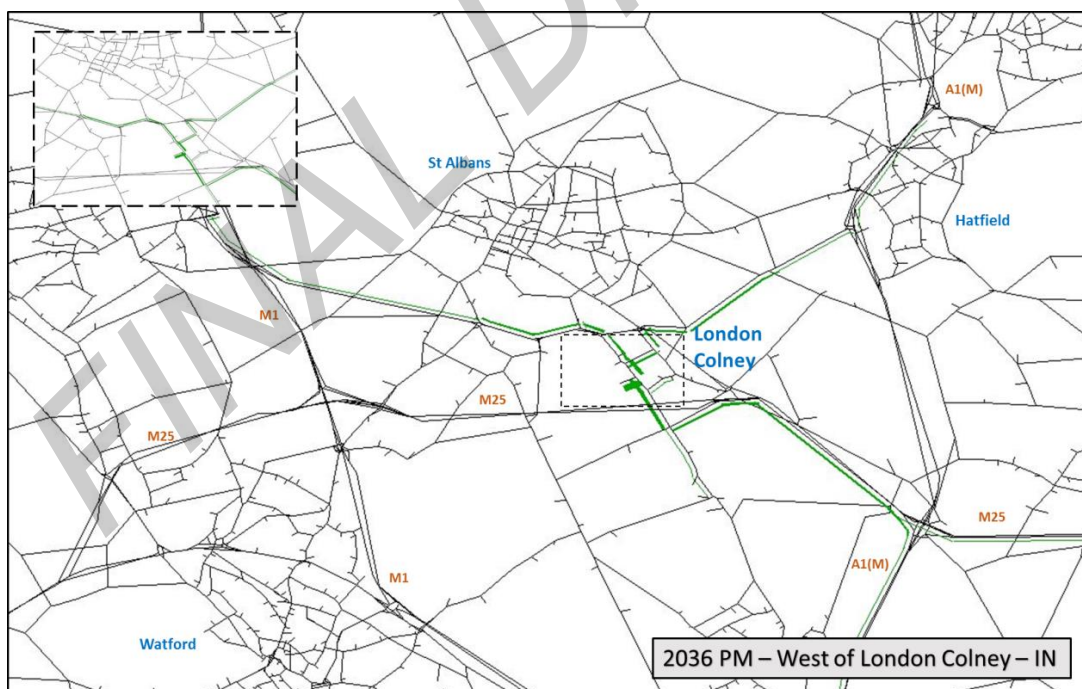
5.4 North of St Albans

- 5.4.1 Trips to and from the North of St Albans development show interactions with the A4147 and Batchwood Drive across to western St Albans. Traffic heading north uses the A1081 towards Harpenden or the B487 across to Redbourn and rural routes towards Hemel Hempstead. Heading east, traffic uses Coopers Green Lane, Sandridgebury Lane or Oaklands Lane to travel to/from Hatfield. There is limited interaction with St Albans town centre which would suggest some of these trips may be undertaken by other modes. In the PM peak there is limited interaction with central St Albans and routes to the south of the development. Most of the traffic originates from Harpenden/Redbourn area or routes across from Hatfield in the east.
- 5.4.2 Given the proximity of this development to the centre of St Albans, there is an opportunity to integrate this development with many of the GTP proposals detailed in Section 6. This could include the City Centre Improvements along St Peter's/Victoria Street and the St Albans Green Ring (Packages PK24 – 29). Accessibility using sustainable travel modes to St Albans Abbey and City stations should be enhanced wherever possible and link to developments such as North of St Albans. This development may also have links to the Alban Way improvements between St Albans and Hatfield. As the development is close to central St Albans it is important that sustainable routes link this development to and from the town centre.
- 5.4.3 This development will also have interaction with Package 9, St Albans-Welwyn Garden City Connectivity, as vehicles travelling to and from the development use local roads between St Albans and Hatfield/Welwyn Garden City.

Figure 27: Outbound trips from the North of St Albans development – 2036 AM**Figure 28: Inbound trips to the North of St Albans development – 2036 PM**

5.5 West of London Colney

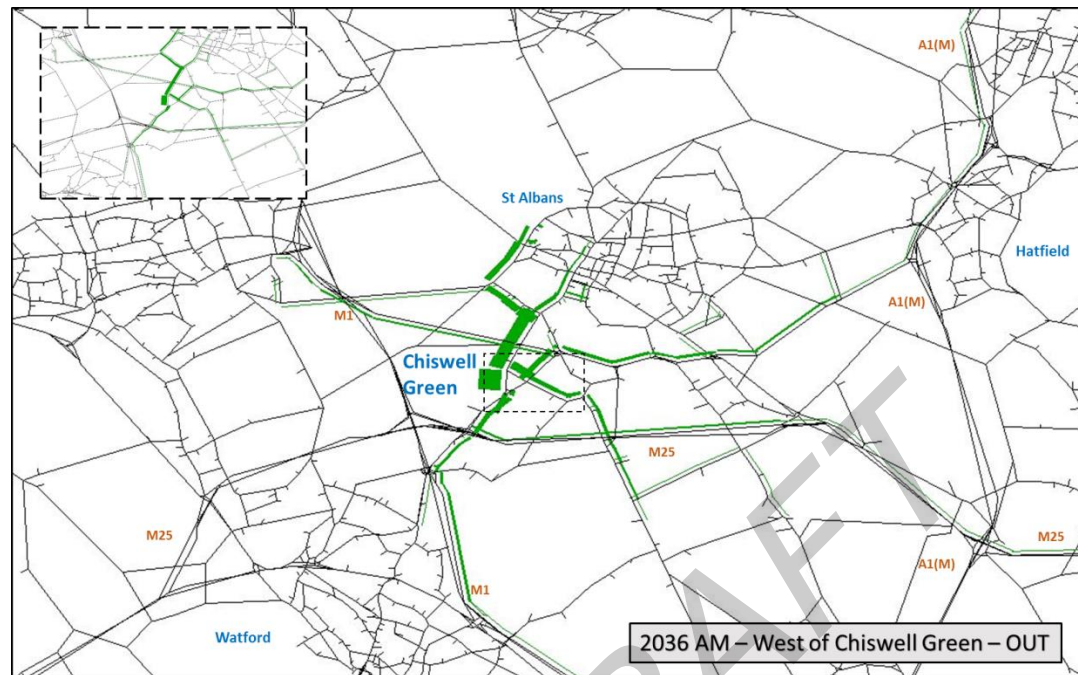
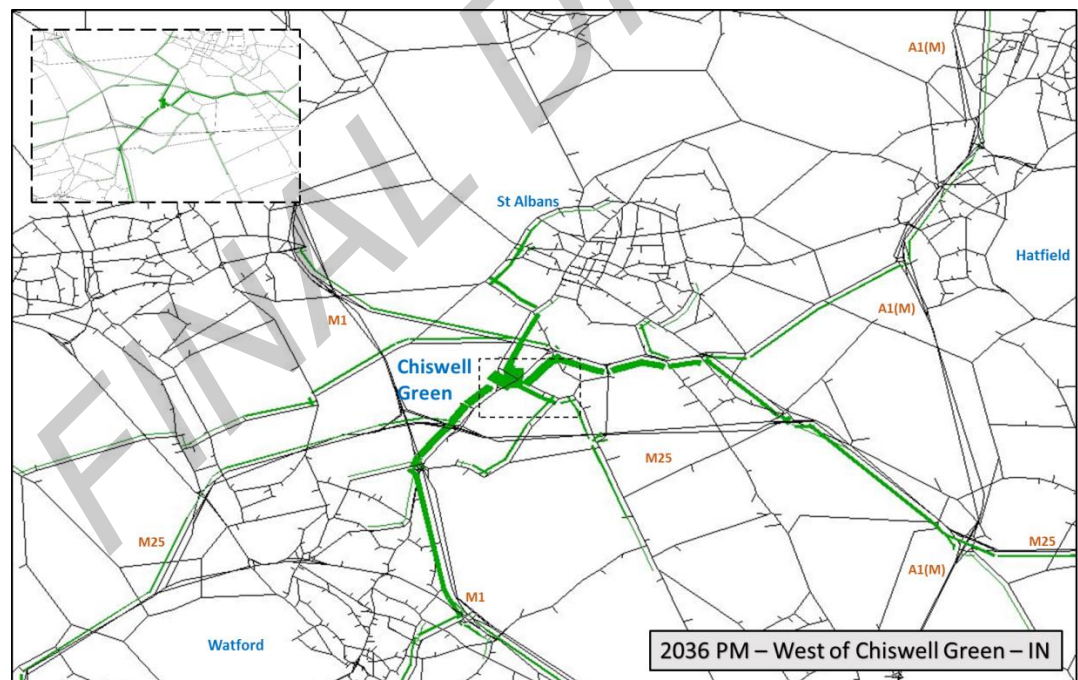
- 5.5.1 Trip distribution to and from the West of London Colney development are quite varied. In the AM peak, outbound trips show linkages with the A414 east and west of St Albans, the M25 in either direction and the A41/M1 to destinations in North London. There is also interaction with local zones around London Colney which may suggest that opportunities for more sustainable travel initiatives should be investigated. Similarly, linkages with Hatfield should be investigated by alternative modes.
- 5.5.2 Traffic accessing the West of London Colney development from the north via the A414 uses the B5378 while access from the M25 is primarily through Barnet Road and St Annes Road.

Figure 29: Outbound trips from the West of London Colney development – 2036 AM**Figure 30: Inbound trips to the West of London Colney development – 2036 PM**

- 5.5.3 The West of London Colney development is likely to interact with the London Colney Inter-Urban Local Connectivity and Internal Connectivity GTP schemes (Packages PK30-33) and Package 25, the St Albans Green Ring. If sustainable connections to London Colney could be improved this would provide another travel mode choice to/from St Albans. Improvements to the High Street would be experienced by residents/businesses in this development and links to St Albans via the High Street and A1081 should be enhanced and improved wherever possible. Improvement of sustainable links to St Albans and Hatfield as proposed in packages PK32-34 would improve local connectivity within the London Colney area by sustainable modes.

5.6 West of Chiswell Green

- 5.6.1 Trips distribution to and from the West of Chiswell Green development are quite varied. There is a strong interaction with the outer St Albans road network, as well as the M25 and A414 which are used for trips east and west of the development. Ragged Hall Lane and Bedmond Lane are used to access Chiswell Green for trips from the west. There are linkages to the M1 south of St Albans and Watford town centre as well as the A1(M) and Hatfield to the east.

Figure 31: Outbound trips from the West of Chiswell Green development – 2036 AM**Figure 32: Inbound trips to the West of Chiswell Green development – 2036 PM**

- 5.6.2 The West of Chiswell Green development will interact with the St Albans Green Ring proposals (PK25) and the A414 Highway Improvements south of St Albans (PK32, PK35). Given the location of the development there will also be strong interaction with the Chiswell Green Corridor Active Travel Improvements (PK35). Consideration should also be given to ensure linkages with this development and both railway stations in St Albans are maximised (Packages 26 and 27). The trip distribution shows sustainable links from Watford should be considered. Directions and way-finding should encourage trips by sustainable modes between Watford and the Chiswell Green area.

5.7 Park Street Garden Village

- 5.7.1 Trips to and from the Park Street Garden Village interact with many routes south of the A414 and central St Albans. Both the A41 and Park Street Lane and Bricket Wood are used to travel to/from Hemel Hempstead, Hatfield and locations further north using the A1(M) and junction 6 of the M1. The new spine road and junction are used to access A414 east. Traffic uses local roads south of the A414 such as Harper Lane to reach the M1 to the west of junction 22 or the M25 to the east. Traffic uses Tippendell Lane, and routes through Chiswell Green to access St Albans.
- 5.7.2 The development exhibits strong links with the M25 and strategic road network compared to other developments in SADC. There are also links to areas north of St Albans which should be encouraged by sustainable modes.
- 5.7.3 The Park Street Garden Village development will interact with the St Albans Green Ring on the western side of St Albans (PK25) and the A414 Highway Improvements south of St Albans (PK30, PK35). Links to the stations in St Albans (both St Albans Abbey and St Albans City - Packages 26 and 27) should be maximised to provide additional sustainable mode choices, although Park Street station is located close to the development.

Figure 33: Outbound trips from the Park Street Garden Village development – 2036 AM

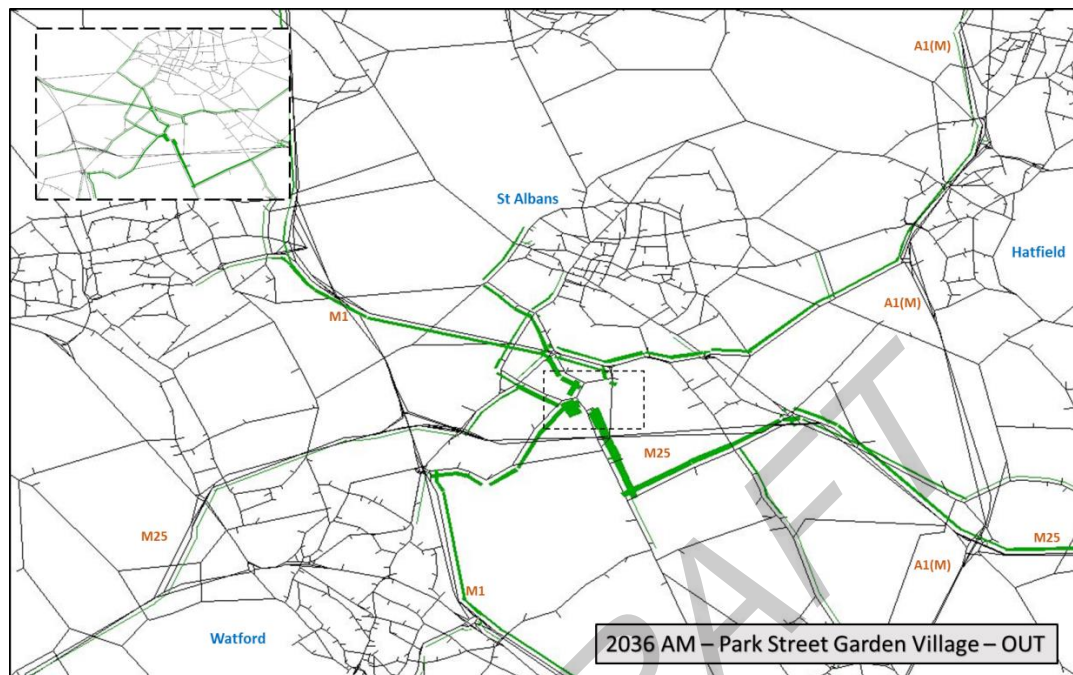
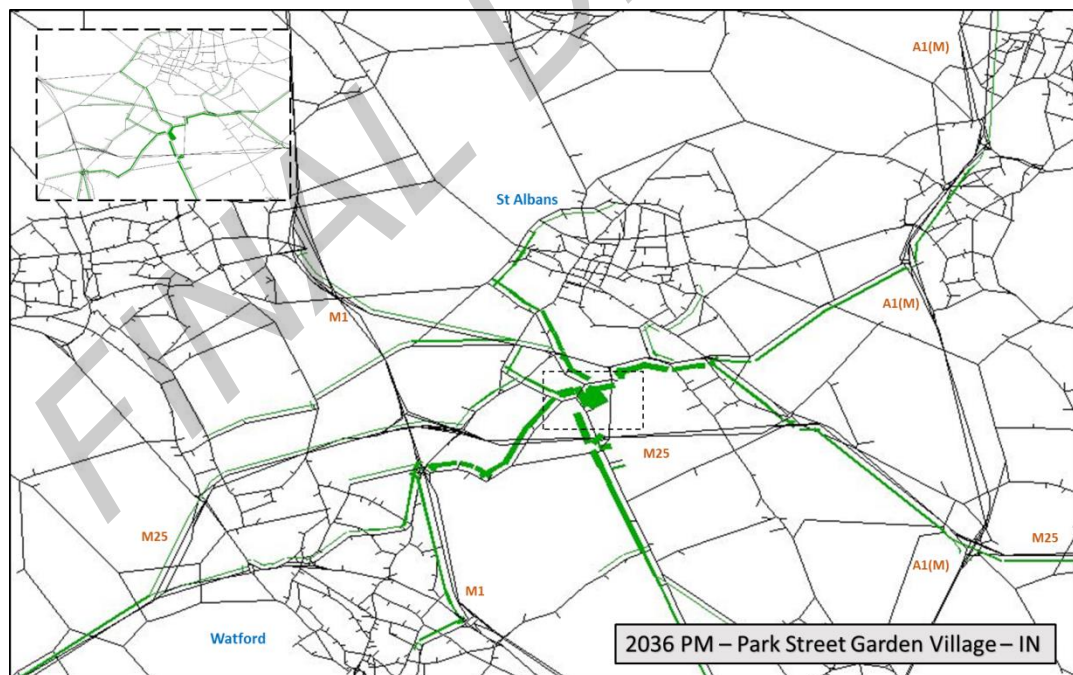
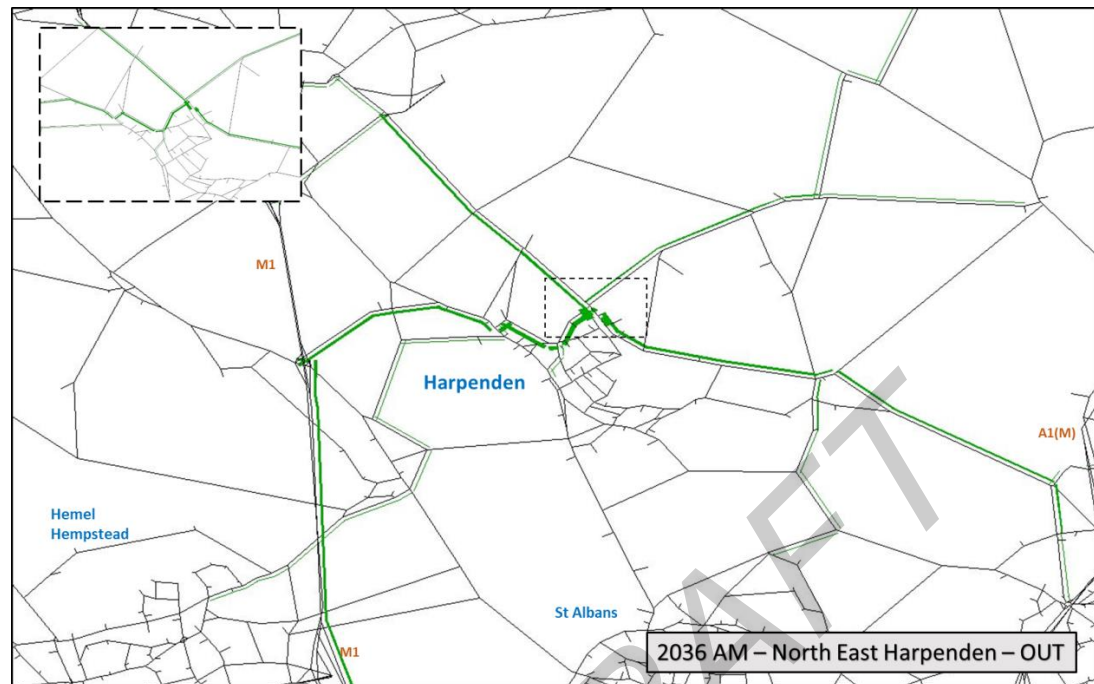
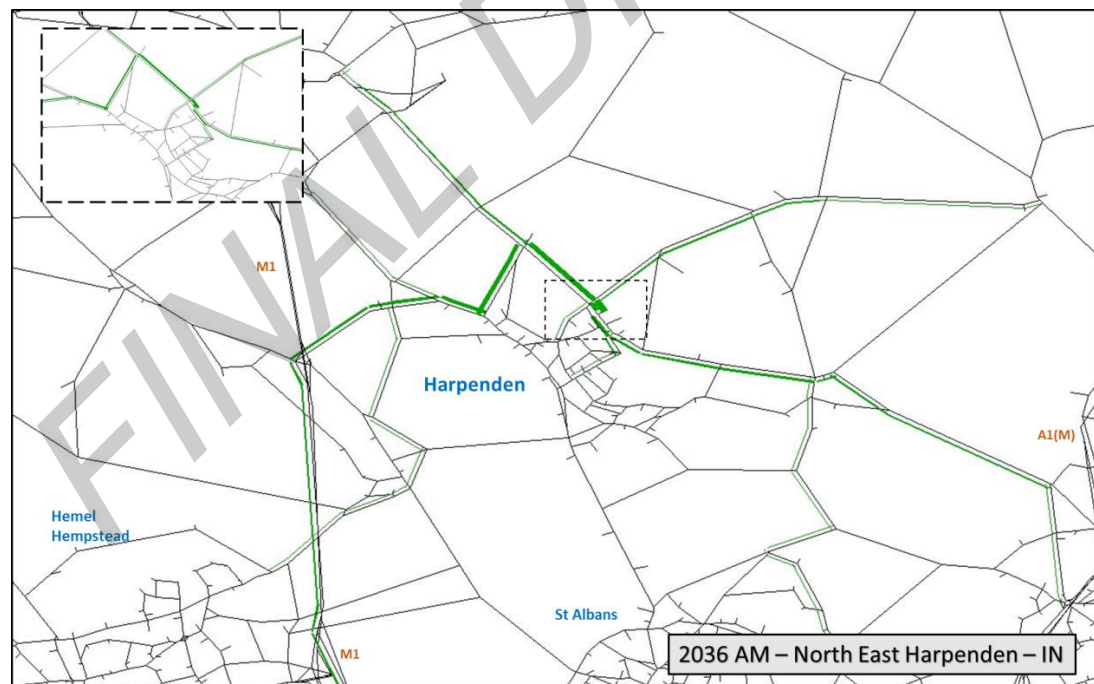


Figure 34: Inbound trips to the Park Street Garden Village development – 2036 PM



5.8 North East Harpenden

- 5.8.1 The North East Harpenden development interacts with routes east and west of Harpenden as vehicles travel to/from the M1 and A1(M) motorways. Lower Luton Road is used for trips to Luton or to Wheathampstead and Hatfield. Trips to the west and M1 re-route through Harpenden and via The Common. Patterns of movements are very similar in the AM and PM peaks suggesting that some local movements may be accommodated by other modes, however it is noted traffic avoids central Harpenden in the PM peak.

Figure 35: Outbound trips from North East Harpenden development – 2036 AM**Figure 36: Inbound trips to North East Harpenden development – 2036 PM**

- 5.8.2 The North East Harpenden development will predominantly benefit from the Luton-Wheathampstead-Hatfield and Welwyn Garden City GTP cycle improvements (Package PK16). As Harpenden has its own railway station, strong sustainable links to the station should be provided. Linkages to St Albans should be encouraged, especially by bicycle/bus however these may already be served by the railway service from Harpenden Station.

6. Scheme Mitigation

- 6.1.1 The modelling results and findings from LP4 have identified the strengths, weaknesses and opportunities of the traffic modelling and inform the likely impact of the new Local Plan allocations. This section includes further recommendations and concludes with considerations on whether there is a need for potential further mitigation options.
- 6.1.2 This will include considerations of whether there is a need for further potential measures to encourage the use of sustainable transport (beyond those already suggested in the GTP work) as well as traditional highway capacity measures to alleviate network stress and delay.

HCC sent⁴ AECOM a full list of sustainable measures that SADC are considering, some of which cannot be modelled in COMET. These are detailed in Table 4 and Table 5 along with qualitative analysis from LP4 which helps provide a narrative for the proposals. It should be noted that not all GTP proposals are supported by SADC.

Appendix A details the schemes physically added to the COMET model constituting Local Plan Run 4. It should be noted that some schemes were previously known as GTP measures originally. Table 4 focusses on the newly revised GTP schemes, as re-issued by AECOM to HCC in September 2019.

Table 5 details the additional GTP schemes from the SW Herts area. There may be some duplications in GTP scheme reference numbers.

⁴ Emails from Sue Jackson entitled "COMET model LP4 additional St Albans analysis" received on 15-Nov-18 and "COMET 2036 LP4: Final Infrastructure Queries" received on 26-Nov-18

6.1.3 Further analysis of the LP4 results shows there are 6 other locations within SADC which may require further mitigation considerations as detailed below. This report only contains high level suggestions of possible mitigation measures which should be investigated further by SADC/HCC.

