University Hill Transportation Study

Technical Memorandum
Alternatives Modeling and Analysis
May 2007

Syracuse Metropolitan Transportation Council

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SECTION ONE- INTRODUCTION

The University Hill Transportation Study (the Study) is intended to keep institutions and business within the University Hill area viable while reducing growth in auto use and parking. The following technical memorandum describes seven transportation alternatives and the modeling analysis for each using the Syracuse Metropolitan Transportation Council (SMTC) Travel Demand Model for the University Hill study area. For modeling purposes, variations of the selected alternatives are also analyzed.

These transportation alternatives were selected for additional analysis by the University Hill Working Group from a list of nearly thirty possible alternatives. An in depth discussion of the long list of possible alternatives is included in the ***Emerging Concepts Report***.

The purpose of modeling these alternatives is to provide information for the Working Group to consider when determining which alternative(s) best addresses the four basic needs for the Study. The four basic needs are specifically outlined in the ***Needs Assessment*** and include accessibility, flexibility, economic vitality and sustainability.

This analysis is helpful in identifying shifts in the demand for travel on various transportation facilities in the University Hill area based on different changes and/or improvements to the existing facilities. It is important to note that this transportation modeling analysis is one of several items the Working Group is using in its decision-making process. Travel demand depends on the type and intensity of the various land uses as well as the design of the transportation system and modes used. As a result, a mixed use land use scenario is also being considered as part of the Study.

The alternatives, as well as a future no-build forecast ("Baseline 2027"), were analyzed in the 24-hour average daily traffic (ADT) time period for the planning horizon year 2027. The SMTC regional model was refined for use within the University Hill area. The refinements incorporated Transportation Analysis Zones (TAZ) for city blocks or individual institutions and network refinements specific to the study area.

Within this memorandum, key findings are discussed based on travel demand model runs and impacts on vehicle-miles traveled (VMT) for the University Hill study area and the SMTC planning region. The analysis is limited to an examination of VMT. Vehicle-miles are the sum of the distance traveled by all roadway traffic. In this instance, VMT is also considered a measure of sustainability. For example, a key measurement in improving the sustainability of a transportation system is the reduction of vehicle emissions. Vehicle emissions account for over a third of greenhouse gas pollution in the United States. A reduction in VMT can directly result in a reduction in vehicle emissions.

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SECTION TWO- SUMMARY OF THE ALTERNATIVES