Table 4: Commentary on sustainable transport measures in light of LP4 results from SC GTP Schemes

Package	Location	Scheme Code	Scheme Details	Scheme Details	Indicative Commentary on Schemes from LP4
PK 9	St Albans-Welwyn Garden City Connectivity	SM67	Coopers Green Lane Active Travel Infrastructure SW of Hatfield Avenue (towards St Albans)	Coopers Green Lane reimagined as a multi-modal corridor with reduced traffic speeds and provision made for pedestrians and cyclists. Segregated cycling and footway infrastructure along Coopers Green Lane to be provided as far as Sandpit Lane, and a new route along Sandpit Lane as far as Woodstock Road.	LP4 indicates there is congestion on the approaches to the Hatfield Avenue / Coopers Green Lane junction. Additionally some congestion on the approach to A1(M) junction. Any scheme which may reduce capacity is likely to intensify congestion and delays in this area.
		PR68	Coopers Green Lane Speed Limit Reduction	Reduced speed limit along Coopers Green Lane to support active transport infrastructure and reflect more urbanised environment along route adjacent to the NW Hatfield development	
		SM207	Sandpit Lane cycle improvements	New and improved cycle route provision along Sandpit Lane, off-road where feasible utilising footways which are widened and converted to shared use. Provide a link between Coopers Green Lane, the new Oaklands development, Verulam School and onwards towards St Albans city centre and the St Albans Green Ring	Some congestion shown in LP4 along Sandpit Lane, specifically at the Beechwood Avenue junction. Reducing capacity from roads to cycling infrastructure may be possible along some segments of Sandpit lane but near the town centre, off road options would be more cyclist friendly.
PK16	Luton-Wheathampstead-Hatfield and Welwyn Garden City Corridor	PR101	Harpenden-Wheathampstead Cycleway	Harpenden-Wheathampstead Cycleway - Complete missing link in National Cycleway 57 between Harpenden and Wheathampstead.	LP4 indicates congestion on Redbourn Lane and the B653 through Wheathampstead, these are key east-west routes between the M1 and A1(M) in north SADC. This would suggest encouraging east-west movements by cycling could help reduce local trips on these congested corridors. Due to the heavy volumes of flows, routes crossing the A1(M) to reach Hatfield should be carefully considered.
		PR102	Wheathampstead-Hatfield Cycleway	Wheathampstead-Hatfield Cycleway - Investigate options for cycling route between Wheathampstead and Hatfield, linking to new development at Symondshyde, potentially along Tower Hill Lane/Hammonds Lane.	
		PR103	Welwyn Garden City-Luton Bus Services	Investigate options for improved WGC-Luton bus services (existing services are infrequent).	
		PR203	B653/B197/Coopers Green Lane roundabout improvement	Junction improvement (as defined by the NW Hatfield, Stanboroughbury developer) to improve traffic conditions	

		SM106	A1(M) Junction 5 closure	Investigate potential for closing A1(M) junction 5 in order to improve traffic flow in Welwyn Garden City. Investigations into a possible closure would need to be considered in relation to how A1(M) Junctions 4 and 6 would operate in response, and whether improvements to these junctions and adjoining links would be required to mitigate the effects of rerouted traffic. Furthermore, other opportunities arising from any closure in terms of improving facilities for pedestrians and cyclists should also be explored.	
		PR104	Hatfield-Luton Bus Services	Maintain/seek to improve Hatfield-Luton bus services.	
		PR105	A6129/B197 Roundabout Signalisation	Junction improvement (signalisation?) to improve flow for right turning traffic from Luton to Hatfield, which is currently blocked by NB Hatfield-WGC traffic.	
		SM70	B653/Lemsford Village/Green Lanes junctions improvement	Junction improvements to reduce congestion and improve capacity and reliability.	
PK24	St Albans City Centre Improvements	PR139	St Albans Footway Improvements Study	St Albans Footway Improvements Study - Investigate potential for widening or otherwise improving narrow footways in the town centre to improve conditions for pedestrians.	LP4 includes wide scale speed reductions across the urban St Albans town centre. The majority of the town centre displays volume over capacity figures of under 80% indicating relatively free flowing traffic, however delays are experienced at Ancient Briton and the Peahen junction which are located near the High Street area. The LP4 model results show that strategic routes avoid the town centre. Reducing capacity for vehicular traffic by increasing footway widths or providing sustainable measures could be accommodated.
		PR140	St Albans City Centre 20mph zone expansion	Expanded 20mph zone in St Albans including Victoria Street, Bricket Road and Catherine Street. Any implementation of 20mph zone needs to be in accordance with HCC's Speed Management Strategy.	
		PR141	A1081 St Peter's Street Pedestrian Crossing	Reduced severance for pedestrians along A1081 St Peter's Road with a new signal-controlled crossing adjacent to the small shopping parade and St Peter's churchyard between St Peter's Close and Grange Street.	
		SM142a	St Peter's Street/Victoria Street Junction Reconfiguration	Junction reconfiguration to improve conditions for pedestrians and cyclists - widened footways on the north eastern and south-eastern corners of the junction. Close the section of Victoria Street as far west as the Maltings GP Surgery to through traffic, except buses. Traffic signal single-way working will enable buses to take a wider turn as there will not be opposing traffic to avoid, therefore enabling the footways to be increased in size.	
			(not included)		

		SM142b	St Peter's Street/Victoria Street Junction Reconfiguration	St Peter's Street/Victoria Street Junction Reconfiguration - Junction reconfiguration to improve conditions for pedestrians and cyclists. Widened footways on the north eastern and south-eastern corners of the junction. Victoria Street continues to be open to all traffic. Traffic signal single-way working will enable buses to take a wider turn as there will not be opposing traffic to avoid, therefore enabling the footways to be increased in size.	
		SM142c	St Peter's Street/Victoria Street Junction Reconfiguration	Renewed footway surfacing.	
		SM143	Victoria Street Urban Realm Improvements	Urban Realm Improvements along Victoria Street to improve conditions for pedestrians and improve amenity of the street.	
		SM144	Enhanced Victoria Street-Civic Centre-St Peter's Street Pedestrian Link	Enhanced Victoria Street-Civic Centre-St Peter's Street Pedestrian Link A new/enhanced link for pedestrians, associated with planned development on the former Police station and office block, between Victoria Street/Bricket Road, the Civic Centre and St Peter's Street (Nationwide Building Society).	
PK 25	St Albans Green Ring	PR148	St Albans Green Ring Enhancement - Beech Bottom/Batchwood Drive	St Albans Green Ring Enhancement - Beech Bottom/Batchwood Drive Beech Bottom-Batchwood Drive raised speed table crossing and improved markings.	<p>There is some congestion on roads that are designated as quietways that make up the St Albans Green Ring, particularly west of the town centre on routes to/from Hemel Hempstead. Delays are experienced at the Ancient Briton and King William IV junctions.</p> <p>Any schemes that affect capacity on the western side of St Albans are likely to induce further congestion if vehicle speeds lower and road space is reallocated to other modes to accommodate the Green Ring schemes.</p>
		PR149	St Albans Green Ring Enhancement - Townsend Drive	St Albans Green Ring Enhancement - Townsend Drive. Introduce a raised speed table crossing where the cycle route crosses Townsend Drive.	
		PR150	St Albans Green Ring Enhancement - Branch Road and St Michael's Street	Additional markings and signage on Branch Road and St Michael's Street to indicate the continuation of the Green Ring on road.	
		SM152	Existing level crossing closure – replacement facility	Existing level crossing closure – replacement facility. SM152a - A new bridge over the Abbey Line for pedestrians and cyclists broadly in the vicinity of the existing level crossing.	Assessing the impact of SM152 is not possible in COMET but removing a level crossing would aid pedestrians/cyclists.

		SM153	St Albans Green Ring 'Spoke' Routes	St Albans Green Ring 'Spoke' Routes - New cycle 'spoke' route - better signposting between the City Station, Hatfield Road and the Alban Way in the vicinity of Flora Grove, Breakspear Avenue, Vanda Close and Camp Road.	These measures would help reduce reliance on the private car in these areas. Routes between southern St Albans and Hatfield do experience some congestion, particularly around the A1081/A414 junction at London Colney and approaches to/from the A1(M). The Alban Way would provide a viable alternative to these routes and also reduce flows on the A1081 between London Colney and St Albans. LP4 modelling results would suggest that there is some capacity on the radial routes east of St Albans therefore there may be scope for some road space to reallocate to cycle lanes that link to the Alban Way.
		PR154	Alban Way Lighting	Alban Way Lighting - Implement lighting along Alban Way, either 'always on' or sensor activated.	
		PR155	Alban Way Wayfinding	Alban Way Wayfinding - Wayfinding to Alban Way in St Albans And Hatfield. Extension of Alban Way branding/signage/wayfinding beyond the extents of the actual cycleway to provide easier wayfinding to it.	
		PR156	Alban Way Cycle Signage	Alban Way Cycle Signage- Improved cycle signage along Alban Way. Include 'reference point' signage to provide an indication to cyclists of where they are in relation to nearby prominent land use features, and distances/estimated journey times to key locations.	
		SM157	Alban Way Physical Improvements	Alban Way Physical Improvements - "Physical improvements including surface, crossings, general maintenance, etc. Maintain the crossing over the Abbey Line as a priority, and incorporate into any improvement scheme. Investigate sensor lighting. Manage vegetation along the route, and clear leaf mould regularly from the relatively new surface to avoid mud building up. Investigate widening and lighting the path as it passes through Hatfield, especially to the east of the Galleria, or consider alternative busier routes as part of the Hatfield regeneration plans."	
		PR158	Alban Way Marketing and Promotion	Alban Way Marketing and Promotion - Marketing and promotion of Alban Way as an attractive sustainable transport connection alongside Hatfield regeneration plans.	
PK26	St Albans Abbey Station Accessibility	PR159	Cycle Parking	Cycle Parking - Increase cycle parking provision at St Albans Abbey station.	Volume over capacity in the area of St Albans Abbey Station suggests that congestion is minimal, however there are delays at the Peahen junction further north. There is congestion and delays on the approaches to the King Harry junction which is a known bottleneck south of the station. An alternative junction on the A414 may relieve some congestion.
		PR160	Station to Station Connectivity	Investigate options for improved connections between St Albans Abbey Station and the town centre and St Albans City station, including maintaining existing shuttle bus with additional marketing/promotion programme, additional wayfinding signage. A new shuttle bus link between St Albans City and the proposed southern St Albans Abbey Line hub (SW-SM13) would also provide better links between the Abbey Line and City station.	

		SM161	St Albans Abbey Station Relocation	St Albans Abbey Station Relocation - Investigate long term potential for relocation of St Albans Abbey station to Cottonmill area of St Albans to facilitate development in the area and realise opportunities for a bus interchange at the station. This may be less viable if an additional or enhanced station is provided on the southern edge of St Albans (see SW-SM13 below). A station relocation could release the existing station site for redevelopment. A relocation could however be costly, with the existing rail track and overhead wires removed.	SADC does not support these options. There is also a query as to whether they would be delivered before 2036.
		SM152	Existing level crossing closure – replacement facility	Existing level crossing closure – replacement facility. SM152a - A new bridge over the Abbey Line for pedestrians and cyclists broadly in the vicinity of the existing level crossing.	Impact cannot be assessed in COMET
		SM162 option a	Abbey Line Park & Rail Hub	Abbey line P & R hub - extension of Park Street station platform (SADC preferred option)	This is the preferred option for SADC and would help improve capacity and enhance the Abbey Line (please note this is the same as SM13a in Table 5 below)
		SM162 option b	Abbey Line Park & Rail Hub	Abbey line additional station and facility	SADC does not support these options. There is also a query as to whether they would be delivered before 2036 (please note these are the same as SM13b, SM13c & SM13d in Table 5 below)
		SM162 option c	Abbey Line Park & Rail Hub	Abbey line additional station and bus only link	
		SM162 option d	Abbey Line Park & Rail Hub	Abbey Line, Park street station relocated	
PK27	St Albans City Station Accessibility	SM163	Victoria Street Footway Improvements	Victoria Street Footway Improvements - Improved and widened footways at the junctions with Ridgmont Road and Alma Road/Beaconsfield Road and the link in between to increase capacity for high pedestrian volumes to/from the City station especially during peak periods. The potential impact of a loss of road space could be increased queues and delays. Any magnitude of impact will need to be carefully investigated prior to implementation of any changes. The objective however of this intervention is to improve the walking environment and encourage modal shift by 'nudging' motorists out of their cars, especially those making shorter distance journeys within St Albans e.g. taking pupils to/from school.	There is some congestion on Victoria Street in LP4, however this is to be expected with many junctions in close proximity. COMET does not include any road widths and Victoria Street is very wide with kerbside parking along some of its length which does not impact vehicle flows. There are opportunities to reallocate road space to other modes and to encourage journeys by other modes. The geometry of Beaconsfield Road/Victoria Street/Alma Road could be improved to narrow the junction and cater for the high pedestrian demand to and from the station.

	PR164	Victoria Street Wayfinding	Victoria Street Wayfinding - Improved wayfinding between town centre and station.	
	SM165	Pedestrian Crossing Improvements	Pedestrian Crossing Improvements - Improve crossings at intersections with consistent type and placement of signals and signal call buttons, and pedestrian priority interventions such as zebra crossings at intersections and maintaining footway level/surfacing across minor roads.	
	SM166	Victoria Street Urban Realm Improvements	Victoria Street Urban Realm Improvements - Urban Realm Improvements along Victoria Street to improve conditions for pedestrians and improve amenity of the street.	
	PR167	Cycle Parking	Cycle Parking. Maintain or increase current and safeguard locations for future provision of cycle parking at St Albans City station and in the town centre, especially as part of the proposed station ticket hall improvements on Ridgemont Road which could also form part of a cycle hub facility.	
	PR168	Grosvenor Road-Ridgemont southern active travel route to the station	Grosvenor Road-Ridgemont southern active travel route to the station - Improved walking/cycling infrastructure along Grosvenor Road and Ridgemont Road for access to the City station. Also as part of SW-SM13, there is the potential for a bus St Albans City-Southern PT Hub bus link which could route via Ridgmont Road. Further investigations would be required.	

PK28	Hatfield Road Corridor - St Albans	PR169	Hatfield Road Parking Study	Hatfield Road Parking Study - Undertake parking study to understand parking requirements and investigate potential for removal of parking along Hatfield Road. Prior to any changes being implemented, any study should also involve consultation with local residents and businesses and an impacts assessment undertaken to determine if there would be any detrimental effect on local businesses.	Hatfield Road suffers from congestion and delays at its eastern end approaching Hatfield. This could be combined with promotion of the Alban Way to encourage sustainable travel between the towns. COMET does not consider parking (which limits road capacity) and the road is only one lane in each direction, however any reduction in speed limit would probably increase the congestion along this route (or reallocate to parallel routes).
		PR170	Hatfield Road Bus Priority and Improvements	Investigate options for bus improvements, such as improved bus stops with real-time service information, and priority measures along Hatfield Road in order to improve reliability and reduce travel times on routes to Hatfield/WGC.	
		SM171	Hatfield Road Urban Realm Improvements	Hatfield Road Urban Realm Improvements - Urban Realm Improvements along Hatfield Road to improve conditions for pedestrians and improve amenity of the high street, potentially as a result of parking removal along all or part of the street as recommended by the parking study (PR169).	
PK29	London Road Corridor - St Albans	PR172	Odyssey Cinema revised footway and crossing	Odyssey Cinema revised footway and crossing - Widening of the footway outside the cinema and relocation of the signal controlled crossing north-westwards to improve safety for pedestrians entering/exiting the cinema.	There is limited congestion in this area in LP4. Results would suggest that the junctions in this area have the capacity and road space. There may be scope for road space to be reallocated (and converting the existing roadside parking) to other modes and there would be limited impact. Given the proximity of other junctions around the town centre there would only be a very local impact.
		SM173	Parking revisions	A review of on-road parking provision along the corridor to consider whether it can be rationalised in order to improve conditions for cyclists and provide additional crossing facilities. Prior to any changes being implemented, any study should also involve consultation with local residents and businesses and an impacts assessment undertaken to determine if there would be any detrimental effect on local businesses.	

		SM174	London Road/Watsons Walk/Lattimore Road junction alterations	Reconfigure the junction to rationalise surplus road space for example the right turn filter lanes on London Road. Remove guardrails. Provide new markings to reinforce existing off-road cycle route or mark it on the road. Widen footways where feasible especially to reduce crossing distances. The potential impact of a loss of road space could be increased queues and delays. Any magnitude of impact will need to be carefully investigated prior to implementation of any changes. The objective however of this intervention is to improve the walking environment and encourage modal shift by 'nudging' motorists out of their cars, especially those making shorter distance journeys within St Albans e.g. taking pupils to/from school.	
		PR175	Peahen junction signal timing reconfiguration	Reconfigure the signal timings so that the Holywell Hill and Chequer Street arms run separately. The aim would be to reduce the occurrence of right turning vehicles blocking the northbound movements.	
PK30	A414 Highway Improvements (South of St Albans)	SM176	A414/A1081 London Colney Roundabout Upgrade	A414/A1081 London Colney Roundabout Upgrade - Conversion of the existing signal-controlled roundabout into a signal-controlled hamburger junction which incorporates an east-west A414 through-link. Consideration should be given to the movement of bus services through the junction and how this could be optimised.	There are delays and congestion along the A414 south of St Albans however the route is a high speed road with many large junctions. There is little evidence of strategic routing through St Albans. The A414 appears to cater for the movements.
		SM177	A414 Park Street Roundabout Improvements	A414 Park Street Roundabout Improvements - An improvement to the existing roundabout layout with signal-control introduced to most if not all arms and some minor physical alterations to the junction's layout.	Any mode shift to sustainable modes could be encouraged by improvements, however it is assumed that any improvements or schemes for other modes would be kept off the carriageway due to safety concerns. These should be promoted and links with the Alban Way made to help reduce congestion on the A414. Results from LP4 indicate there isn't much strategic routeing through St Albans town centre.
		SM178	A414 Colney Heath Longabout Improvements	A safety and capacity related improvement to the existing longabout junction which includes introducing a signal-controlled right turn 'cut-through' for traffic exiting from High Street towards A414 East.	
		SM179	A414 Smart Traffic Management	A review of traffic speed limits and measures required to improve compliance along the A414 Between the Park Street Roundabout and the A1(M) Junction 3). This could include adoption of 'expressway' type technology enhancements which can manage traffic speeds during busy periods and in response to incidents occurring downstream.	
		SM180	Traffic Routing Signage	Traffic Routing Signage - Review and renew signage within St Albans and the surrounding area to ensure motorists are directed towards the A414 for making onward journeys on the A1(M).	
		SM181	A414 Cycle Route upgrade London Colney-Hatfield	A414 Cycle Route upgrade London Colney-Hatfield - Improve the existing footway alongside the A414 to accommodate pedestrians and cyclists between the London Colney Roundabout and Comet Way (Hatfield).	

		SM206	A414 Corridor Park Street-Napsbury-London Colney Cycle Route	A414 Corridor Park Street-Napsbury-London Colney Cycle Route - Upgrade of the existing footway to facilitate shared use by pedestrians and cyclists, providing better connectivity between Park Street (including the proposed station hub (SW-SM13)), the proposed Napsbury interchange for MRT Bus line and London Colney.	
PK31	London Colney Inter-Urban Strategic Public Transport Connectivity	SM183	London-Colney Railway Station	London-Colney Railway Station – Investigate a long term aspiration for a new railway station on the Midland Mainline served by Thameslink rail services, comprising of 2 platforms on the “slow” tracks only or 4 platforms (to mirror the provision at all other MML Thameslink stations). Station would be served by all “stopping” Thameslink services between Luton/St Albans and London (and beyond) and could potentially be served by some or all fast Thameslink services. This would require extensive consultation with DfT, Network Rail and rail operators to determine operational feasibility and a favourable business case which will confirm if there is a need and it presents good value for money. New link road to London Colney will be required, incorporating a lit, shared footway/cycleway and some parking (the amount of parking will need to be determined). Station could be located broadly west of London Colney.	This scheme would be post 2036, but is desired by SADC. Providing a viable rail alternative between St Albans and London Colney (plus other locations in St Albans District) could help reduce car trips.
		SM185	Upgrade of the A414 Napsbury Junction	Upgrade of the A414 Napsbury Junction - Improvements to the A414 Napsbury Junction in conjunction with a new PT facility (SM182), including upgrade of slip road merges and diverges to ensure they comply with current design standards.	Compared to the Base Year, Napsbury experiences increased delays of up to 1 minute in Local Plan Run 4. Flows at this junction increase compared to the base year in all time periods.
		SM186	B5378 Active Travel Corridor (if a PT interchange is provided at Napsbury)	B5378 Active Travel Corridor (if a PT interchange is provided at Napsbury) - Upgrade of existing footway to provide shared use footway/cycleway along the entire length between the junction with St Anne's Road (London Colney) and the A414 Napsbury Junction.	
		SM187	B5378 Active Travel Corridor (if a PT interchange is provided west of London Colney)	B5378 Active Travel Corridor (if a PT interchange is provided west of London Colney) - Upgrade of existing footway to provide shared use footway/cycleway along the length of the B5378 between the St Anne's Road and Coombes Road junctions.	Key linkages by sustainable modes including bus and cycling should be made to St Albans City Railway Station, the Alban Way and towns to the south in Hertsmere.
		SM206	A414 Corridor Park Street-Napsbury-London Colney Cycle Route	A414 Corridor Park Street-Napsbury-London Colney Cycle Route - Upgrade of the existing footway to facilitate shared use by pedestrians and cyclists, providing better connectivity between Park Street (including the proposed station hub (SW-SM13)), the proposed Napsbury interchange for Bus Rapid Transit Line and London Colney.	Demand from planned developments are likely to use active travel corridors for short trips, for example those in West of London Colney shows a large proportion of short trips within London Colney or to St Albans which could be catered for using active travel corridors and a new public transport interchange.
PK32	London Colney Inter-Urban Local Connectivity	PR188	London Colney A414 Cycle/Pedestrian Bridge Improvements	London Colney A414 Cycle/Pedestrian Bridge Improvements - Improvements to the existing overpass approaches including thinning vegetation to increase security, removal of kissing gates, wayfinding and signage, etc.	LP4 indicates limited congestion along London Colney High Street however delays are recorded at the junctions either end (A414/A1081 and M25 Junction 22). Any improvements that would reduce highways trips would help reduce congestion at these junctions.

		SM208	London Colney A414 Sustainable Travel Bridge	London Colney A414 Sustainable Travel Bridge - Investigate longer term options for a new, more attractive sustainable travel bridge over the A414 which will be capable at least of accommodating pedestrians and cyclists but also potentially future PT and autonomous mass transit vehicles.	There are delays at the A414/A1081 hamburger junction therefore accommodating additional bus services should be carefully considered.
		SM190	Improved Pedestrian and Cycle Links within London Colney on the High Street	Improved Pedestrian and Cycle Links within London Colney on the High Street - Improved active travel infrastructure between London Colney and St Albans, including footways, cycleways, crossings, lighting, signage, etc., to encourage more trips to be made by active modes.	
		SM176	A414/A1081 London Colney Roundabout Upgrade	A414/A1081 London Colney Roundabout Upgrade - Conversion of the existing signal-controlled roundabout into a signal-controlled hamburger junction which incorporates an east-west A414 through-link. Consideration should be given to the movement of bus services through the junction and how this could be optimised.	
		PR191	Improved London Colney-St Albans bus services	At least maintain or seek to improve service levels of all bus routes through London Colney including routes 84, 358, 602 and 658. Explore potential for existing enhanced or brand new service if South Mimms garden village proceeds (to form a sustainable transport corridor).	Improvements to bus provision and services would help encourage mode shift for short journeys to St Albans and Hatfield.
		SM206	A414 Corridor Park Street-Napsbury-London Colney Cycle Route	A414 Corridor Park Street-Napsbury-London Colney Cycle Route - Upgrade of the existing footway to facilitate shared use by pedestrians and cyclists, providing better connectivity between Park Street (including the proposed station hub (SW-SM13)), the proposed Napsbury interchange for Bus Rapid Transit and London Colney.	
PK33	London Colney Internal Connectivity	SM192	High Street streetscape improvements	High Street streetscape improvements - Streetscape improvements adjacent to High Street shopping parade incorporating a new crossing facility, traffic calming, reduced parking (with space given over to cycle parking) and widened footway with new surfacing.	There is limited congestion on local roads within the London Colney area suggesting there is capacity available for other modes or reallocation of road space to accommodate active travel measures.
		PR193	High Street 20mph speed limit	A 20mph speed limit introduced on the section of the High Street adjacent to the shopping parade.	
		PR194	Town wide 20mph speed limit	A 20mph speed limit introduced on all roads within London Colney.	
		PR195	Cross-town core pedestrian and cycle route linked to potential new housing development	Cross-town core pedestrian and cycle route linked to potential new housing development - Cross-village core pedestrian and cycle route or routes linked to potential new housing development on land to the west of London Colney. Should comprise of new signal-controlled crossing provision on B5378 Shenley Road and improvements along St Anne's Road (to the High Street and onward connection to the retail park).	Large proportion of short trips within London Colney or to St Albans which could be catered for with a cross town core pedestrian and cycle route. This could be coordinated with a new public transport interchange to improve active access to the interchange.

PK34	St Albans-Hatfield Local Connectivity	SM180	Traffic Routing Signage	Traffic Routing Signage - Review and renew signage within St Albans and the surrounding area to ensure motorists are directed towards the A414 for making onward journeys on the A1(M).	LP4 indicates there is congestion on the approaches to the Hatfield Avenue / Coopers Green Lane junction. Any scheme which may reduce capacity is likely to intensify congestion and delays in this area.
		PR197	St Albans-Hatfield Local Bus Route Improvements	Support improvements to local stopping bus services between St Albans and Hatfield, including increased frequencies and extended hours of operation (Service 724 will need to be considered in conjunction with Bus Rapid Transit line which will provide wider connectivity across Hertfordshire).	
		SM67	Coopers Green Lane Active Travel Infrastructure (SW of Hatfield Avenue)	Coopers Green Lane Active Travel Infrastructure (SW of Hatfield Avenue) - Cycling and footway infrastructure along Coopers Green Lane, including link to Hatfield Business Park.	
		PR68	Coopers Green Lane Speed Limit Reduction	Reduced speed limit along Coopers Green Lane to support active transport infrastructure and reflect more urbanised environment along route due to Symondshyde development.	
PK35	Chiswell Green Corridor Active Travel Improvements	SM200	B4630 Watford Road Improvements	Intervention to reduce traffic: Currently B road with highest flows in Hertfordshire. On road cycle lane in each direction (removing central hatched areas) and improved footways and crossing facilities around the shopping parades on both sides of the road.	LP4 indicates there are delays and congestion on all approaches to the Park Street Roundabout. Signalisation should be considered and linked to other signal junctions in the local area.
		SM177	A414 Park Street Roundabout Improvements	A414 Park Street Roundabout Improvements - An improvement to the existing roundabout layout with signal-control introduced to most if not all arms and some minor physical alterations to the junction's layout.	Junction delays remain similar to the Base Year. Delays are approximately 30 seconds at some arms. Congestion observed on A414 and A405 North Orbital arms of the junction.
		SM201	A405/B4630 Watford Road junction reconfiguration	Conversion of the existing roundabout to a signal-controlled crossroads with more priority given to the A405 arms. Improvements would need to ensure signal priority is given to bus services (e.g. 321) in terms of GPS / transponder technology. Any junction improvement needs to ensure that provision is made for the planned A405 cycle route (SW-SM20).	
PK36	Alban Way Improvements	PR154	Alban Way Lighting	Alban Way Lighting - Implement lighting along Alban Way, either 'always on' or sensor activated.	Routes between southern St Albans and Hatfield experience some congestion, particularly around the A1081/A414 junction at London Colney and approaches to/from the A1(M). The Alban Way would provide a viable alternative to these routes and also reduce flows on the A1081 between London Colney and St Albans. LP4 results suggest there is some capacity on the radial routes east of St Albans therefore if additional road space was removed and converted to cycle lanes to link to the Alban Way this may be feasible.
		PR155	Alban Way Wayfinding	Alban Way Wayfinding - Wayfinding to Alban Way in St Albans And Hatfield. Extension of Alban Way branding/signage/wayfinding beyond the extents of the actual cycleway to provide easier wayfinding to it.	
		PR156	Alban Way Cycle Signage	Alban Way Cycle Signage- Improved cycle signage along Alban Way. Include 'reference point' signage to provide an indication to cyclists of where they are in relation to nearby prominent land use features, and distances/estimated journey times to key locations.	

	SM157	Alban Way Physical Improvements	Alban Way Physical Improvements -"Physical improvements including surface, crossings, general maintenance, etc. Maintain the crossing over the Abbey Line as a priority, and incorporate into any improvement scheme. Investigate sensor lighting. Manage vegetation along the route, and clear leaf mould regularly from the relatively new surface to avoid mud building up. Investigate widening and lighting the path as it passes through Hatfield, especially to the east of the Galleria, or consider alternative busier routes as part of the Hatfield regeneration plans."	
	PR158	Alban Way Marketing and Promotion	Alban Way Marketing and Promotion - Marketing and promotion of Alban Way as an attractive sustainable transport connection alongside Hatfield regeneration plans.	

Table 5: Commentary on sustainable transport measures from SW GTP in light of LP4 results

Scheme Details	Scheme Code	Indicative Commentary on Schemes from LP4
Hemel Hempstead Eastern Spine Road (multimodal)	SM6b	This was tested in LP4 and performs well both at junctions to Leighton Buzzard Road and Hemel Hempstead Road. It also significantly changes routeing options through Hemel Hempstead when combined with changes at M1 junction 8.
M1 Junction 8 Enhancement	SM7c	Some congestion on approach to slip roads in both directions.
HH townwide bus service reconfiguration, maximising connections to Maylands, the station, town centre and EW links to neighbouring towns.	SM8	
Dedicated coach Luton to Hemel - A new express coach service along the M1 connecting Hemel Hempstead to Luton or potential to divert existing Greenline services from Luton to London via Hemel Hempstead (Maylands). Would complement East Hemel (Maylands) Multi-Modal Transport Interchange (LP2).	SM10	This would help reduce congestion between the Maylands developments and the town centre/station if implemented. Considerable A414 schemes were included in LP4 so results should be considered in light of this.
Abbey line P & R hub – extension of Park Street station platform (SADC preferred option)	SM13a	This is the preferred option for SADC and would help improve capacity and enhance the Abbey Line (please note this is the same as SM162a in Table 4 above)
Abbey line additional station and facility	SM13b	SADC does not support these options. There is also a query as to whether they would be delivered before 2036 (please note these are the same as SM162b, SM162c & SM162d in Table 4 above)
Abbey line addition station and bus only link	SM13c	
Abbey line, Park Street station relocated	SM13d	
A405 Cycleway	SM20	Would help relieve congestion on the A405 in southern St Albans but as the road is very congested would suggest any scheme is segregated from the traffic.
A414 - Jct 8 cycle bridge	SM29	LP4 is not suitable for assessing these schemes, however any scheme which would promote sustainable measures given the growth planned in east and north Hemel should be encouraged.
East Hemel Multi-Modal Interchange	PR19	
Maylands Central Car Park	PR95	
Maylands shuttle service and ML1 enhancements - A shuttle bus service connecting the multi-modal transport interchange, car park and Maylands area, potentially incorporating enhancements to existing ML1 services.	PR96	This would help reduce congestion between the Maylands developments and the town centre/station if implemented. Considerable A414 schemes were included in LP4 so results should be considered in light of this.
Converting Nicky line to public transport (discounted at early stage)	SM9	HCC advised scheme would not progress.
Nickey Line N-S Extension	PR20	Extended the Nickey Line and providing sustainable travel choices north and south of the existing coverage should be encouraged if mode shift is envisaged.
A4147 cycleway, Hemel	PR21	LP4 shows congestion on the A4147 in Hemel Hempstead both along Maylands Avenue and Green Lane. Providing an alternative mode choice could help ease congestion.
A414 cycleway, Hemel to Park Street	PR22	Considerable A414 schemes were included in LP4 so results should be considered in light of this. Removing further capacity on the road network in this area is likely to exasperate congestion issues in the area, however an off-road cycle route could help ease congestion by providing another mode choice.
New lighting on Nickey Line cycle route	PR30	LP4 is not suitable for assessing this scheme
Improved step free access to Nickey Line	PR100/PR101	

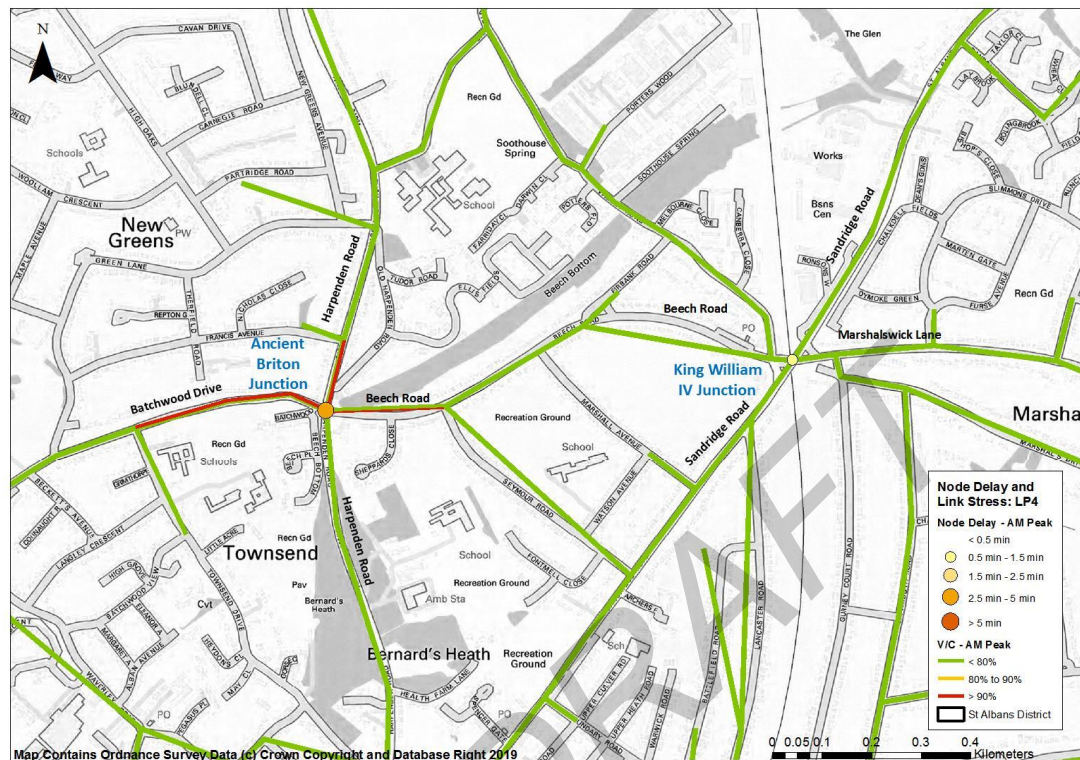
Improve capacity on slip roads at M1 J10 south of Luton with the intention of reducing congestion and consequently encouraging trips to travel on the M1 rather than avoiding delays by instead rat-running along local roads via Kinsbourne Green and Harpenden. Cooperation with Highways England required	PR35	LP4 shows that capacity improvements encourage traffic to remain on A1081 and join the M1 rather than rat running. This has reduced the rat running seen parallel to the M1. East west movements still use local routes between Harpenden and Luton.
A1081 Harpenden TC capacity reduction and streetscape improvements. Narrowing of road, more crossings and speed tables in town centre and on Station Road	PR36	LP4 shows some reduction in traffic passing through Harpenden Town Centre.
A1081 cycle corridor	PR37	<p>There are no capacity issues along the A1081 between Harpenden and St Albans. Between St Albans town centre and M25 Junction 21, LP4 shows congestion at A1081/Drakes Drive and on the approaches to London Colney Roundabout and the Bell Roundabout.</p> <p>Some capacity could be reallocated to cycling lanes. Free flow speeds along this road are national speed limit, therefore off road cycling provision should be considered.</p>

FINAL DRAFT

6.2 Ancient Briton and King William IV Junctions

- 6.2.1 Signal optimisation undertaken in LP4 did not reduce delays at either junction. At the Ancient Briton junction delays are greatest for Batchwood Drive (up to 3 minutes). There is limited scope to improve conditions due to the highway boundary around the junction. At the King William IV junction delays are greatest for straight ahead movements on Marshalswick Lane (5-6 minutes), Beech Road (5 minutes) and straight and left turn movements on Sandridge Road. The left turn from Sandridge Road northbound also experiences delays of up to 4 minutes. There is limited scope for improvements due to the proximity of the railway.
- 6.2.2 It is acknowledged that the highway boundary and existence of buildings around these junctions does not provide much capacity to propose alternative measures. Ancient Briton and King William IV junctions form part of the outer link road network around St Albans. Both junctions will be influenced by the North of St Albans development which is located north of the Ancient Briton junction.
- 6.2.3 A signage strategy diverting some traffic away from the ring road may help to reduce the congestion and delays at these junctions. Traffic flows and volumes may also be influenced by the St Albans Green Ring proposals in this area which may reduce speeds and therefore the attractiveness of the route as road space may be reduced or allocated to other modes. However with sufficient uptake, the St Albans Green Ring proposals (Package 25) could help alleviate pressure on this junction. Links to St Albans City and Abbey stations should be promoted to encourage alternative travel options (Packages 26 and 27).

Figure 37: 2036 LP4 traffic conditions at the Ancient Briton and King William IV Junctions



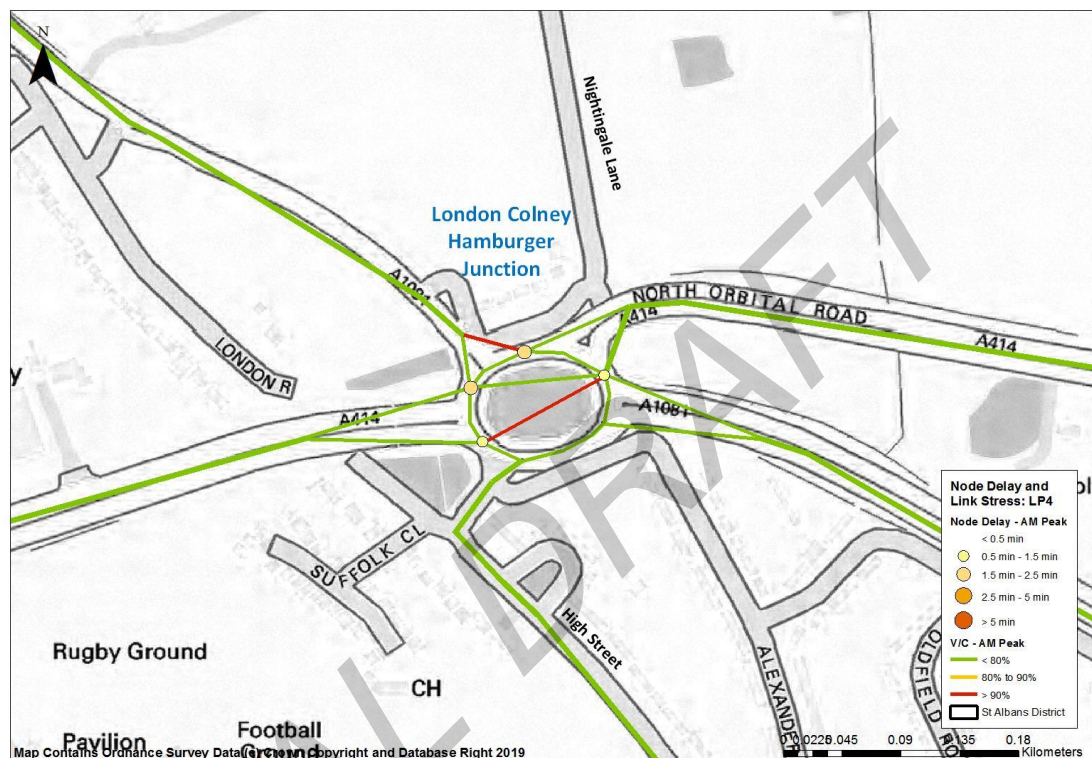
- 6.2.4 Given the pressures on these junctions it is imperative that any traffic signals are linked and can adapt to changing flows during the day. It may be that delays at these junctions have to be accommodated as they help complement other measures, or there are no viable alternatives given the limited carriageway space available.

6.3 London Colney Hamburger Roundabout

- 6.3.1 LP4 included the conversion of London Colney Roundabout into a Hamburger roundabout, this was previously tested as part of the A414 strategy. No signal timings were provided for this junction, all timings were assumed. Delays of up to 2 minutes are experienced at this junction. The A1081 southbound arm experiences the greatest delays in both time periods (5 minutes in AM, 2.5 minutes in PM). There are also delays of up to 4 minutes for A414 eastbound flows. The greatest demand in flows at the junction comes from the A414 arms and the northbound A1081 arm. Delays at this junction may be reduced once the full signal timings for the scheme are known. The timings are estimated based on demand flows on each arm, however COMET does not allow further optimisation.
- 6.3.2 It is acknowledged this junction will be affected by surrounding developments, particularly at Park Street Garden Village and Tyttenhanger Garden Village in Hertsmere. It is important that delays at this junction are minimised to ensure growth does not materially increase delays and congestion in the area. Signal timings should be vehicle actuated and more detailed junction modelling would help refine the scheme at this location.

- 6.3.3 This junction is also one of the key access points to London Colney which is subject to various sustainable transport measures (packages PK31-34). Delays may limit the success of these measures if the area is highly congested. A longer term aim of installing a railway station (package 31) would encourage mode shift and reduce congestion at this junction. Linking London Colney to St Albans via the cycling measures proposed would also help reduce dependency on car trips through this junction (Package 31).

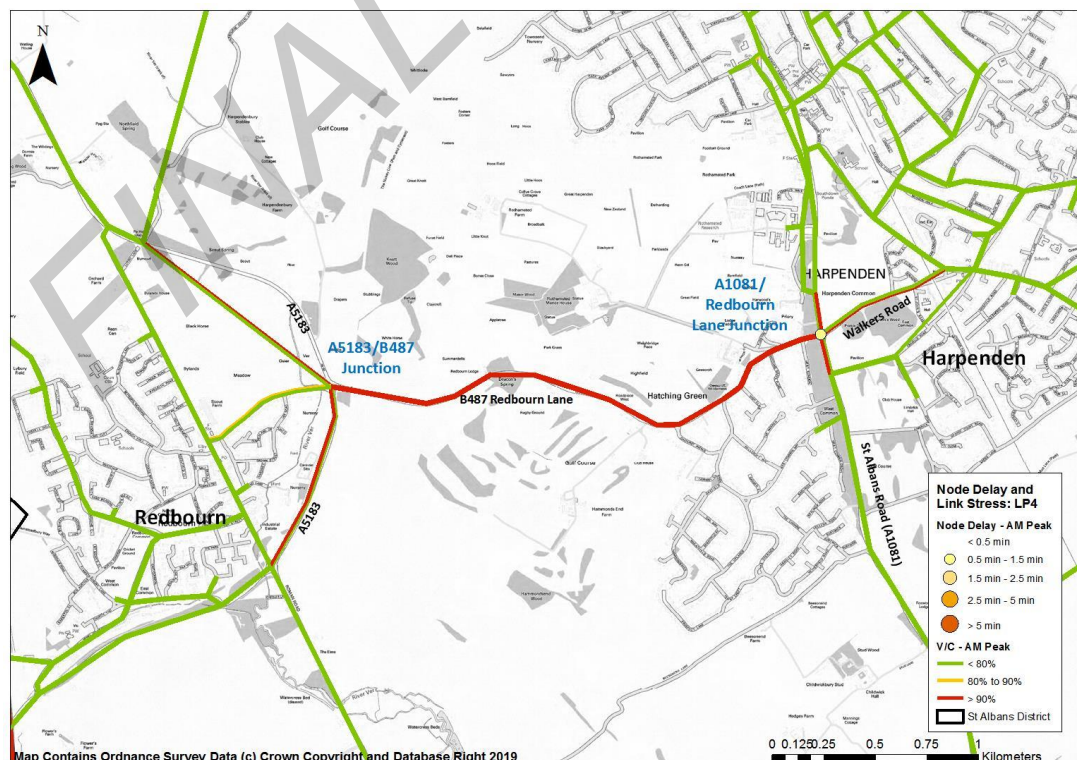
Figure 38. 2036 LP4 traffic conditions at the London Colney Hamburger junction



6.4 Redbourn to Harpenden

- 6.4.1 The congestion between Redbourn and Harpenden is partly generated by the junctions at either end of Redbourn Lane. Consideration should be given to signalling both junctions to help smooth traffic flows and react to any delays as they develop. The route also forms an alternative east-west route between the M1 and A1(M) corridors across northern SADC. Redbourn is used as an east west route for strategic trips between the M1 to Welwyn and Hatfield or A414. Redbourn Road is also used for access to North of St Albans, Harpenden and Wheathampstead.
- 6.4.2 Delays at the A5183/B487 junction are up to 45 seconds. The Harpenden Lane and A5183 arms have delays of up to 1 minute at the roundabout. Similar demand flows are experienced for all major arms, the A5183 and Redbourn lane. Delays at the Redbourn Lane/A1081 junction are up to 1 minute, with up to 2 minute delays for Walkers Road caused by right turners from Redbourn Lane and the straight ahead from the A1081 to the A1081 southbound.
- 6.4.3 It is acknowledged that improvements to cycle facilities are only proposed as far as Harpenden. A parallel route for cycling should be provided between Redbourn and Harpenden, with greater improvement and promotion, the Nickey line could prove a viable alternative. Consideration should be given to linking proposals to Redbourn and ensuring that a viable transport mode is provided. The speed limit on this link also varies and lowering it to 30mph along its entire length should be considered together with traffic calming measures along east-west routes to the north (such as Watery Lane/Annables Lane) to help ensure the route is only used for local movements and rat running is dissuaded. This area may also be influenced by Package 16 which includes proposals to link Luton-Wheathampstead-Hatfield and Welwyn Garden City via a cycling corridor through this area.

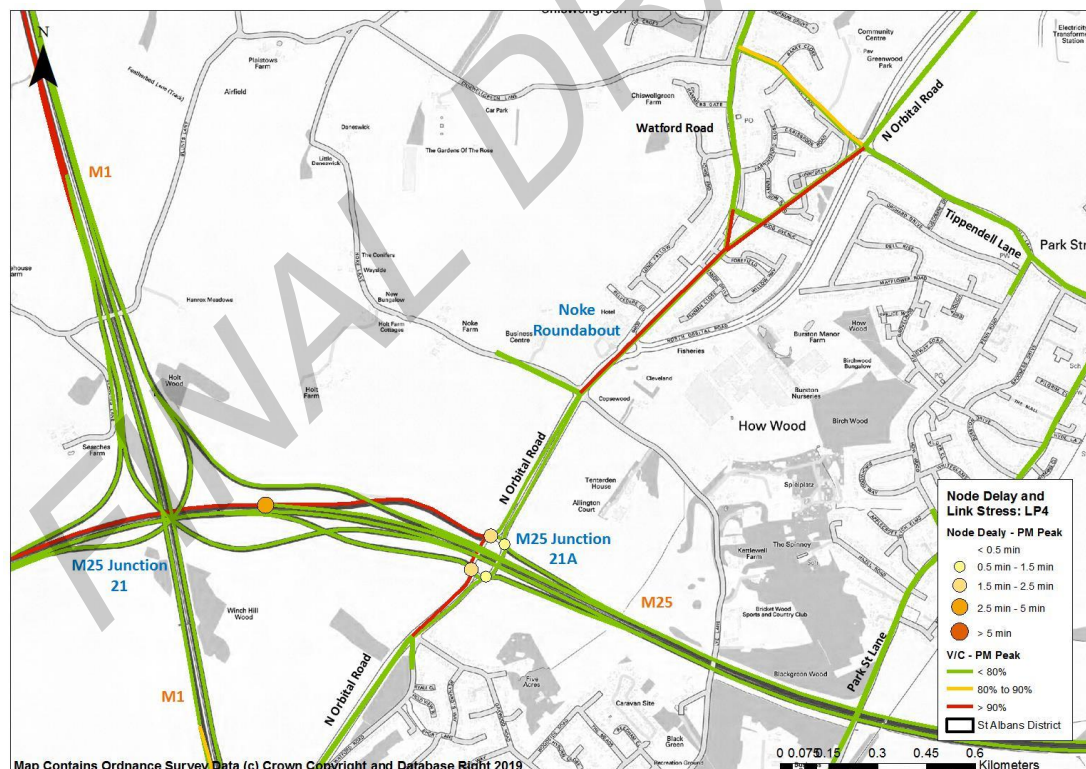
Figure 39: 2036 LP4 traffic conditions Redbourn to Harpenden



6.5 M25 Junction 21 and Associated Signals

- 6.5.1 This area is identified as it was found to be very sensitive during modelling. Any attempts to revise signal timings generated convergence issues. Further localised modelling will help ensure accurate signal timings are used in future scenarios. LP4 includes the signalisation of Noke Roundabout north of Junction 21A and linked signal. The signals also contribute to the high levels of congestion in the area. Installing demand responsive timings should be considered.
- 6.5.2 Delays of up to 3.5 minutes are experienced by eastbound traffic on the off slip approaching Junction 21a. Congestion is experienced on all approaches to the Noke roundabout with delays up to 2.5 minutes. There are delays on the A405 of up to 3 minutes for southbound flows in the AM peak and 4.5 minutes northbound on the A405 in the PM peak.
- 6.5.3 There are plans for a cycle route along the A405 which aims to reduce congestion in the area by providing cycling alternatives for shorter trips using these roads. Longer term, SADC would like to work with Highways England to develop a scheme to provide a new slip road between the M25 and M1 southbound to provide alternative slip roads independent of M25 junction 21a.