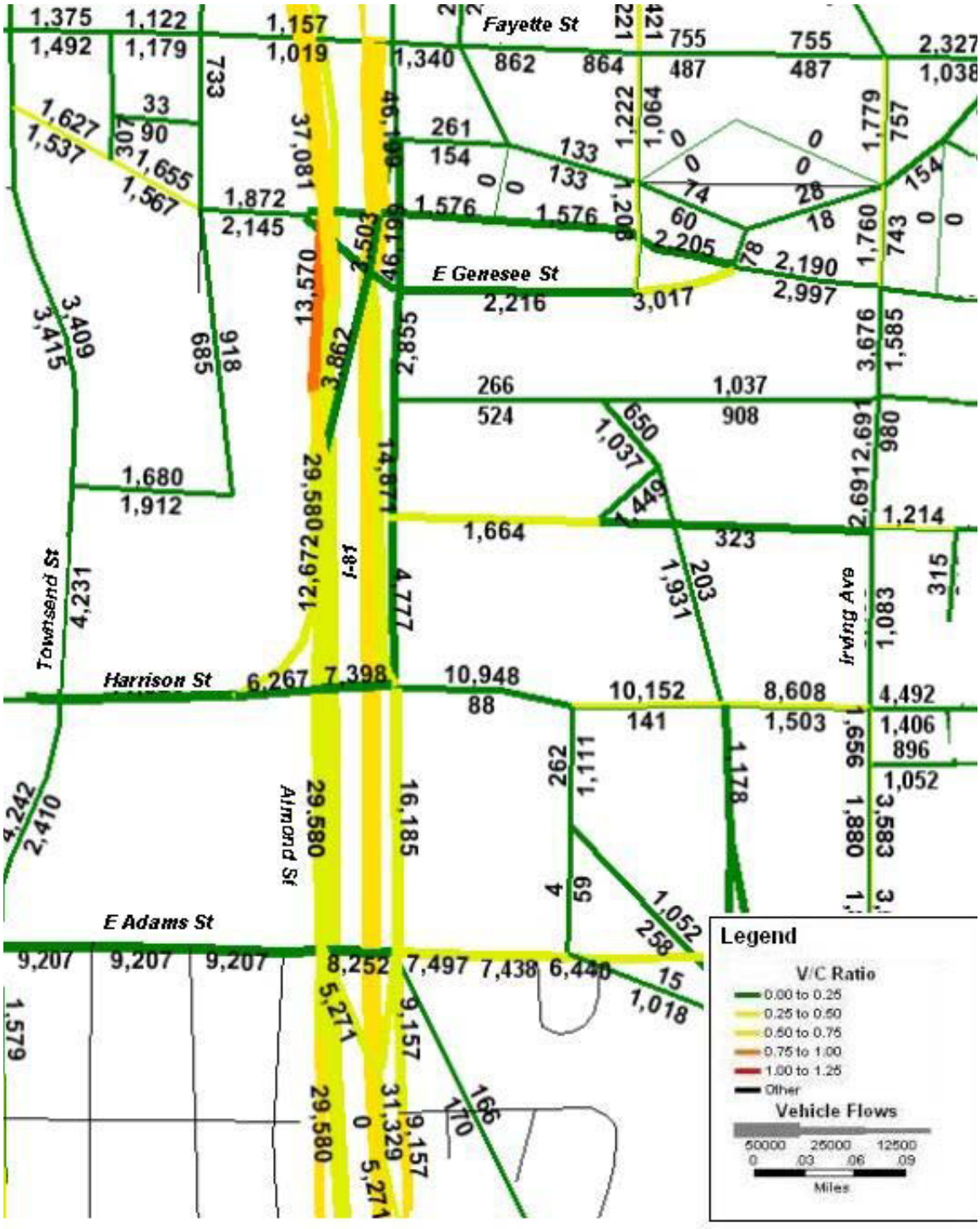
Section 2 includes a description and illustration of the short list of alternatives identified through the ***Emerging Concepts Report***. A discussion of the modeling results is also included. In addition, an illustration of the volume to capacity (V/C) ratios with ADT volumes and the change in 24-hour traffic volume for each alternative are included. Table 1 outlines the alternatives describe throughout this section.

TABLE 1. TRANSPORTATION ALTERNATIVES

Alternative #	Description
Baseline – No Improvements	Baseline year 2027 with refinements to the University Hill demographics/employment datasets, TAZ boundaries, and network characteristics.
Alternative #1	Widening of all four ramps connecting I-81 with Harrison Street and Adams Street.
Alternative #1-A	Widening three of four ramps connecting I-81 with Harrison Street and Adams Street. (Excludes the northbound on-ramp from Harrison Street to I-81 due to weaving traffic conflict.)
Alternative #2	New I-81 interchange at E. Castle Road.
Alternative #3	Replacement of traffic signals on Almond Street at Harrison and Adams Streets with dual-teardrop roundabouts.