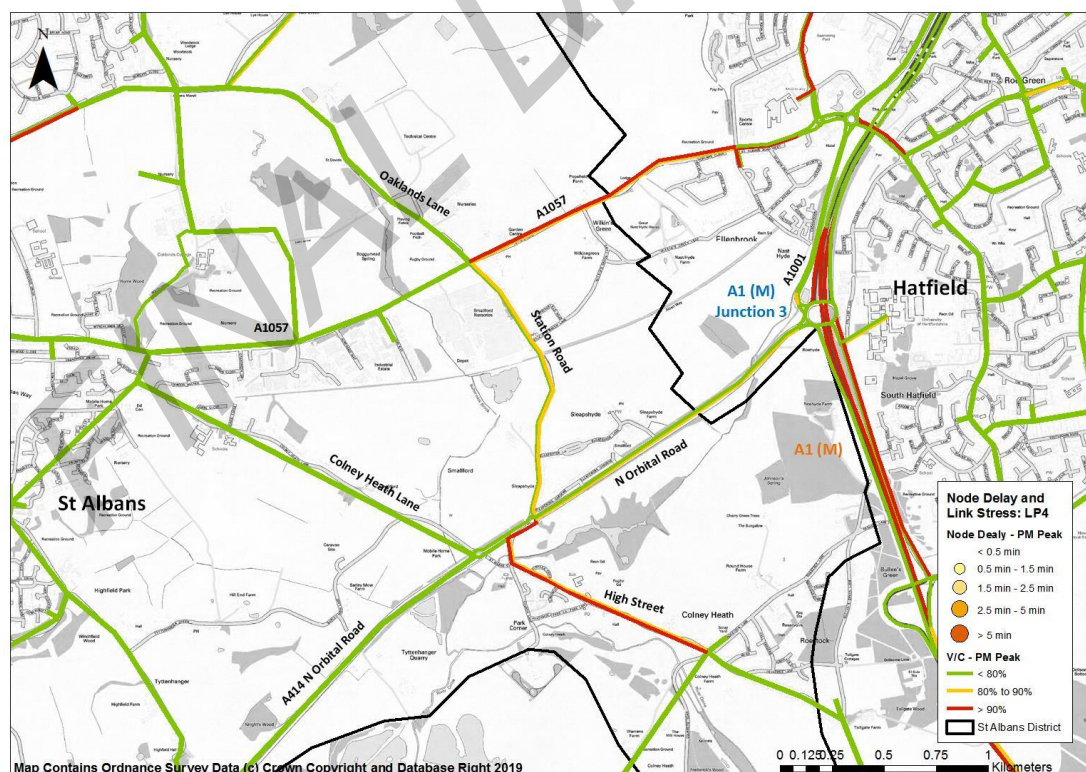
Figure 40: 2036 LP4 Traffic conditions around M25 Junction 21A



6.6 St Albans to Hatfield East/West Routes

- 6.6.1 This area has been identified as there are high levels of congestion east of St Albans on the approaches to the A1(M) and Hatfield. There may be rerouting onto cross country routes to avoid delays and congestion associated with A1(M) junctions. The A1(M) itself through Hatfield shows high levels of congestion in both directions.
- 6.6.2 Delays of up to 30 seconds are observed on the A1057 eastbound at Oaklands Lane junction. The A414 London Colney Long-about was signalled in Local Plan 4. There are delays on minor arm priority junctions for the A414/Colney Heath Lane Long-about with average delays of up to 1.5 minutes through the junction and 2.5 minutes for the High Street.
- 6.6.3 Lowered speeds should be considered on the A414 to help meter flows on these routes. More detailed junction modelling will help determine the signal timing that should be implemented at this junction.
- 6.6.4 As part of the A414 strategy, Coopers Green Lane is promoted as a sustainable transport corridor. Other sustainable measures to promote use of the Alban Way, A414 cycle way should also be considered. Improved passenger transport services would help cater for movements between St Albans and Hatfield and encourage mode shift away from private vehicles using these congested routes. Packages 9, 25, 28, 29, 31, 32, 34 and 36 all offer considerable opportunities to offer travel by sustainable modes in this congested area of the network.

Figure 41: 2036 LP4 Traffic conditions around eastern St Albans



6.7 St Albans to Hemel Hempstead East West Routes

- 6.7.1 This area has been examined in further detail as it is acknowledged there is a lot of development planned around East Hemel and interaction with St Albans will be key. There are a series of junctions with delays of up to 30 seconds including Bedmond Lane/A4147 junction and 1 minute at King Harry Lane/A4147 junction. Hemel Hempstead Road experiences congestion from King Harry Lane/A4147 roundabout to the Bedford Lane priority junction. There are delays on this arm of up to 2 minutes. There are also delays at the King Harry double mini roundabout up to 2 minutes averaged across the junction. For traffic from the south on Watford Road delays are up to 3 minutes.
- 6.7.2 Given the development planned around East Hemel consideration may be given to extending sustainable transport schemes between the areas. Links to or through Verulamium Park should be promoted especially in conjunction with St Albans Green Ring (Package 25) proposals but capacity may be reduced by future schemes and could cause greater delays or congestion on St Stephen's Hill and Watling Street. This may lead to further congestion and delays on these roads. It is noted that cycle schemes are proposed on the A4147 and A414 along with bus schemes linked to Maylands development proposals. Synergies with these development proposals should be made and those in the East Maylands Prospectus. Similarly, Package 30 which proposes measures on the A414 south of St Albans may have impacts on the local roads in this area if traffic is attracted back to the A414.

Figure 42: 2036 LP4 Traffic conditions around western St Albans



7. Summary and Discussion

7.1 Summary

- 7.1.1 LP4 shows there are several areas of congestion and delay around SADC, however no obvious “showstoppers” where very long delays or high levels of congestion are recorded. Many of the junctions experiencing delays are currently known as congestion hotspots.
- 7.1.2 The locations of the new strategic sites appear to be feasible around SADC, however they do generate congestion on the approaches to some of the urban centres such as Hemel Hempstead, St Albans and Hatfield. Journey times increase as expected however the locations of developments away from traditional town centres appears to benefit some movements.
- 7.1.3 LP4 does not indicate that any of the sustainable measures proposed would conflict with the planned growth, however greater improvements could be considered to improve links to the west of the District, such as between East Hemel and Redbourn. Links between the surrounding key towns such as Hemel Hempstead, Hatfield and Watford should be maximised and any GTP schemes along these corridors to/from St Albans should be considered essential.
- 7.1.4 LP4 suggests the interaction of SADC with the M1, M25 and A1(M) strategic network is key. As the District is bordered by these routes it is paramount that any rat running onto the District network is discouraged wherever possible.

7.2 Discussion

Future Uncertainty and COMET Forecasts

- 7.2.1 The COMET forecasting methodology takes into account future changes in population, number of jobs and dwellings, as well as rising costs of travel and proposed transport infrastructure schemes.
- 7.2.2 However, there is currently no allowance for factors that may fundamentally alter the nature of travel in Hertfordshire or elsewhere in Great Britain. These factors may include the introduction of new technologies (e.g. autonomous vehicles) or a significant shift in travel patterns relative to the Base Year model as a result of behavioural change. Such behavioural change may be brought about by factors such as changing demographic characteristics / consumer preferences, economic instability, climate change and globalisation.
- 7.2.3 Consequently, COMET forecasts should be viewed as possible representations of the future in Hertfordshire among a number of potentially different alternatives that require unconventional approaches to planning and investment in the county.

Sustainable Transport

- 7.2.4 It should be noted that the approach to modelling modal shift in a multi-modal model (such as COMET) should be based on the inclusion/coding of infrastructure to facilitate such behaviour change in the forecast network. Without doing so (as applies to this forecast) the modelled modal shift is not a result of COMET's Variable Demand Model representing behavioural change; rather, it is the result of a parameter adjustments that are currently not based on any specific interventions to the transport network. Once more specific scheme assumptions regarding the proposed sustainable travel initiatives are known, these should be coded into COMET as other forecast schemes already are.

8. Appendices

8.1 Appendix A: LP4 Schemes within St Albans District

Table 6: Highway Schemes within SADC area included in LP4

	Location Details	Description of scheme	Modelled Before?
Codicote	B656 High Street, Bury Lane, Heath Lane and St Albans Road speed reductions	Reduce speed coded on these roads to 20mph to simulate impact of traffic calming in village	LP3
Colney Heath	A414 / Colney Heath Lane / High Street	A414 Colney Heath longabout safety scheme	LP3
Chiswell Green	A405 / B4630 Watford Road, Chiswell Green	New Arm to roundabout to serve new hotel development	LP3
Harpenden	A1081 Luton Road, Harpenden	Development access	LP3
Harpenden	A1081 Luton Rd / Redbourn Lane, Harpenden	A1081 Luton Rd / Redbourn Lane capacity enhancements	LP3
Harpenden	A1081 Luton Rd / Station Road, Harpenden	A1081 Luton Rd / Station Road capacity enhancements	LP3
Harpenden	A1081 Luton Road / The Common, Harpenden	A1081 Luton Road / The Common capacity enhancements	LP3
St Albans	Sandpit Lane, St Albans	Oaklands development new access onto Sandpit Lane	LP3
St Albans	Sandpit Lane / House Lane, St Albans	Sandpit Lane / House Lane enlargement of existing roundabout	LP3
St Albans	Sandpit Lane / Marshalswick Lane, St Albans	Sandpit Lane / Marshalswick Lane junction improvements	LP3
St Albans	Sandpit Lane / Coopers Green Lane, St Albans	Sandpit Lane / Coopers Green Lane junction improvements	LP3
St Albans	Sandpit Lane / Barnfield Road, St Albans	Sandpit Lane / Barnfield Road junction improvement	LP3
London Colney	A414-A1081-London Colney Roundabout	A414-A1081-London Colney Roundabout junction improvement	LP3
St Albans	St Albans Road/Sandridge Road/Marshalswick Lane/Beech Road	St Albans Road/Sandridge Road/Marshalswick Lane/Beech Road - junction improvement	LP3
St Albans	A5183 Redbourn Road/A4147 Bluehouse Hill/Batchwood Drive Roundabout, St Albans	A5183 Redbourn Road/A4147 Bluehouse Hill/Batchwood Drive Roundabout junction improvement	LP3
Wheathampstead	B653 Cory Wright Way/Marford Road, Wheathampstead	B653 Cory Wright Way/Marford Road, Wheathampstead junction improvement	LP3

St Albans	A4147 Hemel Hempstead Road / King Harry Lane St Albans	A4147 Hemel Hempstead Road / King Harry Lane junction improvement	LP3
Harpenden	A1081 Luton Road/ Park Hill Junction, Harpenden	A1081 Luton Road/ Park Hill Junction optimisation	LP3
St Albans	Hatfield Road/Station Road, Smallford Roundabout	Hatfield Road/Station Road, Smallford Roundabout junction improvement	LP3
St. Albans City Centre	Central St Albans	Expanded 20mph zone in St Albans including Victoria Street, Bricket Road and Catherine Street.	No
St Peters Street	A1081 St Peter's Street Pedestrian Crossing	New pedestrian crossings (various points)	LP3
St. Albans City Centre	Peahen Junction	Signal reconfiguration	No
A414 Park Street rbt- A1(M) J3	A414 Smart Traffic Management	Speed limit changes	No
London Colney	High Street	Speed limit reduction.	No
London Colney	Non-strategic roads	A 20mph speed limit introduced on all roads within London Colney	No
St Peters Street/Victoria Street	St Peter's Street/Victoria Street	Junction Reconfiguration.	No
Chiswell Green Corridor	A405/B4630 Watford Road	Junction signalisation	No
Coopers Green Lane	Coopers Green Lane	Speed limit reduction	A414 DS
Chiswell Green Corridor	B4630 Watford Road	Traffic calming measures	No
London road corridor	London Road/Watsons Walk/Lattimore Road junction alterations	Junction reconfiguration	No
Harpenden	A1081 Harpenden Town Centre & Station Road	Traffic calming measures	No
Harpenden	North East Harpenden Access	New access from North East Harpenden development site (site NEH)	No
Chiswell Green	Chiswell Green Lane	New access from Chiswell Green development (site CG)	No
Park Street	A5183 Frogmore & A414	New access from Park Street Garden Village	No

London Colney	Shenley Lane	New access from West of London Colney development	No
St Albans	A1081 Harpenden Road	New access from North of St Albans development	No
M25 junction 21a	M25 junction 21a	M25 junction 21a capacity improvements (Radlett Railfreight mitigation)	LP3
M25 junction 22	M25 junction 22	M25 junction 22 capacity improvements (Radlett Railfreight mitigation)	LP3

Table 7: Public Transport Schemes within SADC area included in LP4

Scheme type	Location	Location Details	Description of scheme	Modelled before?
Bus Scheme	St Albans	St Albans Abbey station - city station	SC1 Abbey Line Shuttle bus service	LP3 (some changes)
Bus scheme	Hatfield road corridor	Hatfield Road	Bus priority measures	No
Bus Scheme	London Colney-St. Albans		Improved London Colney-St Albans bus services	No
Bus Scheme	St. Albans-Hatfield		Increased frequencies and extended hours of operation.	No
Park & rail	Park Street	Park Street station	Potential new Park and rail facility south of A414 and east of A405 linked to existing / relocated Park Street station	No

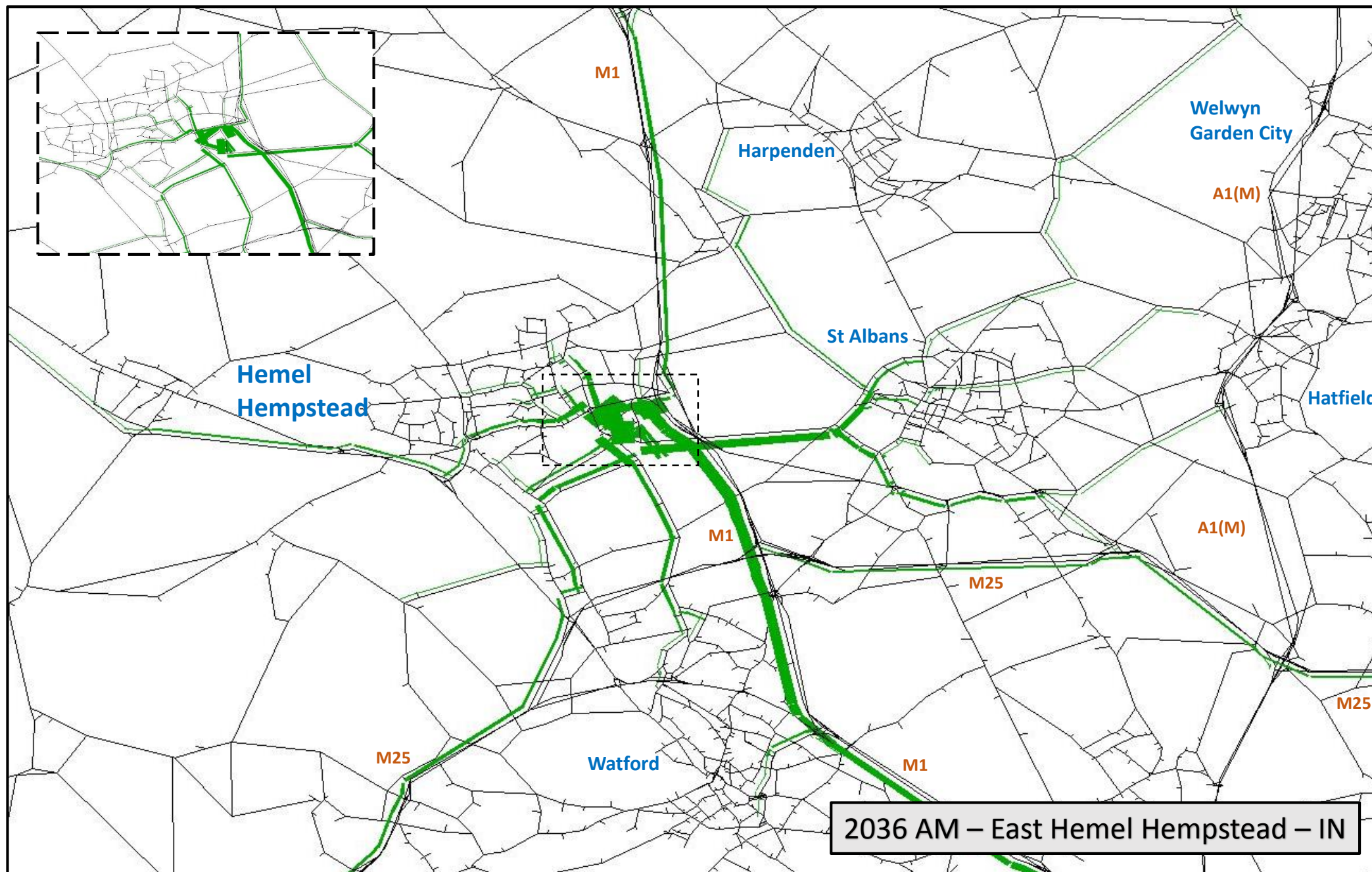
Table 8: LP4 Mode Shift Schemes included in SADC area

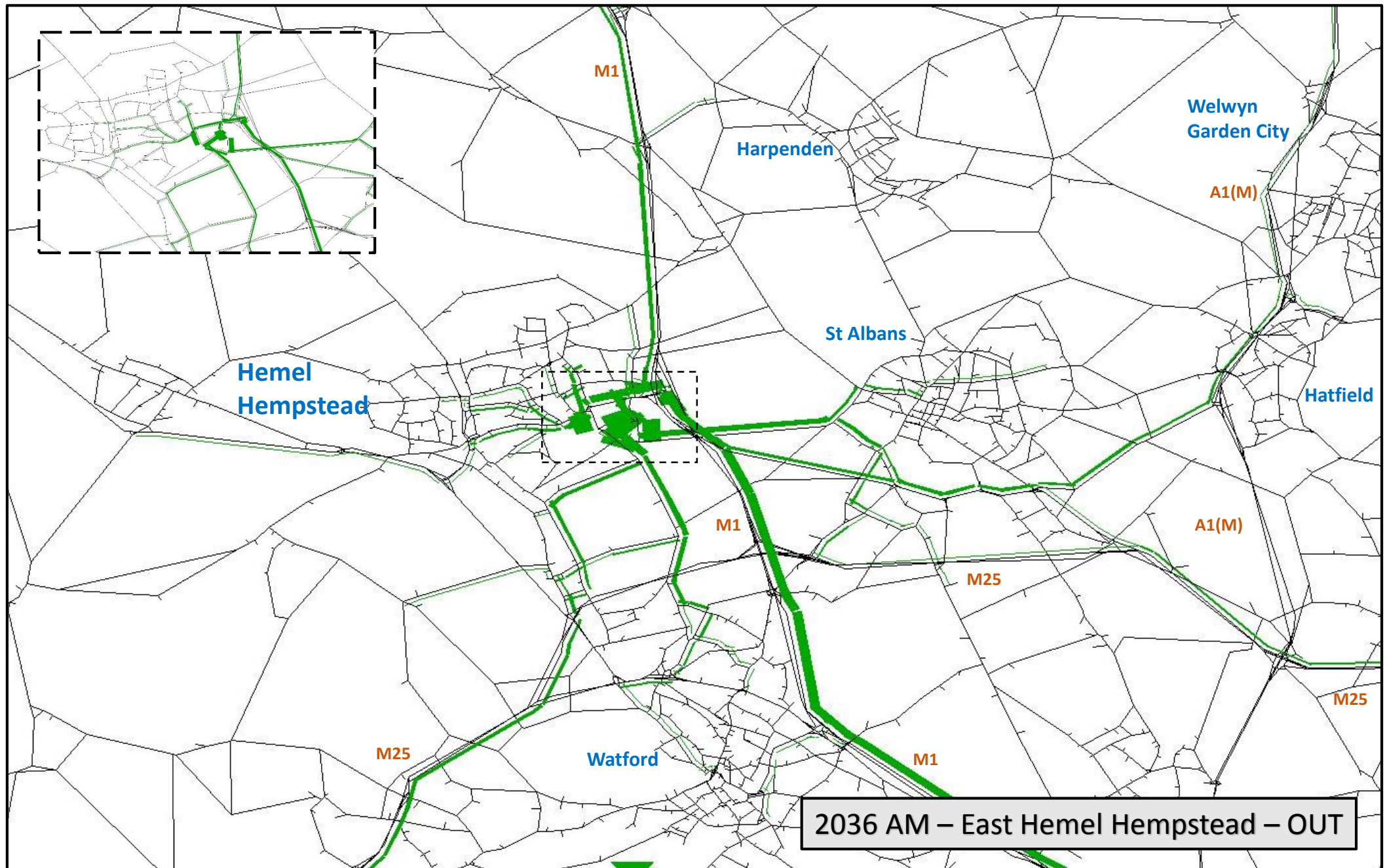
Location Details	Description of scheme	Modelled in LP3?
North of B656 and east of Bower Heath Lane	NE Harpenden development to have distinct development zone	No
West of Chiswell Green & south of Chiswell Green Lane	West of Chiswell Green development to have distinct development zone	No
East of Park Street & south of A414	Park Street Garden Village development zone	No
East of Park Street & south of A414	Park Street Garden village (trip internalisation)	No
West of London Colney (Shenley Lane)	West of London Colney development zone	No
East of Hemel developments	East of Hemel developments (trip internalisation)	No

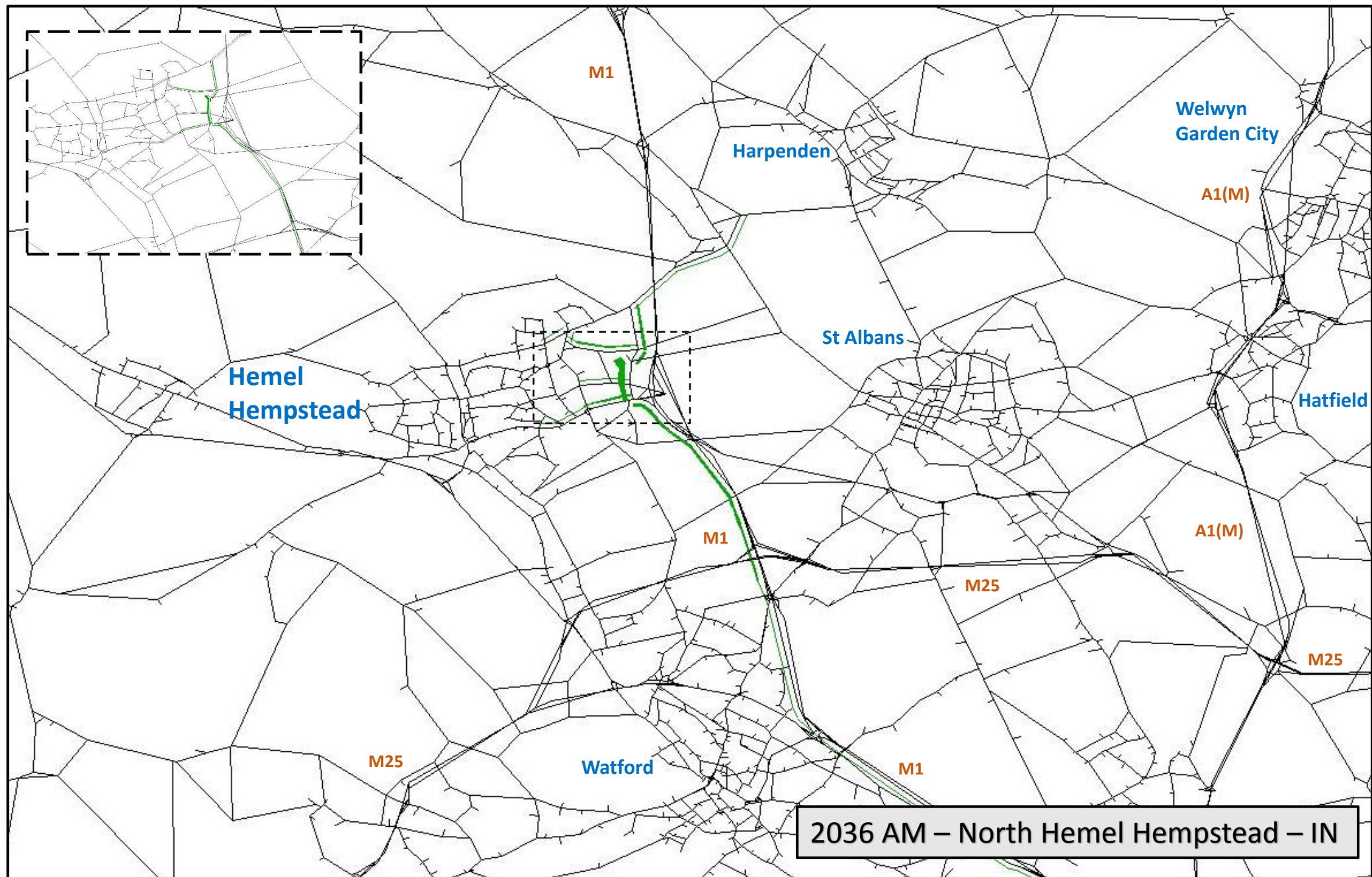
8.2 Appendix B: Development Flow Analysis