Alternative #3-A	This includes modifications to Alternative 3 as follows: ▪ Replacement of traffic signals on Almond Street at Harrison and Adams Streets with roundabouts. The roundabout at Almond/Adams has 3 legs (no circulating roadway on the north side of the intersection); the roundabout at Almond/Harrison has 4 legs (to permit southbound Almond Street traffic to turn left eastbound onto Harrison Street.). ▪ 2 lanes each direction on Harrison Street from Almond Street to Crouse Avenue. ▪ A BRT system, keeping 1-way circulation on Harrison Street west of Almond Street, but adding contraflow BRT lane on Harrison Street and narrowing Harrison Street on sections carrying the BRT to 3 westbound traffic lanes.
Alternative #4	Narrowing of Almond Street at select locations by 1 lane
Alternative #5	Removal of I-81 elevated Almond Street section – Replace with Almond Street Boulevard; Interchange geometry and I-481 speed enhancements (35 mph) incorporated to re-route through traffic onto I-481.
Alternative #5-A	Removal of I-81 elevated Almond Street section – Replace with Almond Street Boulevard; Interchange geometry and I-481 speed enhancements (45 mph) incorporated; this alternative has a higher-speed and higher-capacity Almond Street Boulevard than Alternative 5.
Alternative #6	Same as Alternative #5 with more extensive reconstruction at I-81/ I-690 ramp system.
Alternative #7	BRT alignment connecting transit center and University Hill via Harrison Street; Convert Adams/Harrison streets and Crouse/University Avenues to two-way operation.

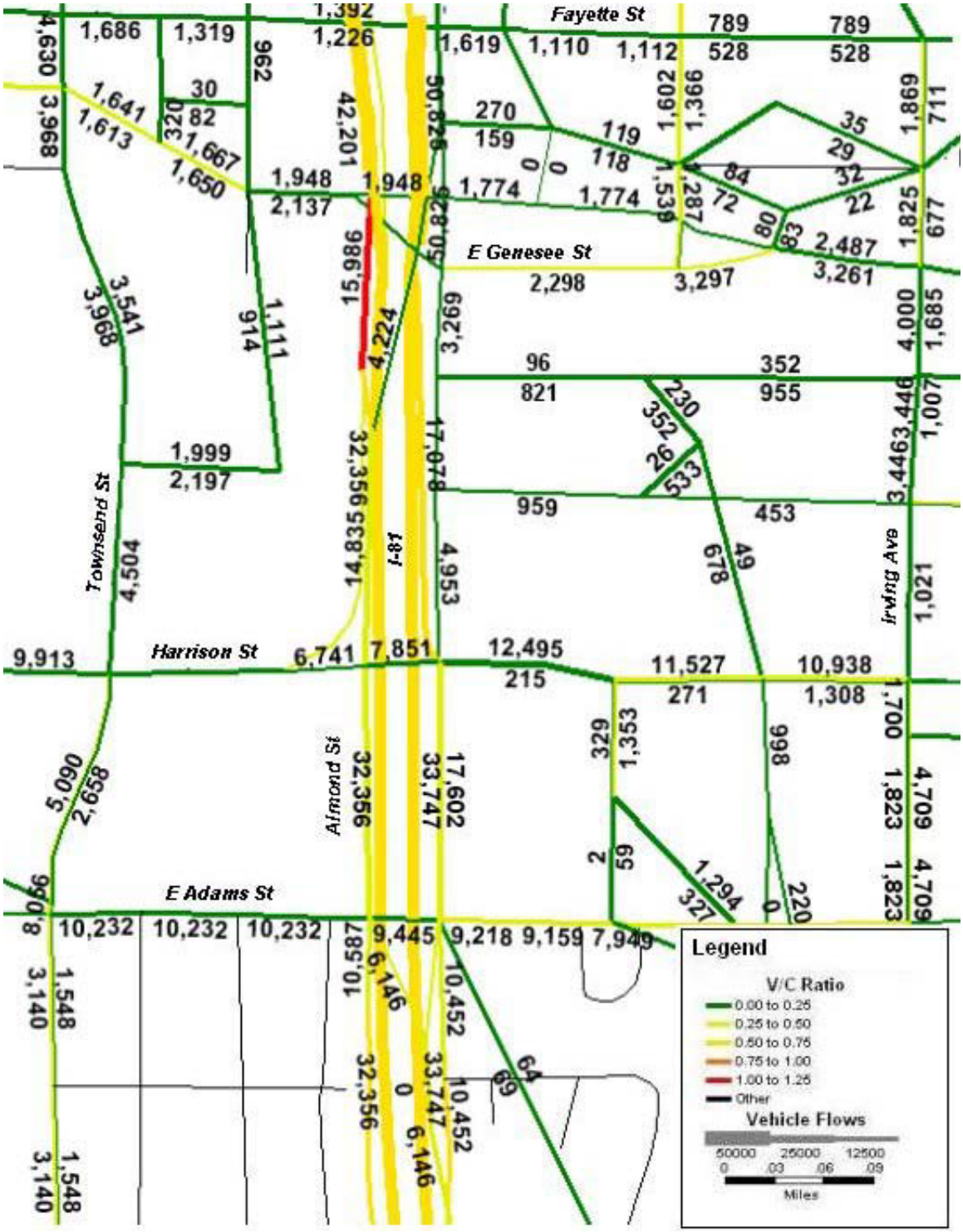
To understand the potential impacts of the alternatives discussed, it is necessary to have an understanding of the current conditions. Figure 1 illustrates V/C Ratios and ADT volumes for 2003, the most current data available. It is also important to compare potential impacts of each alternative on the transportation system for year 2027. 2027 was established as the Build Year early in the study. Figure 2 represents the V/C ratios and ADT volumes for the Baseline 2027 or the year 2027 with no improvement to the transportation system.