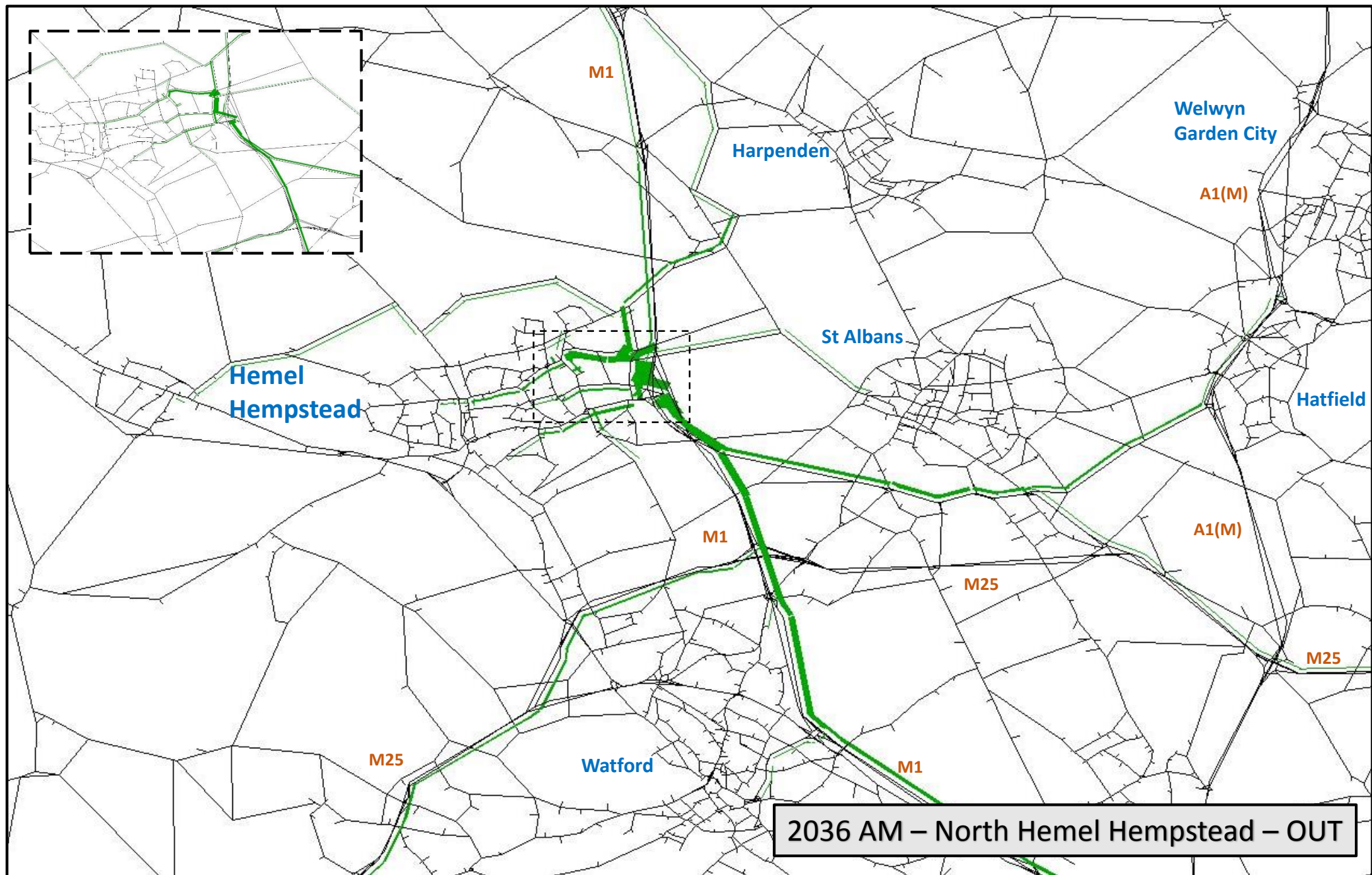
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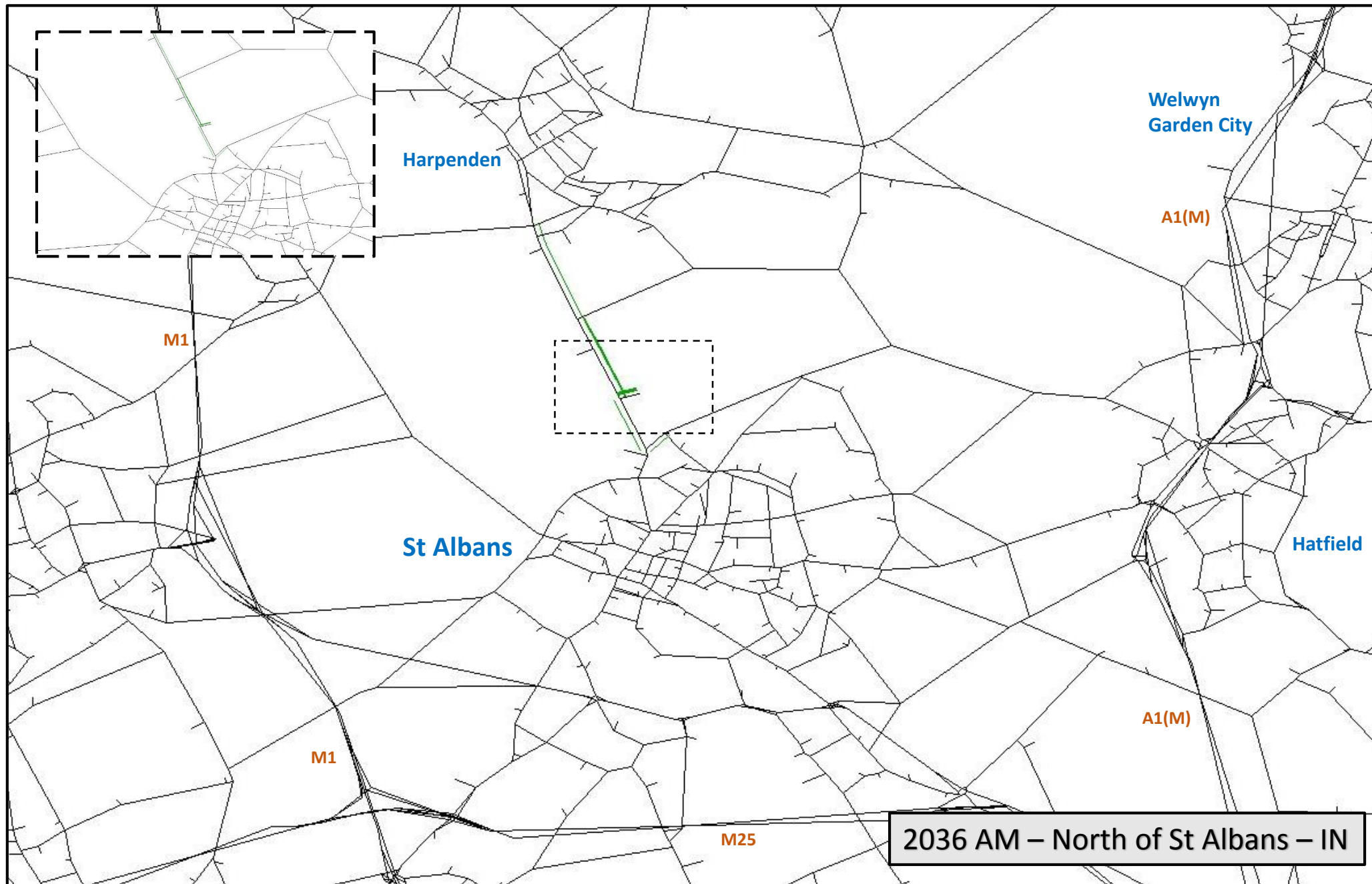
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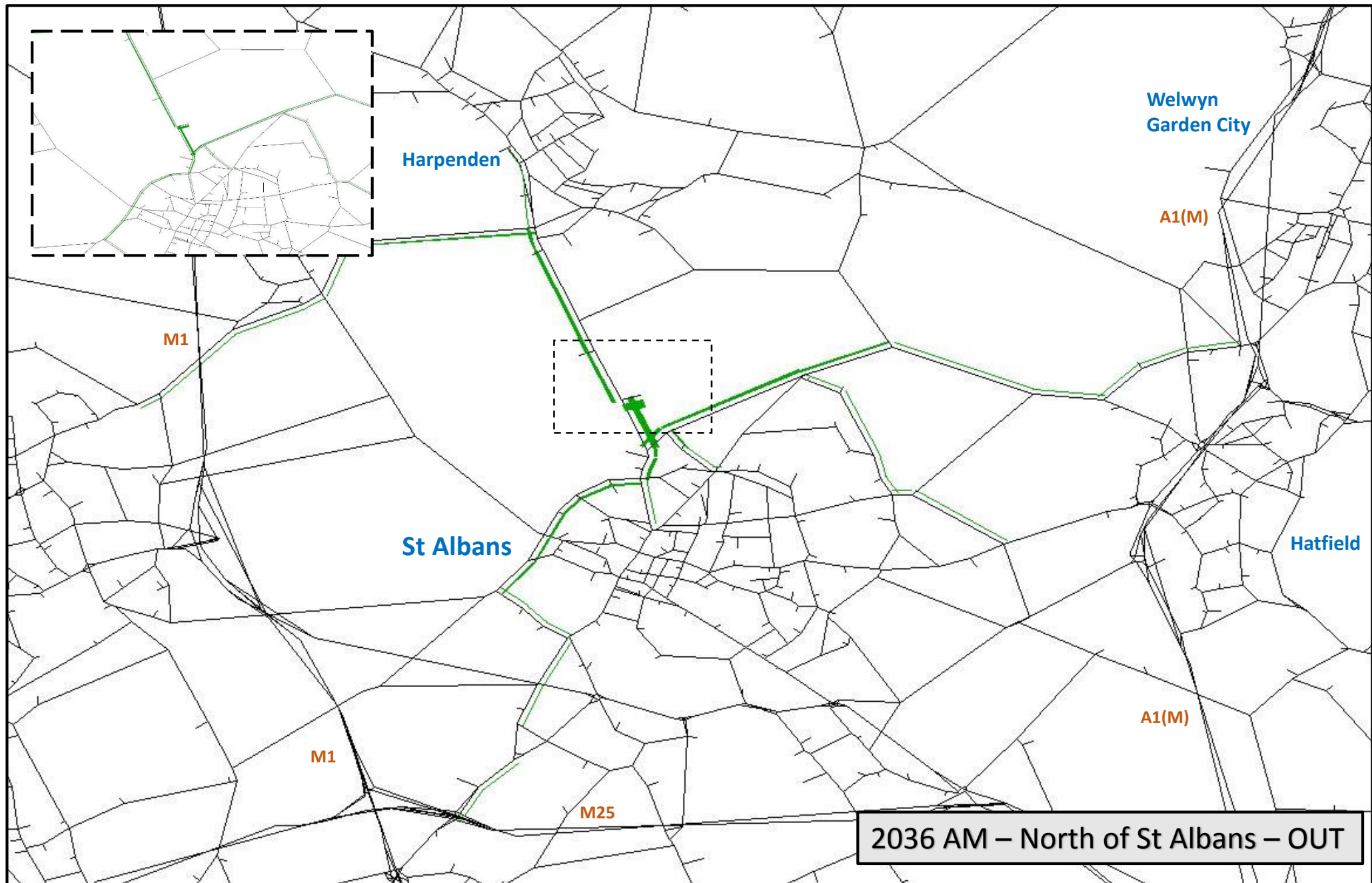