FIGURE 1. 2003 V/C RATIOS AND ADT VOLUMES



Note: V/C Ratio=volume to capacity ratio. A V/C ratio of 1.00 or greater indicates the roadway segment is at a near capacity. ADT=average daily traffic.

FIGURE 2. BASELINE 2027 V/C RATIOS AND ADT VOLUMES



Note: V/C Ratio=volume to capacity ratio. A V/C ratio of 1.00 or greater indicates the roadway segment is at a near capacity. ADT=average daily traffic.

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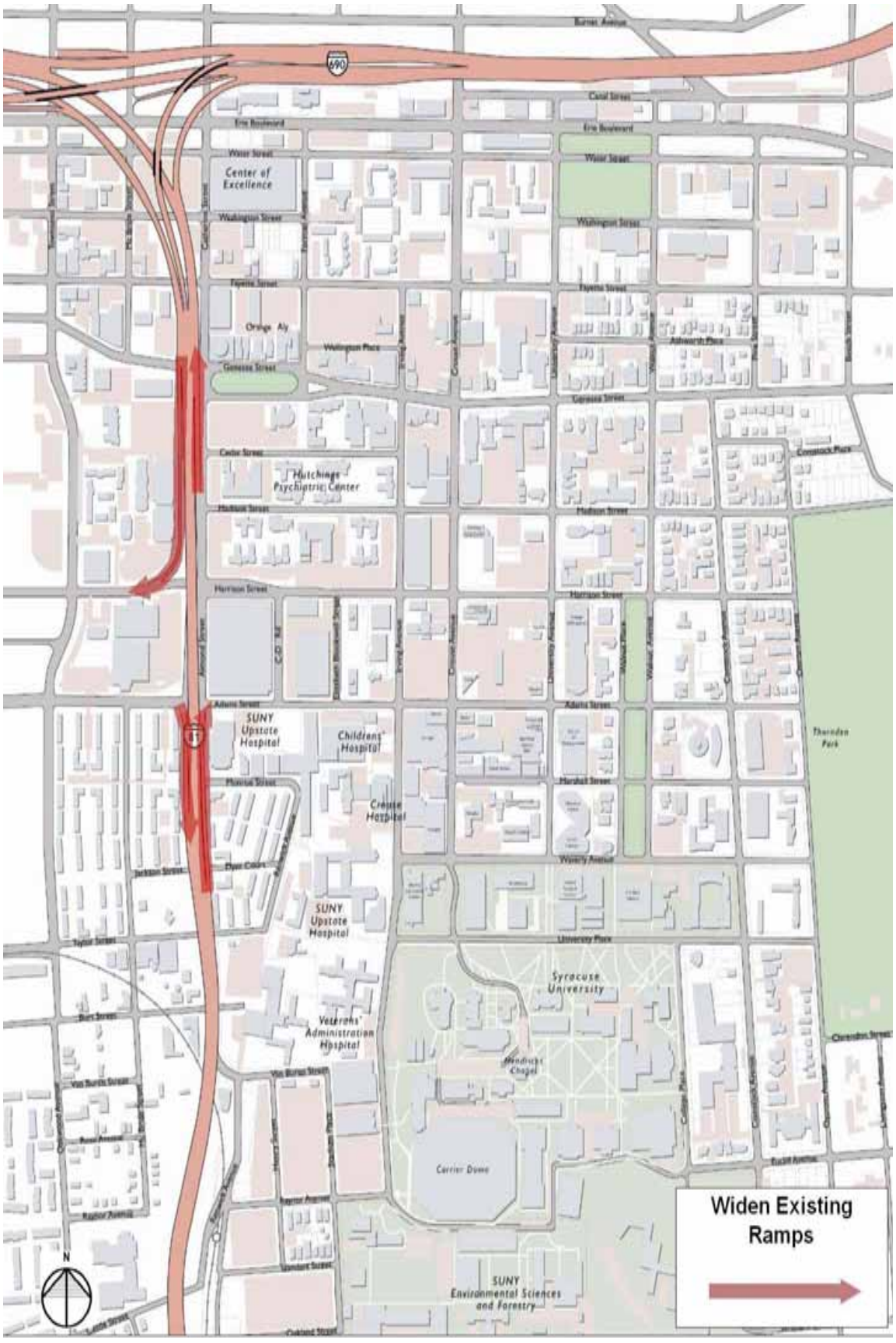
FIGURE 3. ALTERNATIVE #1- WIDEN ALL FOUR I-81 RAMPS