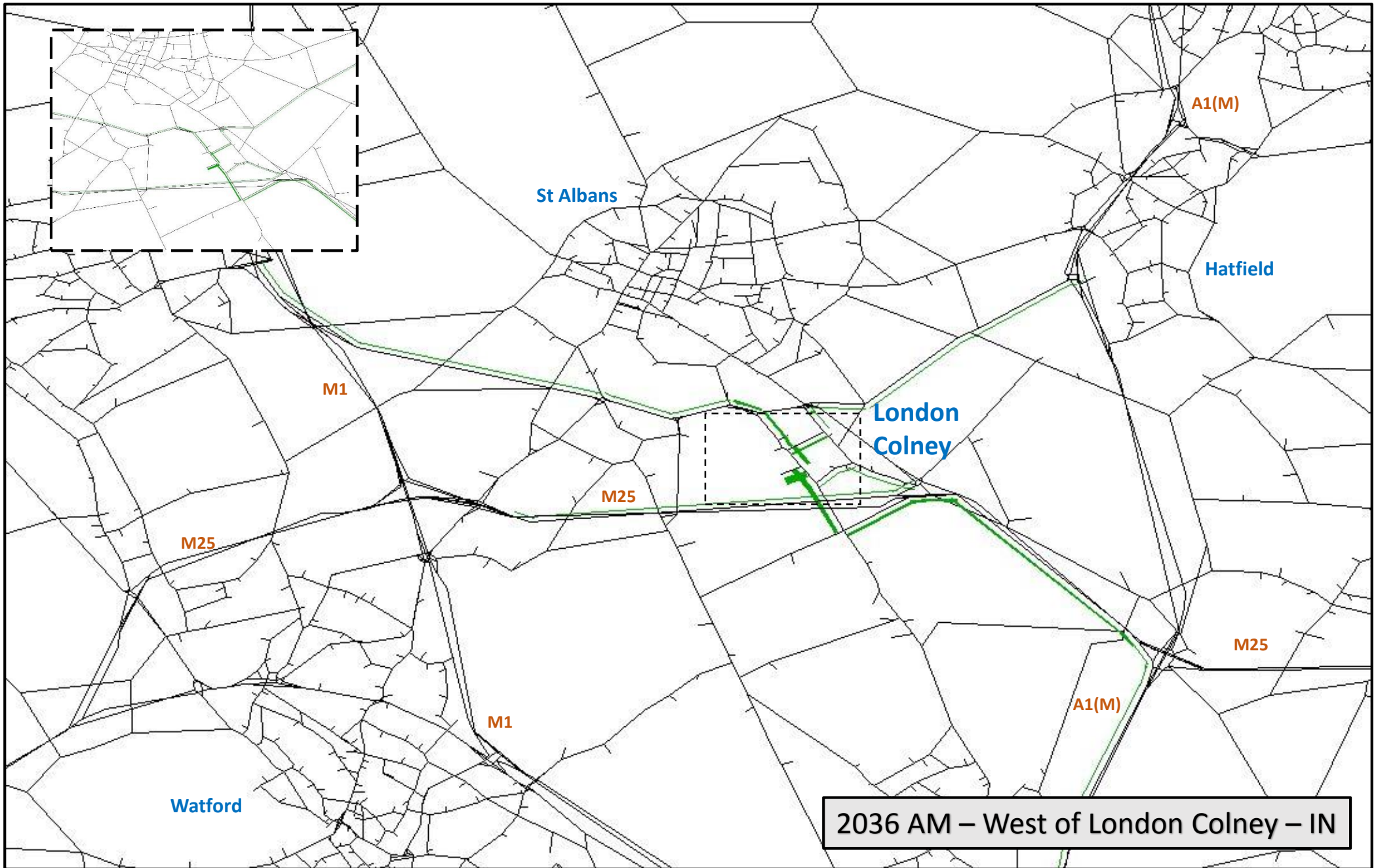


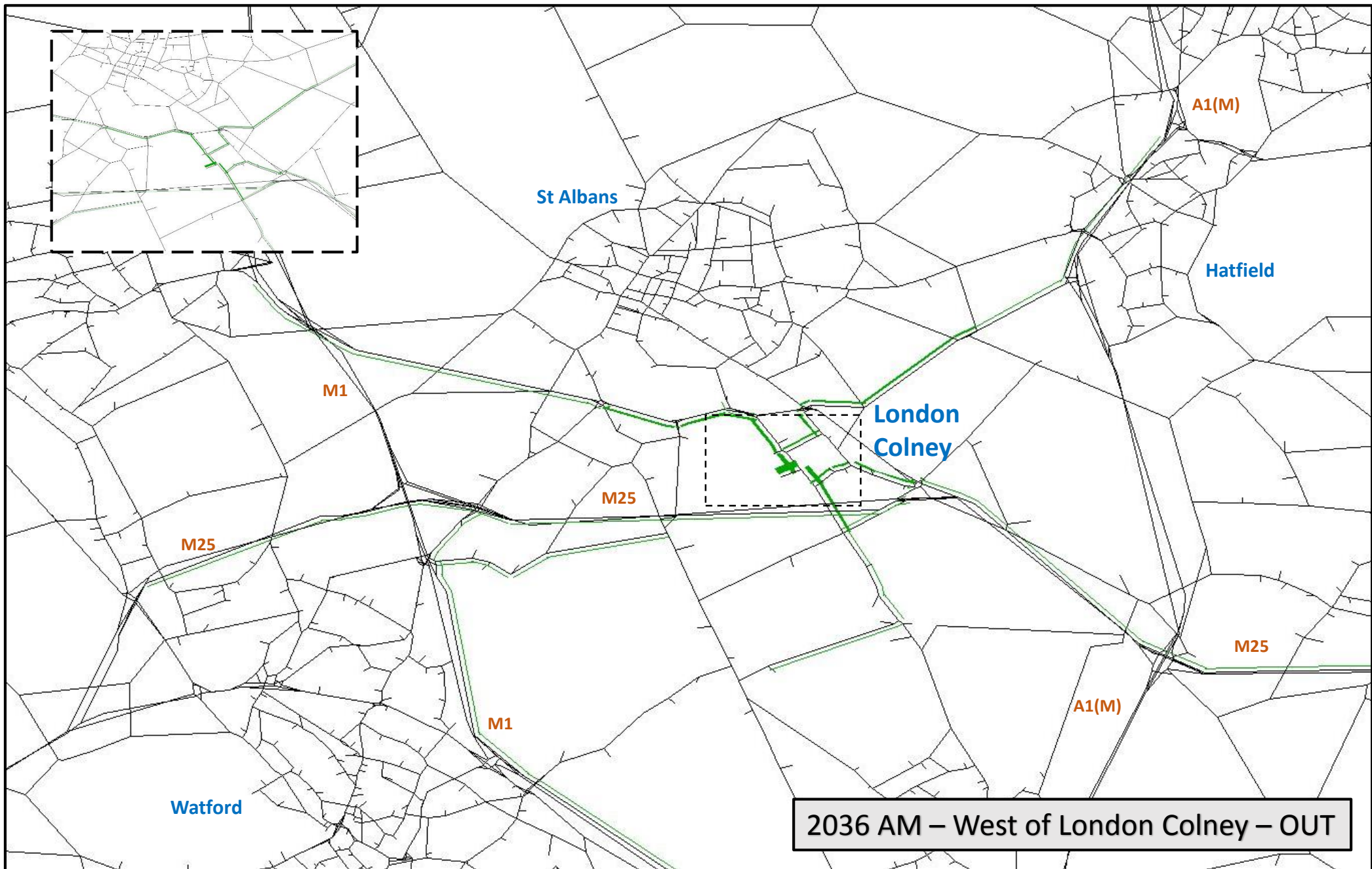


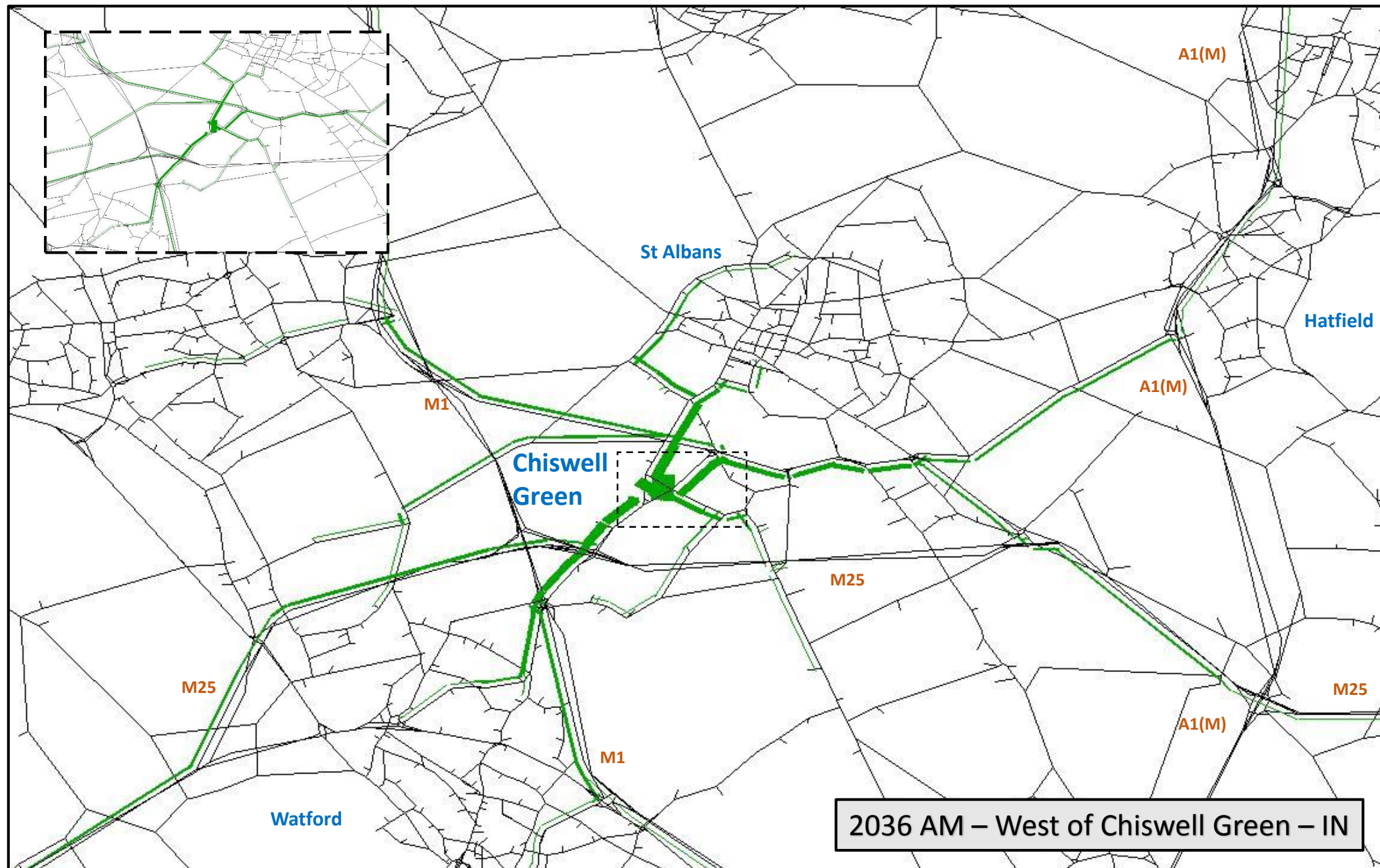


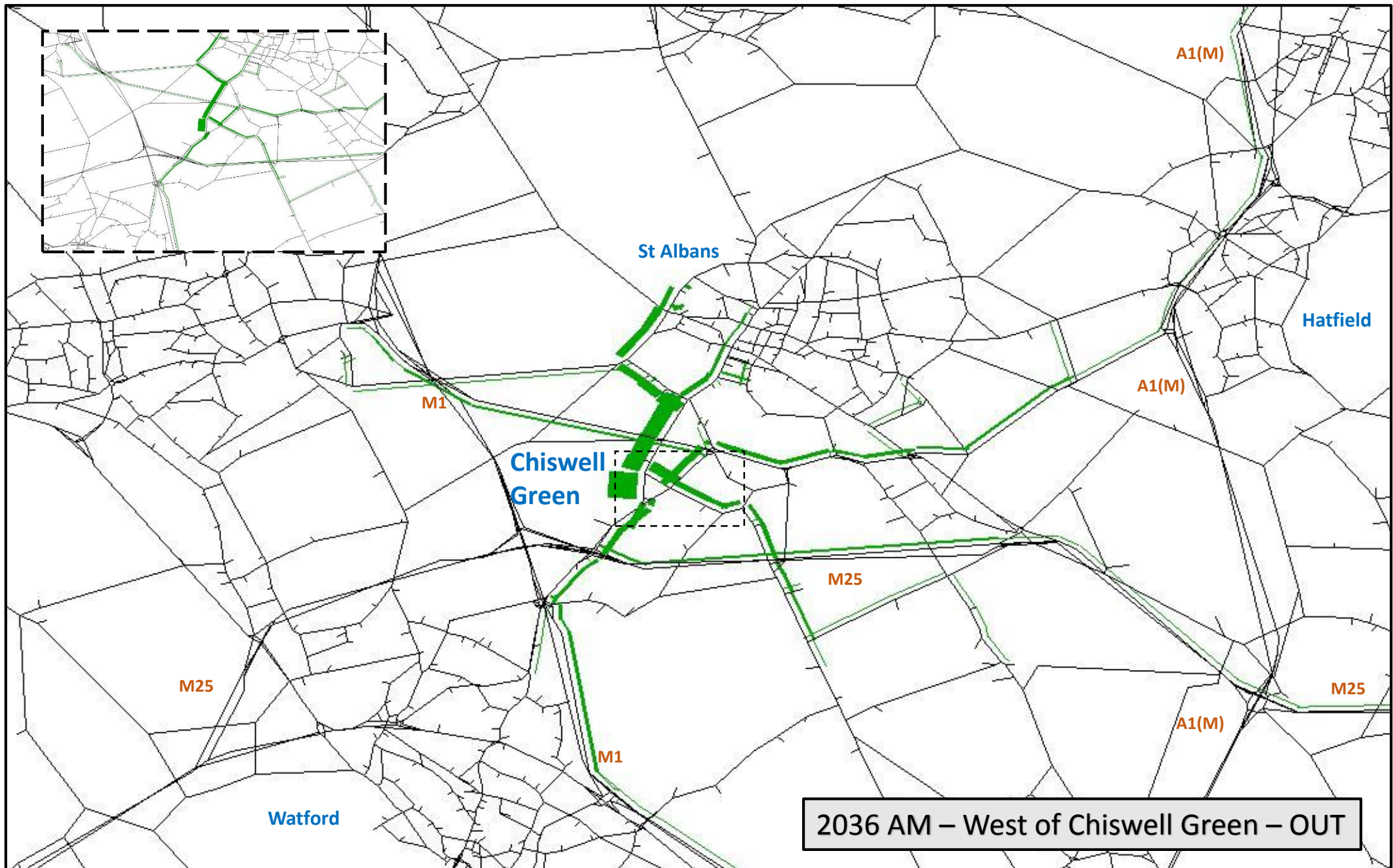


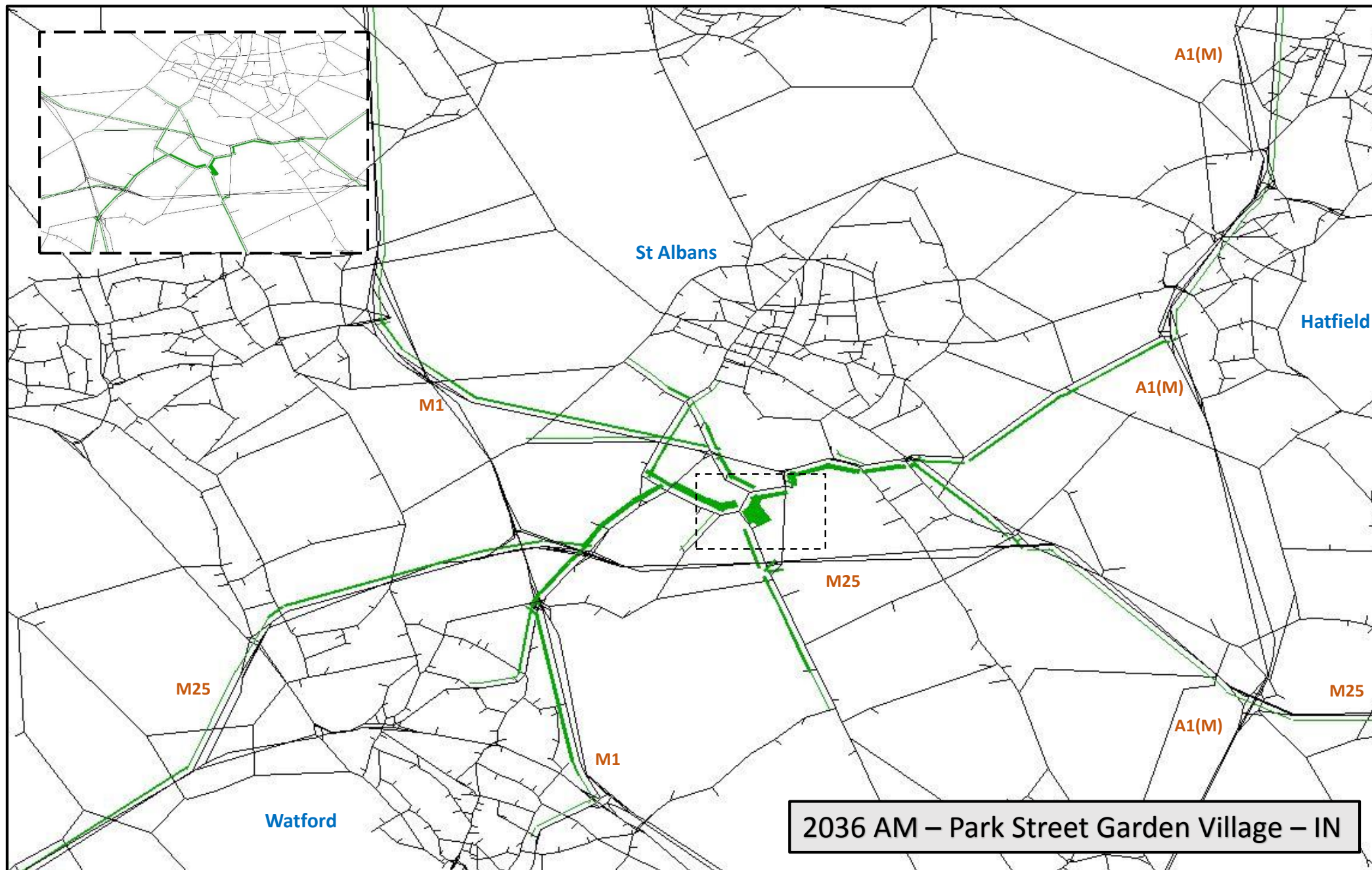


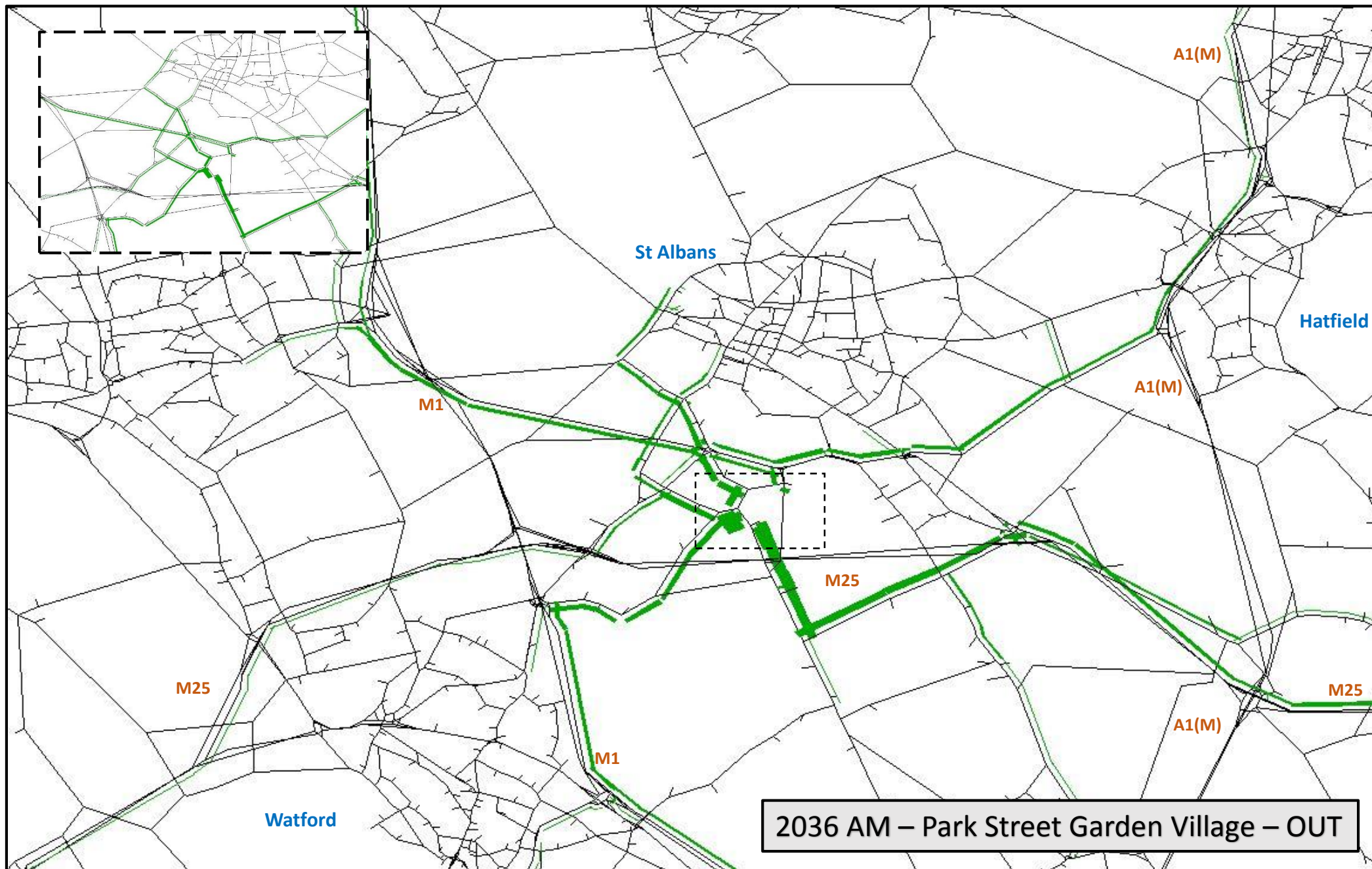


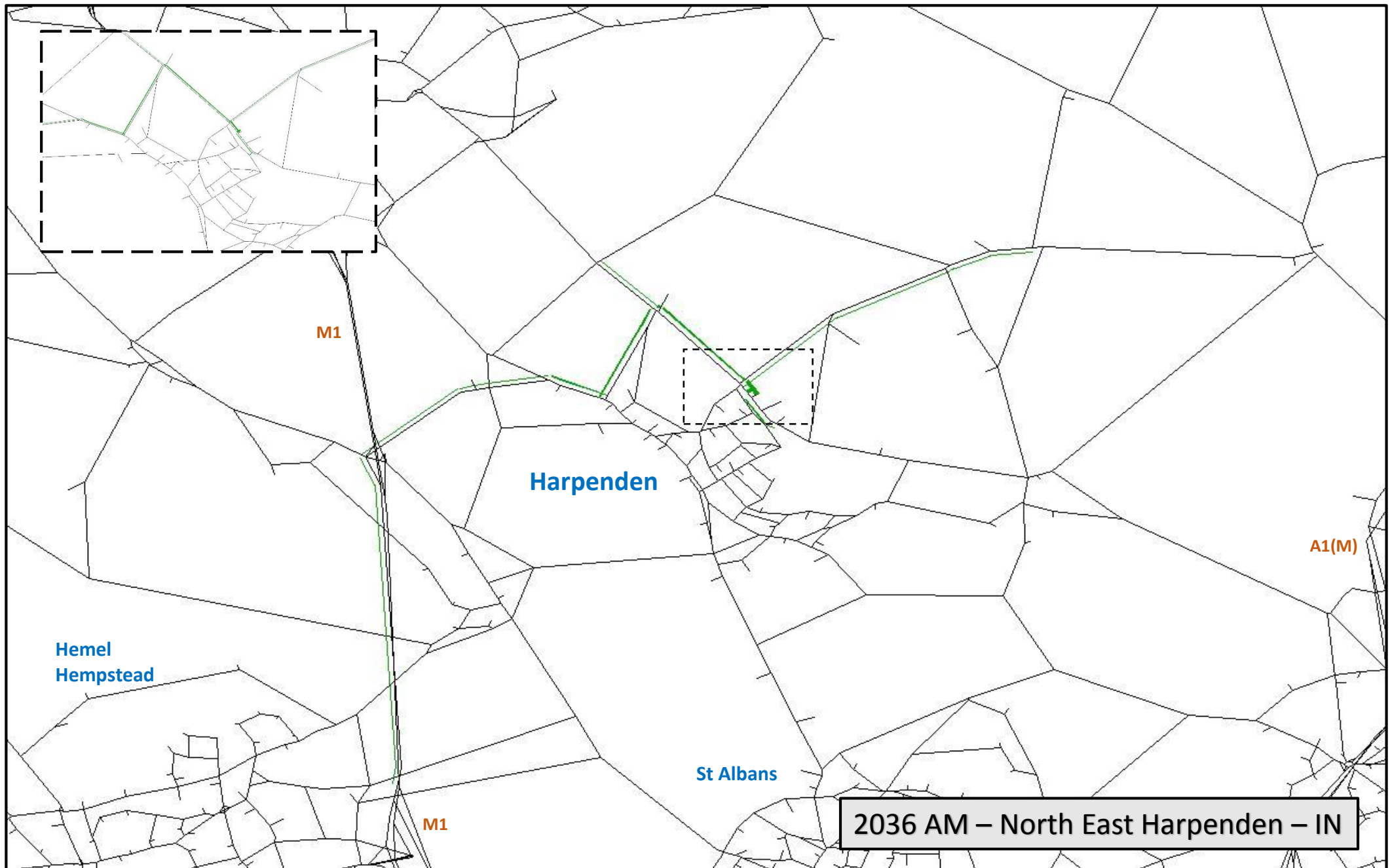




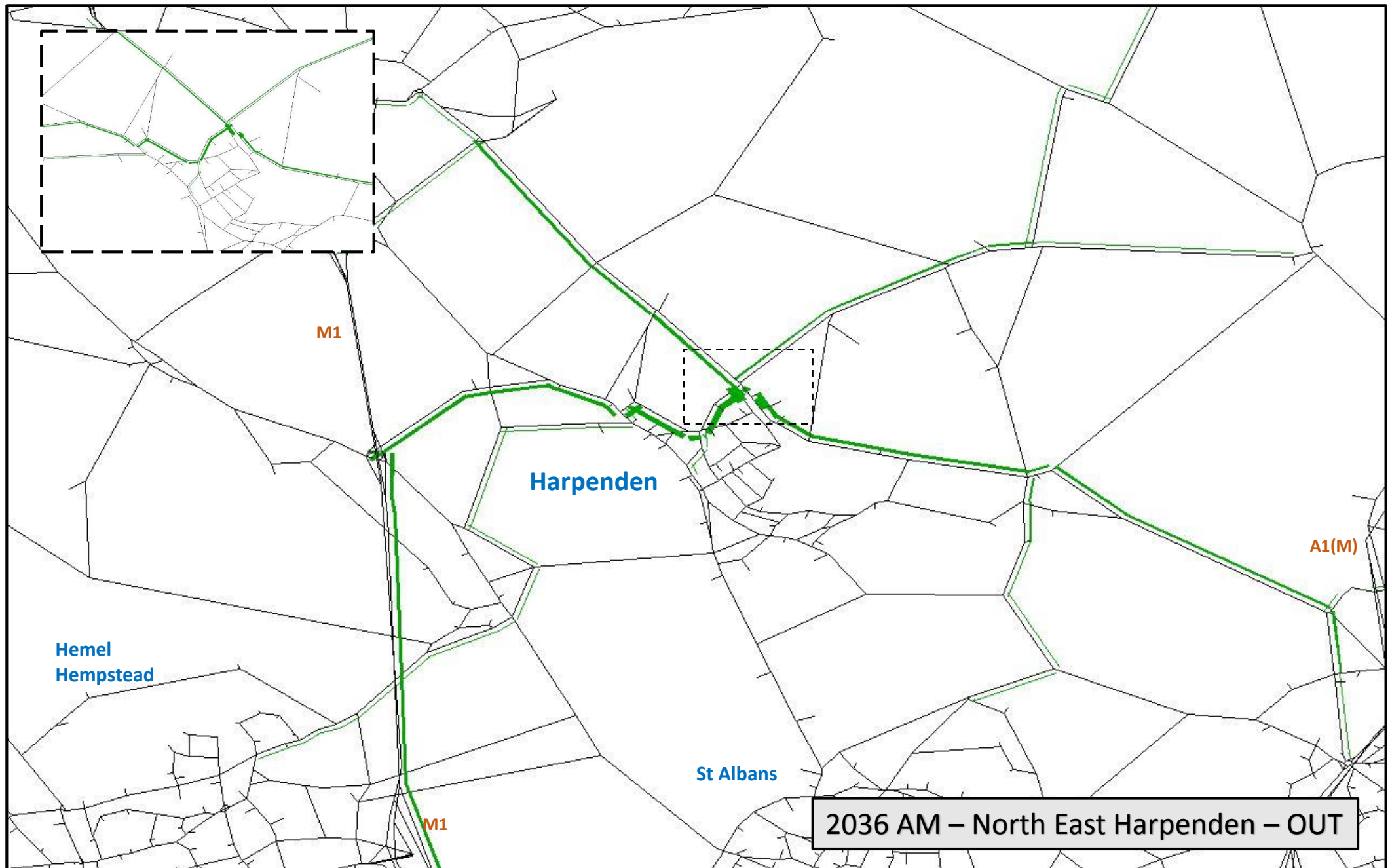