ALTERNATIVE #1.

Description

In this scenario, all four of the ramps connecting I-81 with Almond Street were widened with an additional lane (See Figure 3).

Findings

Each of the widened ramps would receive moderate increases in traffic volumes-between 2.5% and 4.2%–after being widened. The combination of major capacity increases and moderate traffic volume increases results in significantly lower v/c ratios and congestion.

Figure 4 illustrates vehicle to capacity ratios (v/c ratios) and average daily traffic volumes (ADT). The roadway segments colored in red carry higher traffic volumes in this alternative (relative to the 2027 baseline), and those shaded green carry lower traffic volumes.

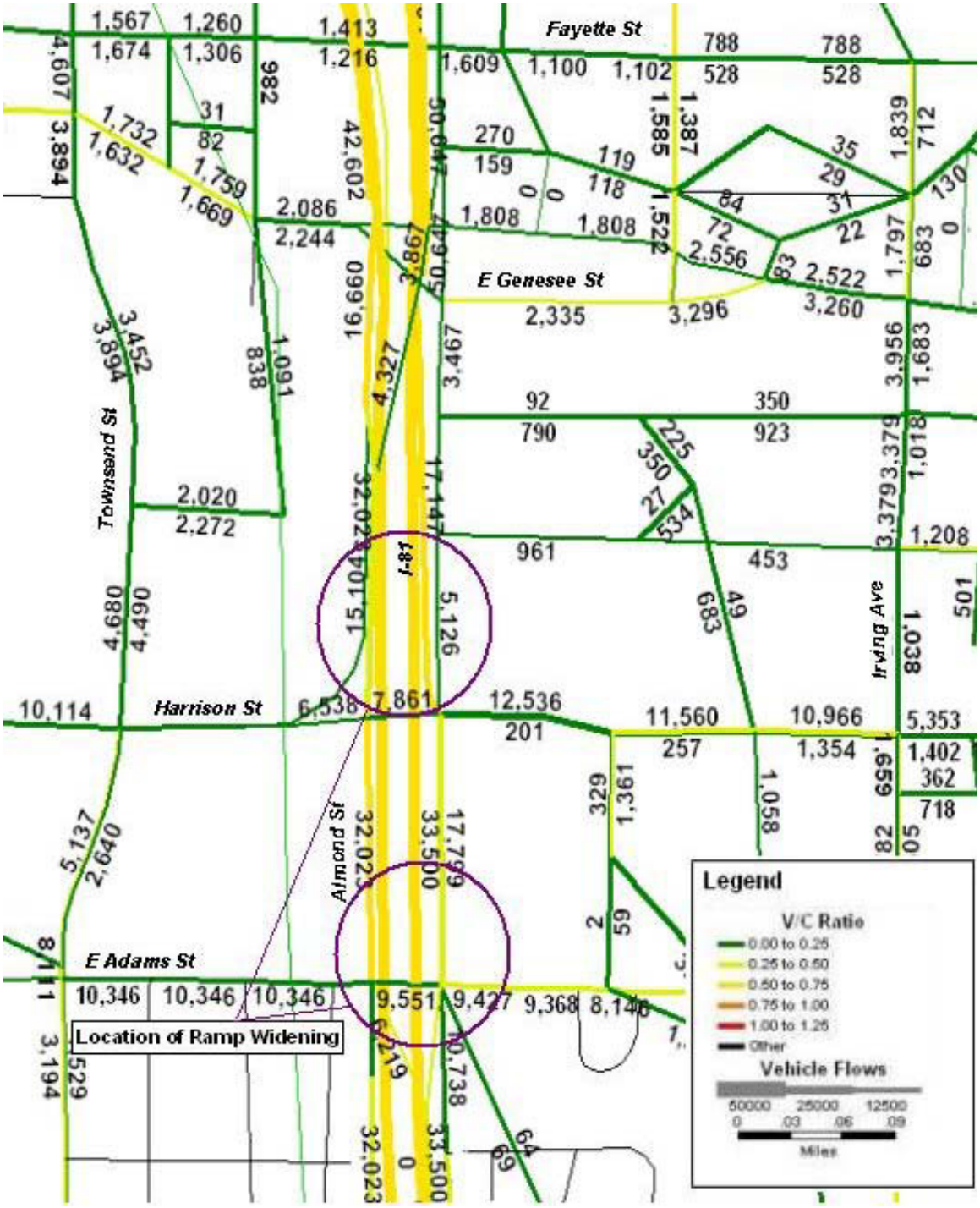
A discernable pattern is that traffic volumes on roadway segments connecting to the I-81/Almond Street ramp system also increase. This includes Almond Street, Harrison Street and Adams Street.

The scenario resulted in a minor increase in VMT both in the University Hill study area and regionally. This is because the increased traffic-moving capacity on the ramps allows lower volume-to-capacity ratios, and can accommodate additional vehicular traffic in the vicinity of University Hill. For example, ADT on the southbound exit ramp onto Harrison Street is forecast to increase from 16,000 to 16,600, and ADT on the northbound entrance ramp from Harrison Street is forecast to increase from 17,100 to 17,500.

The net increases in ADT and VMT, both on University Hill and regionally, are very minor.

In Figure 5, the numbers shown are the increases in 24-hour volume. For the purposes of this technical memorandum, a change in 24-hour traffic volume of greater than 250 vehicles is considered significant. For example, a change in volume of 250 vehicles over a 24-hour period is equivalent to approximately 25 vehicles during a peak hour. Alternative 1 results in one area of a significant increase in 24-hour volumes. This occurs on Harrison Street west of I-81 (an increase of 305 vehicles).