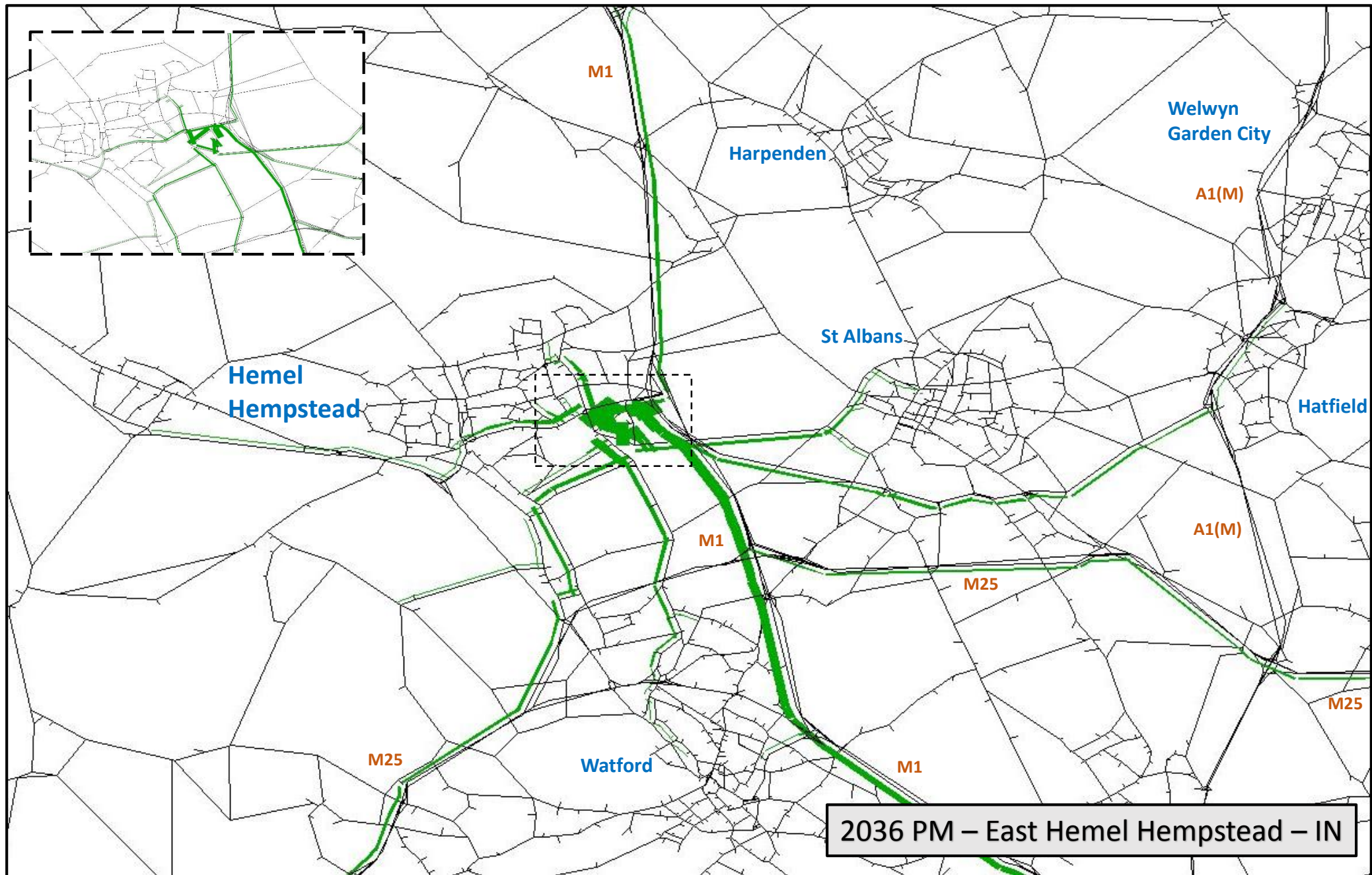


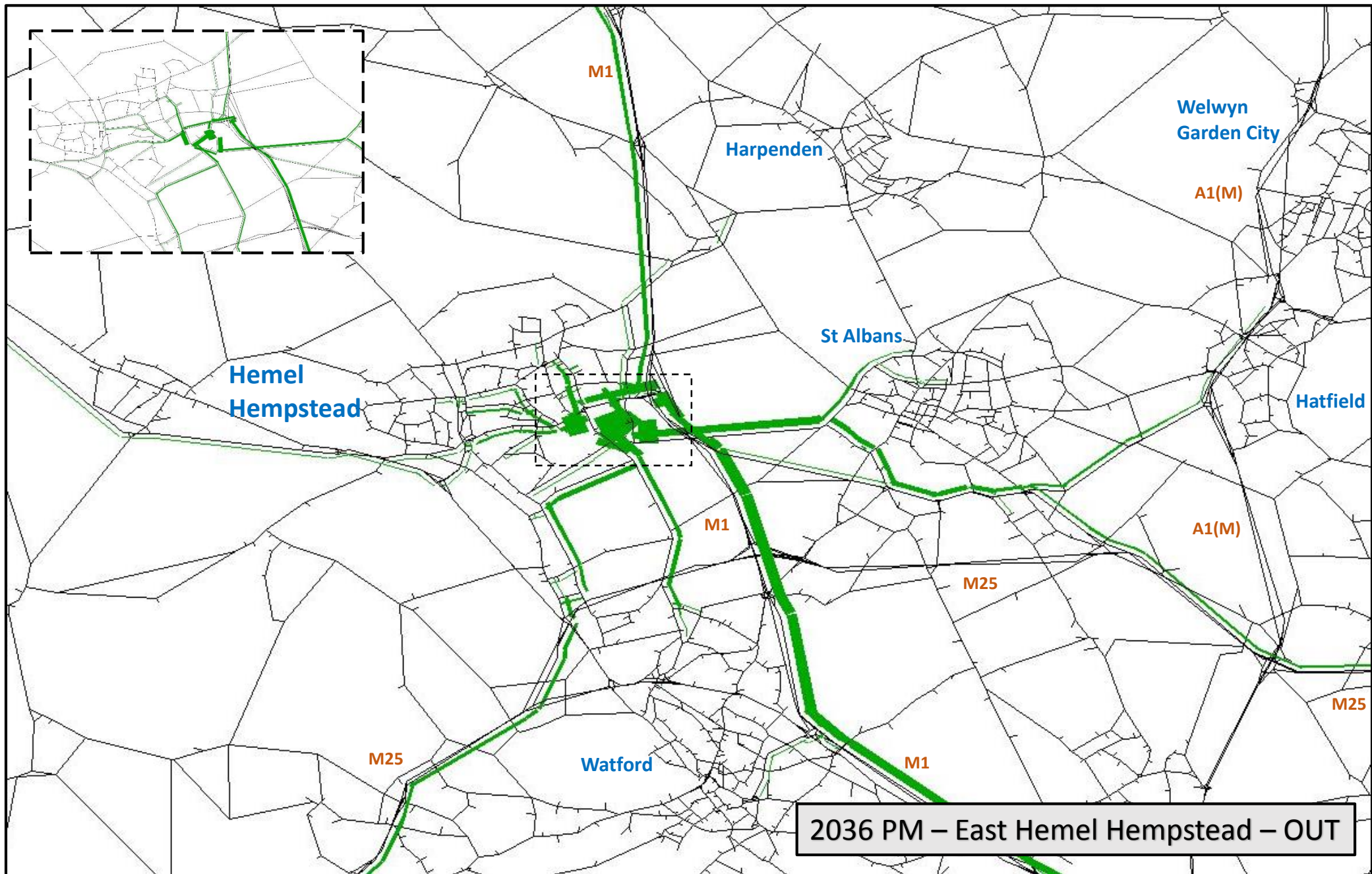


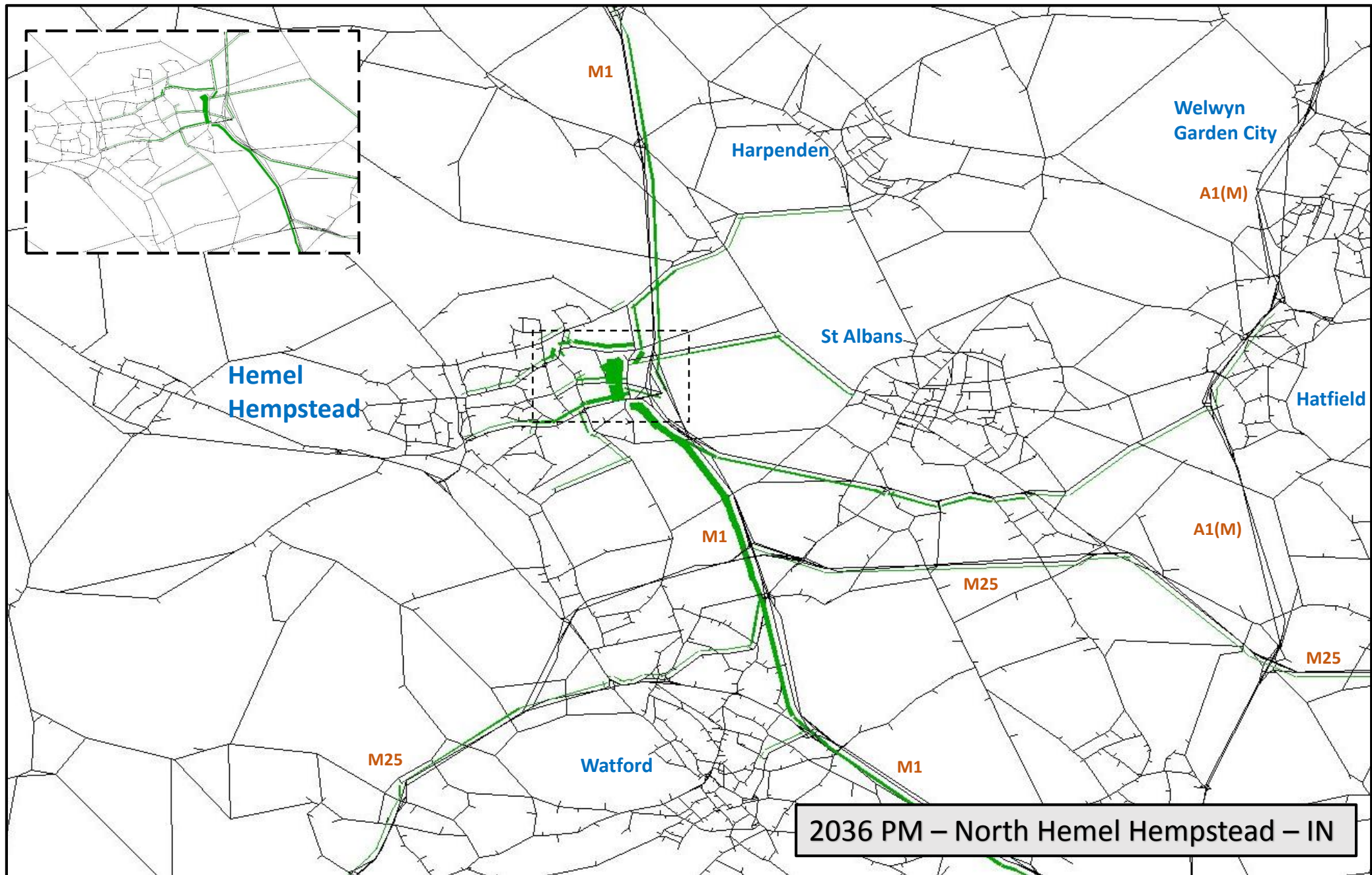
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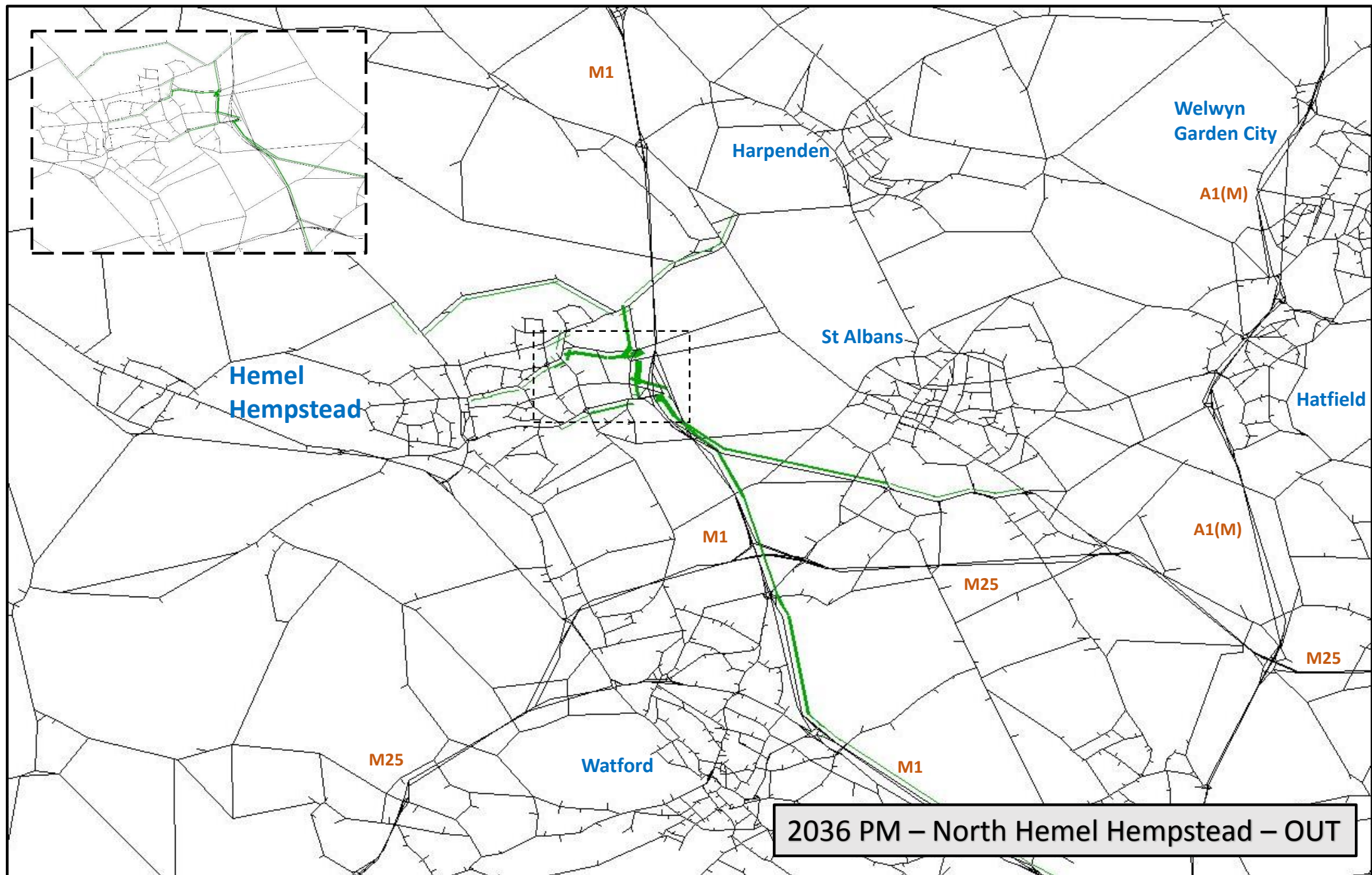


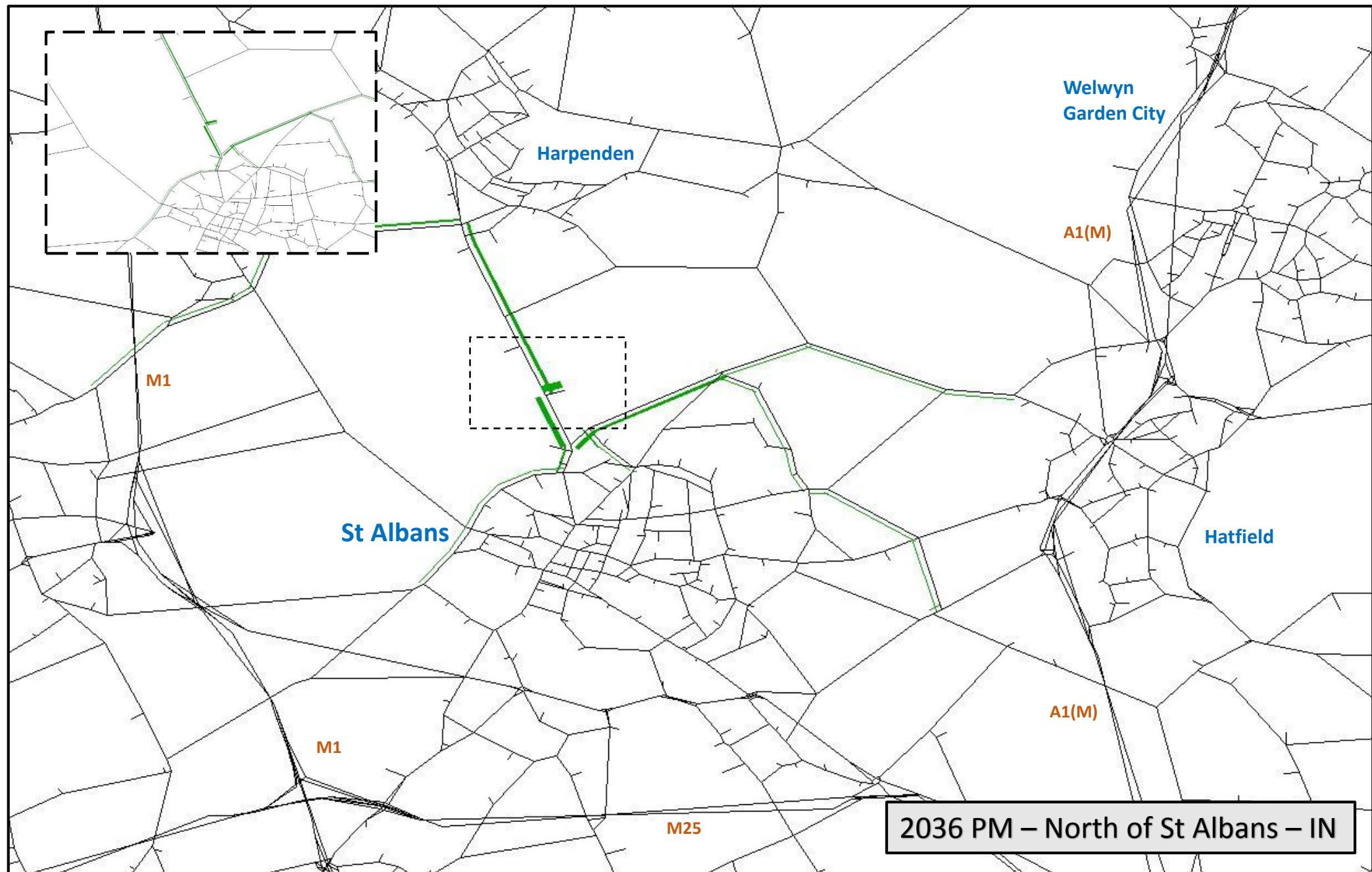
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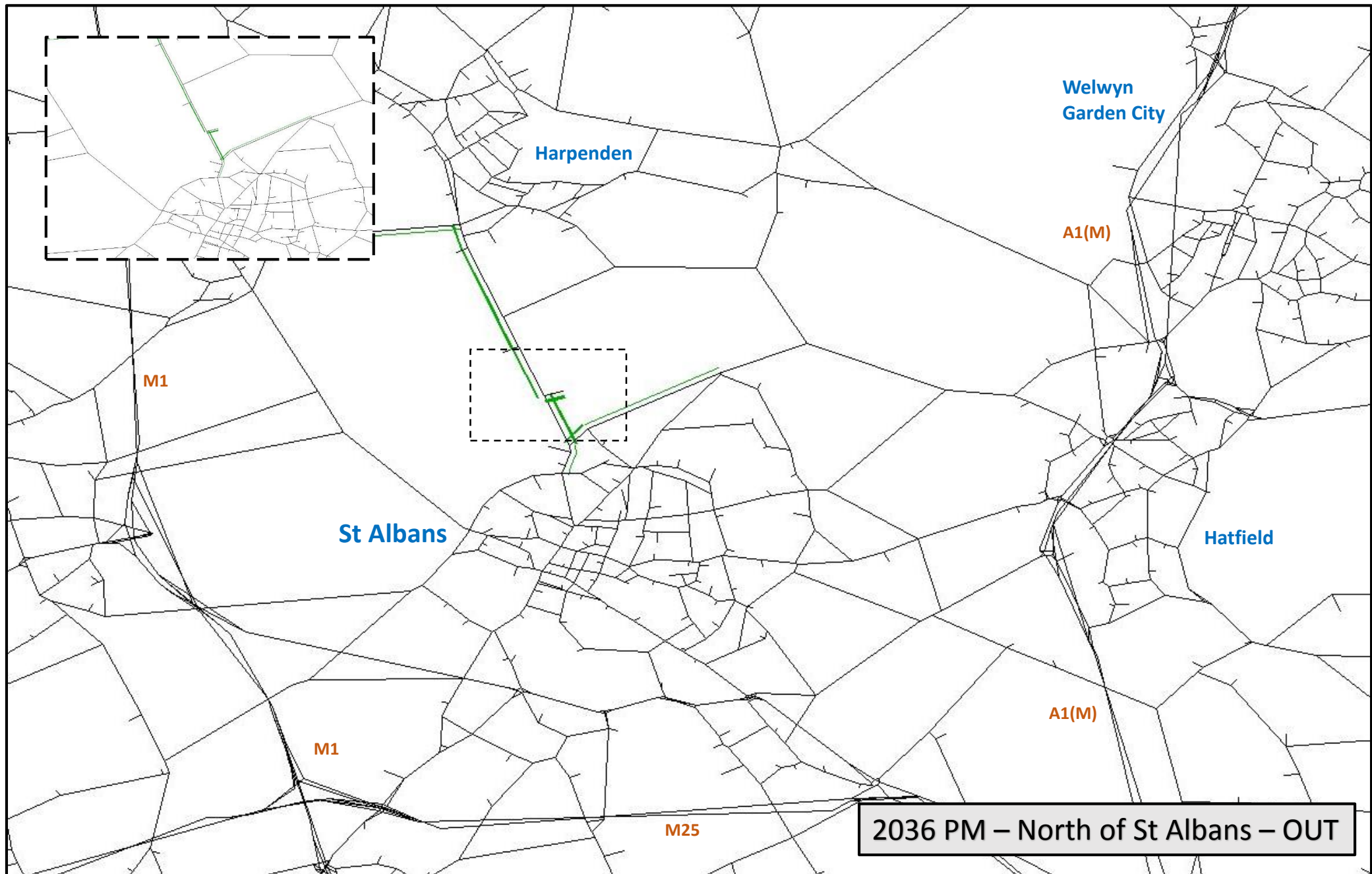


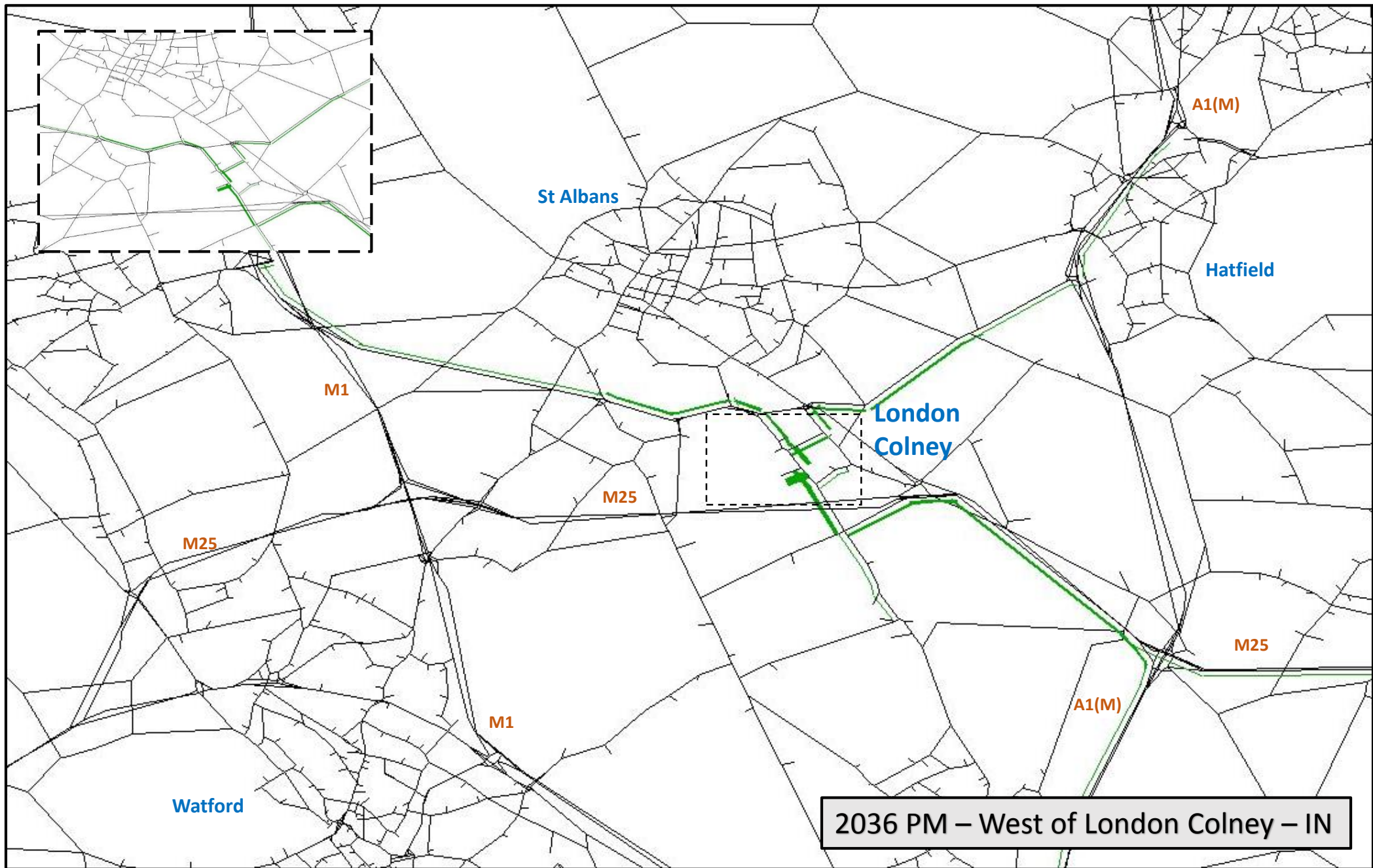


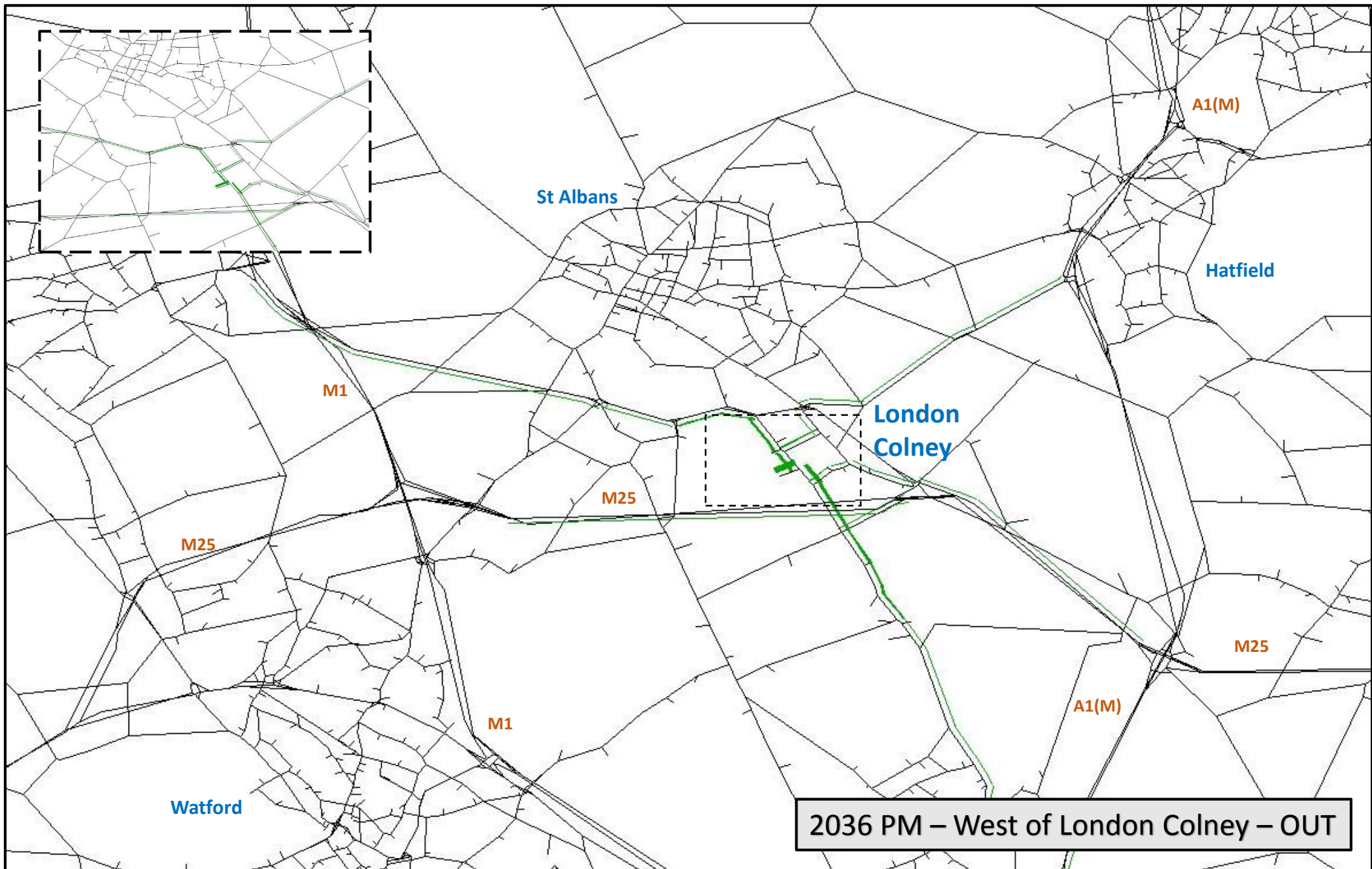


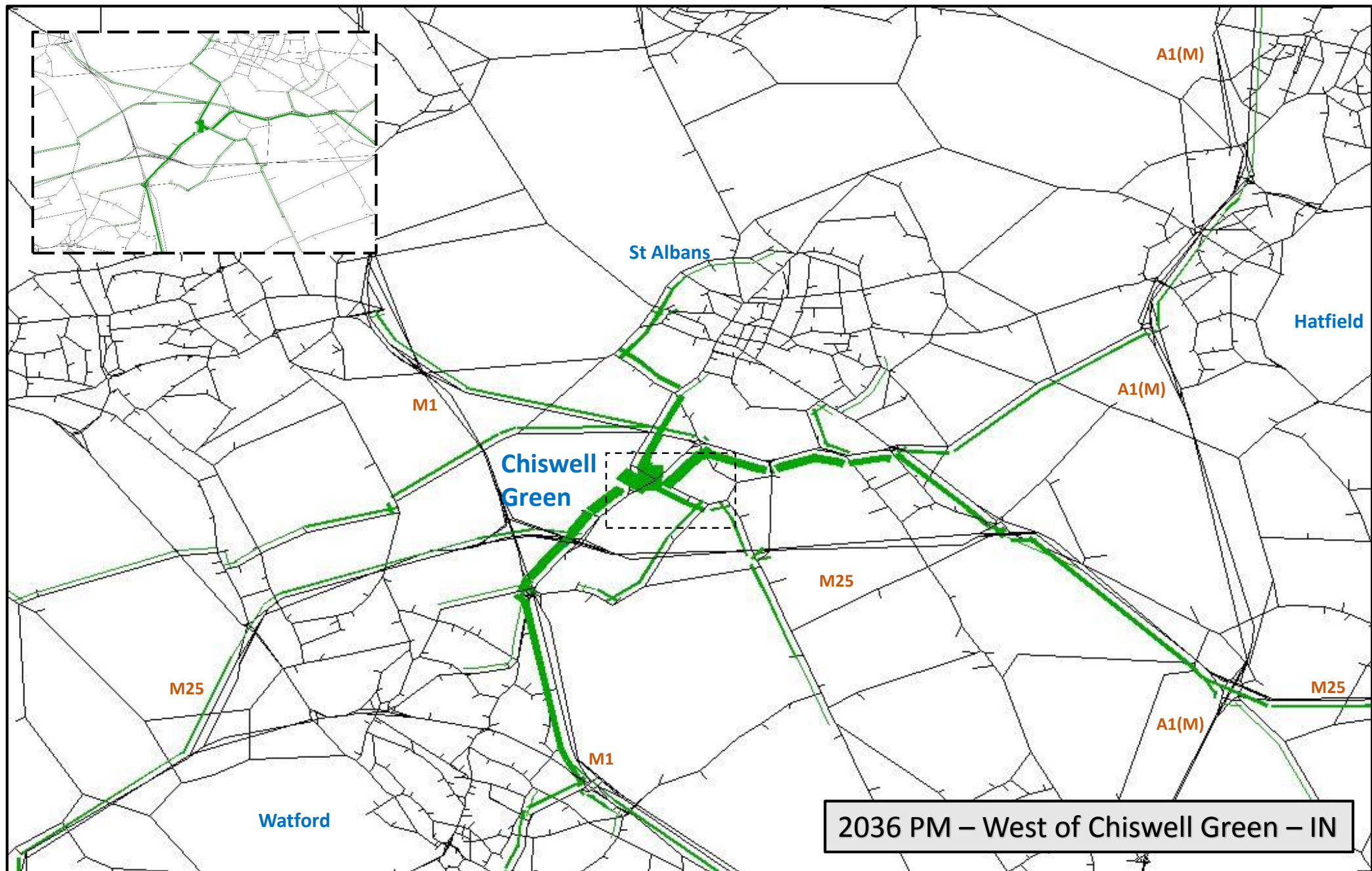


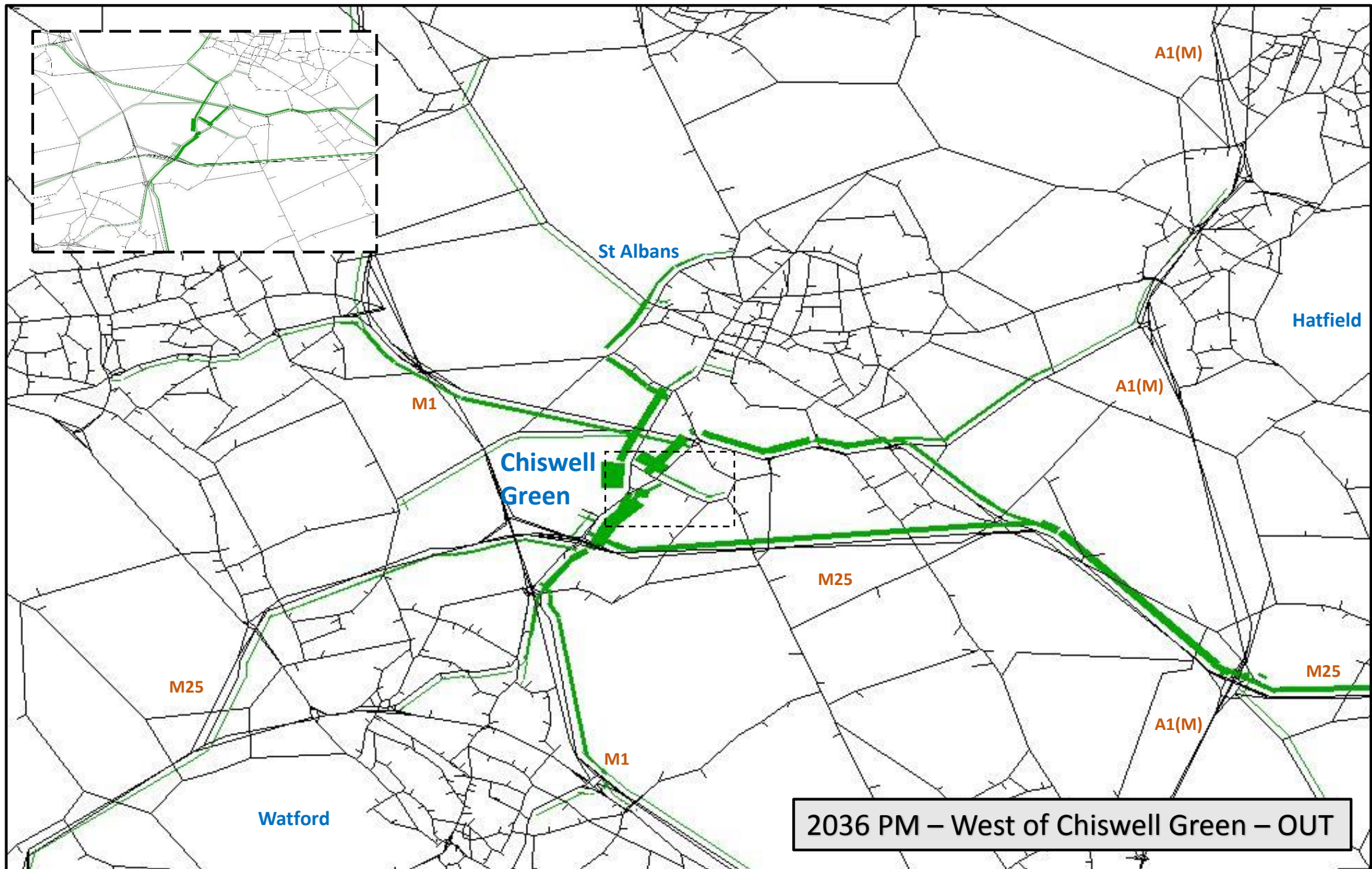


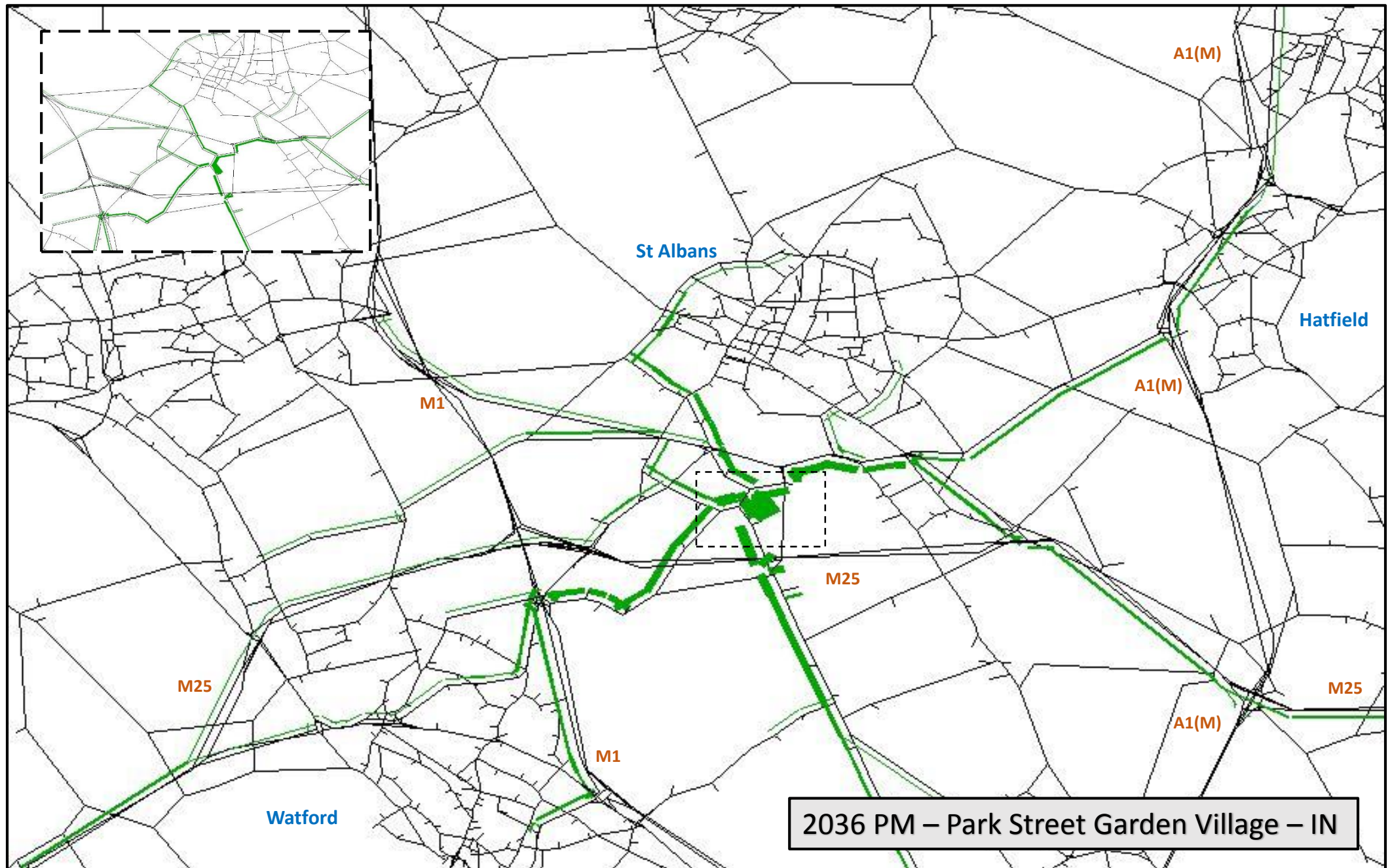


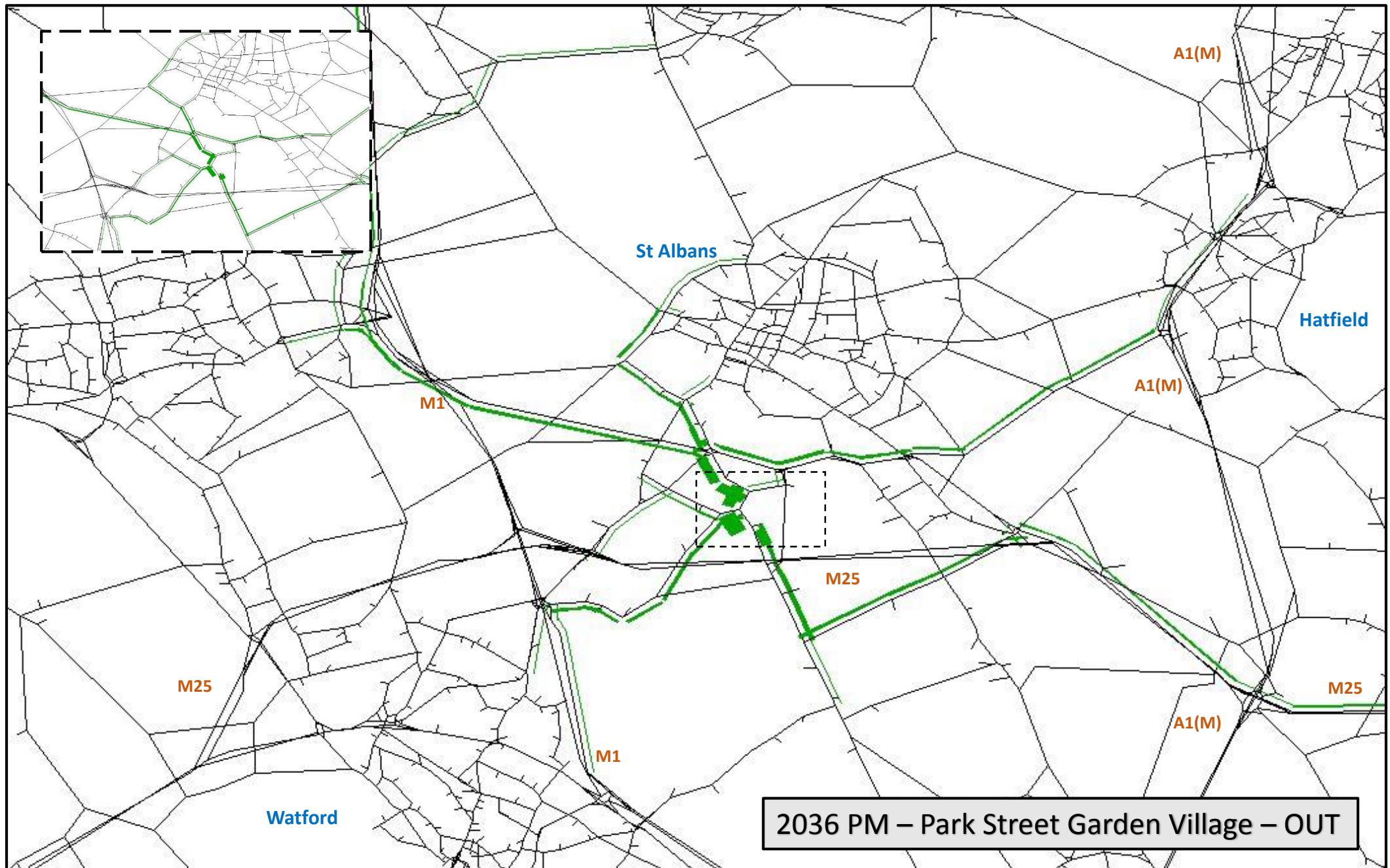


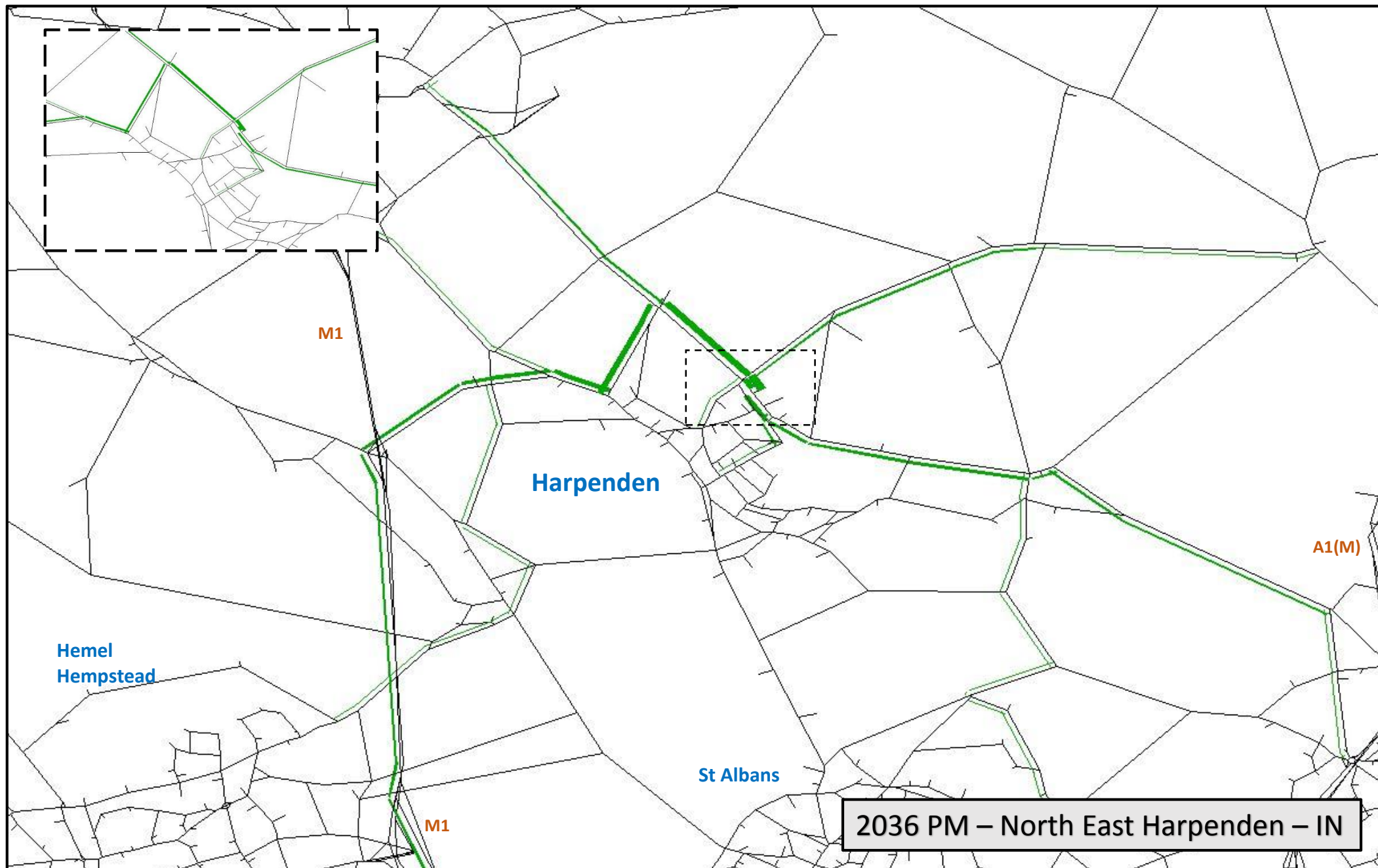


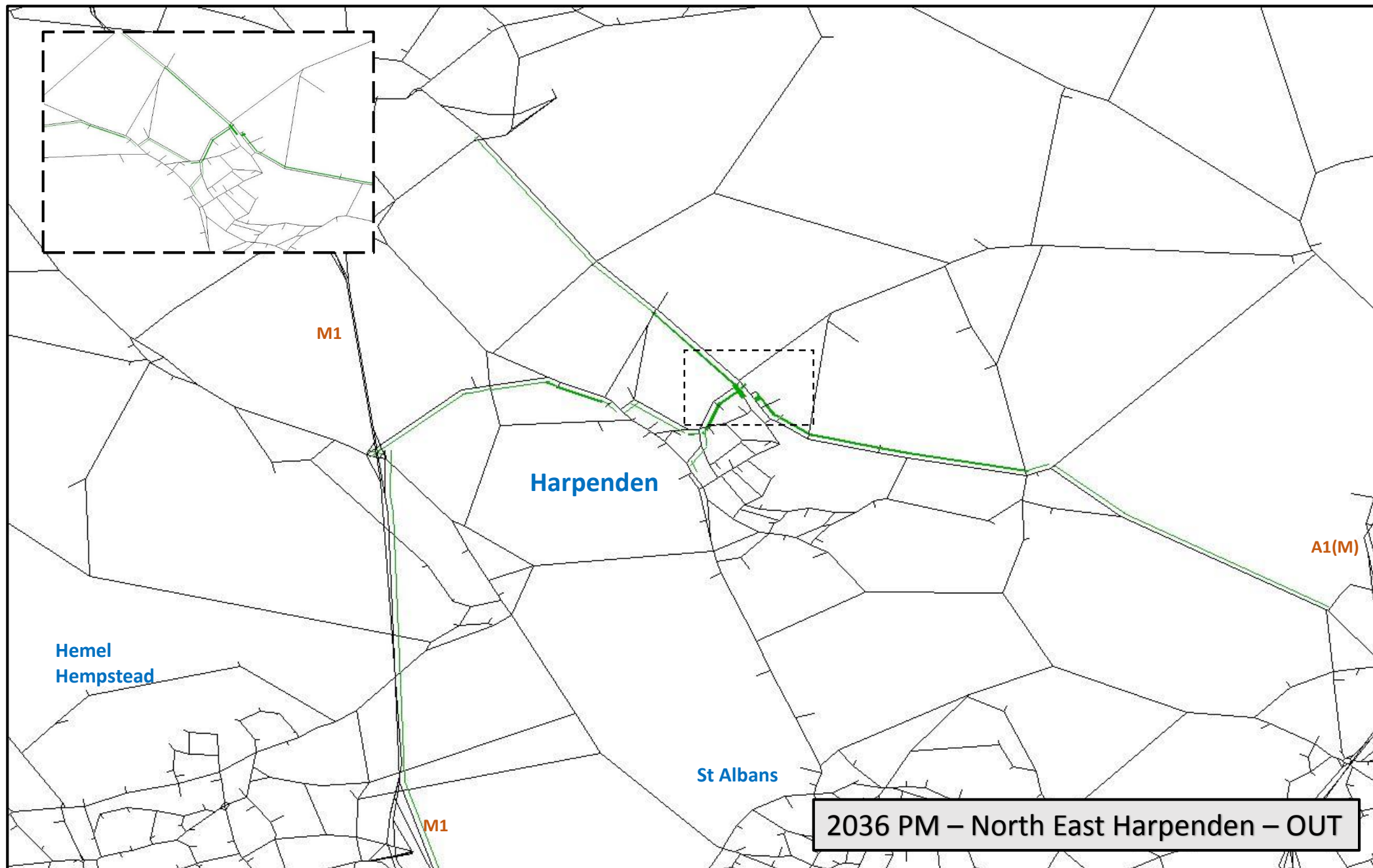












8.3 Appendix C: Transport Initiatives Within St Albans District

SCH Package	Location	Scheme Details	Scheme Code	Modelled in LP4?
PK 9	St Albans-Welwyn Garden City Connectivity	Coopers Green Lane Active Travel Infrastructure SW of Hatfield Avenue (towards St Albans)	SM67	N
		Coopers Green Lane Speed Limit Reduction	PR68	Y
		Sandpit Lane cycle improvements	SM207	N
PK16	Luton-Wheathampstead-Hatfield and Welwyn Garden City Corridor	Harpenden-Wheathampstead Cycleway	PR101	N
		Wheathampstead-Hatfield Cycleway	PR102	N
		Welwyn Garden City-Luton Bus Services	PR103	Y
		Hatfield-Luton Bus Services	PR104	Y
		B653/B197/Coopers Green Lane roundabout improvement	PR203	Y
		A1(M) Junction 5 closure	SM106	N
		A6129/B197 Roundabout Signalisation	PR105	Y
		B653/Lemsford Village/Green Lanes junctions improvement	SM70	Y
PK24	St Albans City Centre Improvements	St Albans Footway Improvements Study	PR139	N
		St Albans City Centre 20mph zone expansion	PR140	Y
		A1081 St Peter's Street Pedestrian Crossing	PR141	Y
		St Peter's Street/Victoria Street Junction Reconfiguration	SM142a	Y
			SM142b	N
			SM142c	N
		Victoria Street Urban Realm Improvements	SM143	Y
		Enhanced Victoria Street-Civic Centre-St Peter's Street Pedestrian Link	SM144	N

PK25	St Albans Green Ring	St Albans Green Ring Enhancement - Beech Bottom/Batchwood Drive	PR148	N
		St Albans Green Ring Enhancement - Townsend Drive	PR149	N
		St Albans Green Ring Enhancement - Branch Road and St Michael's Street	PR150	N
		Existing level crossing closure – replacement facility	SM152	N
		St Albans Green Ring 'Spoke' Routes -	SM153	N
		Alban Way Lighting	PR154	N
		Alban Way Wayfinding	PR155	N
		Alban Way Cycle Signage	PR156	N
		Alban Way Physical Improvements	SM157	N
PK26	St Albans Abbey Station Accessibility	Alban Way Marketing and Promotion	PR158	N
		Cycle Parking	PR159	N
		Station to Station Connectivity	PR160	N
		St Albans Abbey Station Relocation	SM161	Y
		Existing level crossing closure – replacement facility	SM152	N
		Abbey line P & R hub - extension of Park Street station platform (SADC preferred option)	SM162a	N
		Abbey line additional station and facility	SM162b	N
		Abbey line additional station and bus only link	SM162c	N
PK27	St Albans City Station Accessibility	Abbey Line, Park street station relocated	SM162d	N
		Victoria Street Footway Improvements	SM163	N
		Victoria Street Wayfinding	PR164	N
		Pedestrian Crossing Improvements	SM165	N
		Victoria Street Urban Realm Improvements	SM166	N
		Cycle Parking	PR167	N

		Grosvenor Road-Ridgemont southern active travel route to the station	PR168	N
PK28	Hatfield Road Corridor - St Albans	Hatfield Road Parking Study	PR169	N
		Hatfield Road Bus Priority and Improvements	PR170	Y
		Hatfield Road Urban Realm Improvements	SM171	N
PK29	London Road Corridor - St Albans	Odyssey Cinema revised footway and crossing	PR172	N
		Parking revisions	SM173	N
		London Road/Watsons Walk/Lattimore Road junction alterations	SM174	Y
		Peahen junction signal timing reconfiguration	PR175	Y
PK30	A414 Highway Improvements (South of St Albans)	A414/A1081 London Colney Roundabout Upgrade	SM176	Y
		A414 Park Street Roundabout Improvements	SM177	Y
		A414 Colney Heath Longabout Improvements	SM178	Y
		A414 Smart Traffic Management	SM179	Y
		Traffic Routing Signage	SM180	N
		A414 Cycle Route upgrade London Colney-Hatfield	SM181	N
		A414 Corridor Park Street-Napsbury-London Colney Cycle Route	SM206	N
PK31	London Colney Inter-Urban Strategic Public Transport Connectivity	London Colney Railway Station	SM183	N
		Upgrade of the A414 Napsbury Junction	SM185	N
		B5378 Active Travel Corridor (if a PT interchange is provided at Napsbury)	SM186	N
		B5378 Active Travel Corridor (if a PT interchange is provided west of London Colney)	SM187	N
		A414 Corridor Park Street-Napsbury-London Colney Cycle Route	SM206	N
PK32	London Colney Inter-Urban Local Connectivity	London Colney A414 Cycle/Pedestrian Bridge Improvements	PR188	N

		London Colney A414 Sustainable Travel Bridge	SM208	N
		Improved Pedestrian and Cycle Links within London Colney on the High Street	SM190	N
		A414/A1081 London Colney Roundabout Upgrade	SM176	Y
		Improved London Colney-St Albans bus services	PR191	N
		A414 Corridor Park Street-Napsbury-London Colney Cycle Route	SM206	N
PK33	London Colney Internal Connectivity	High Street streetscape improvements	SM192	N
		High Street 20mph speed limit	PR193	N
		Town wide 20mph speed limit	PR194	Y
		Cross-town core pedestrian and cycle route linked to potential new housing development	PR195	N
PK34	St Albans-Hatfield Local Connectivity	Traffic Routing Signage	SM180	N
		St Albans-Hatfield Local Bus Route Improvements	PR197	N
		Coopers Green Lane Active Travel Infrastructure (SW of Hatfield Avenue)	SM67	Y
		Coopers Green Lane Speed Limit Reduction	PR68	N
PK35	Chiswell Green Corridor Active Travel Improvements	B4630 Watford Road Improvements	SM200	Y
		A414 Park Street Roundabout Improvements	SM177	Y
		A405/B4630 Watford Road junction reconfiguration	SM201	Y
PK36	Alban Way Improvements	Alban Way Lighting	PR154	N
		Alban Way Wayfinding	PR155	N
		Alban Way Cycle Signage	PR156	N
		Alban Way Physical Improvements	SM157	N
		Alban Way Marketing and Promotion	PR158	N

SW Scheme Details		
	Scheme Code	Modelled in LP4?
Hemel Hempstead Eastern Spine Road (multimodal)	SM6b	Y
M1 Junction 8 Enhancement	SM7c	Y
HH townwide bus service reconfiguration, maximising connections to Maylands, the station, town centre and EW links to neighbouring towns.	SM8	Y
Dedicated coach Luton to Hemel - A new express coach service along the M1 connecting Hemel Hempstead to Luton or potential to divert existing Greenline services from Luton to London via Hemel Hempstead (Maylands). Would complement East Hemel (Maylands) Multi-Modal Transport Interchange (LP2).	SM10	Y
Abbey line P & R hub - extension of Park Street station platform (SADC preferred option)	SM13a	N
Abbey line additional station and facility	SM13b	N
Abbey line additional station and bus only link	SM13c	N
Abbey Line, Park street station relocated	SM13d	N
A405 Cycleway	SM20	N
A414 - Jct 8 cycle bridge	SM29	N
East Hemel Multi-Modal Interchange	PR19	N
Maylands Central Car Park	PR95	N

Maylands shuttle service and ML1 enhancements - A shuttle bus service connecting the multi-modal transport interchange, car park and Maylands area, potentially incorporating enhancements to existing ML1 services.	PR96	Y
Converting Nicky line to public transport (discounted at early stage)	SM9	N
Nickey Line N-S Extension	PR20	N
A4147 cycleway, Hemel	PR21	N
A414 cycleway, Hemel to Park Street	PR22	N
New lighting on Nickey Line cycle route	PR30	N
Improved step free access to Nickey Line	PR100/PR101	N
Improve capacity on slip roads at M1 J10 south of Luton with the intention of reducing congestion and consequently encouraging trips to travel on the M1 rather than avoiding delays by instead rat-running along local roads via Kinsbourne Green and Harpenden. Cooperation with Highways England required	PR35	Y
A1081 Harpenden TC capacity reduction and streetscape improvements. Narrowing of road, more crossings and speed tables in town centre and on Station Road	PR36	Y
A1081 cycle corridor	PR37	N

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