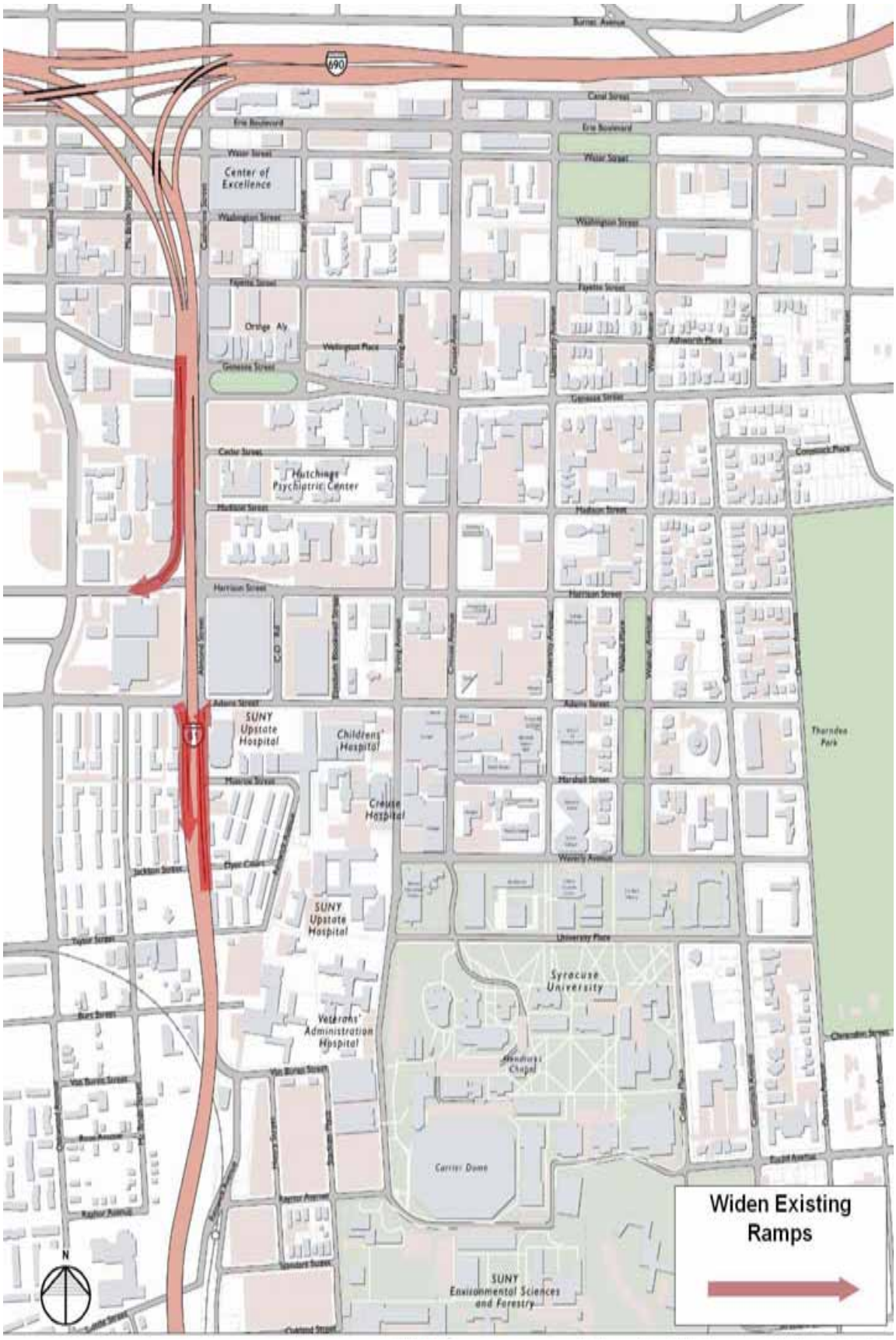
FIGURE 4. ALTERNATIVE #1- V/C RATIOS AND ADT VOLUMES FOR 2027



Note: V/C Ratio=volume to capacity ratio. A V/C ratio of 1.00 or greater indicates the roadway segment is at a near capacity. ADT=average daily traffic.

FIGURE 5. ALTERNATIVE #1- CHANGE IN 24-HOUR TRAFFIC VOLUMES FOR 2027

FIGURE 6. ALTERNATIVE #1A - WIDEN THREE OF THE I-81 RAMPS



ALTERNATIVE #1-A

Description

In this scenario, three of the ramps connecting I-81 with Almond Street were widened to two lanes each (See Figure 6). The southbound on and northbound off-ramps in the vicinity of Adams Street were widened, as was the southbound off-ramp in the vicinity of Harrison Street. (The northbound on-ramp from Harrison Street to I-81 was not widened in this scenario as it was determined to be infeasible due to the weaving traffic conflict with traffic exiting I-81 northbound onto I-690 eastbound.)

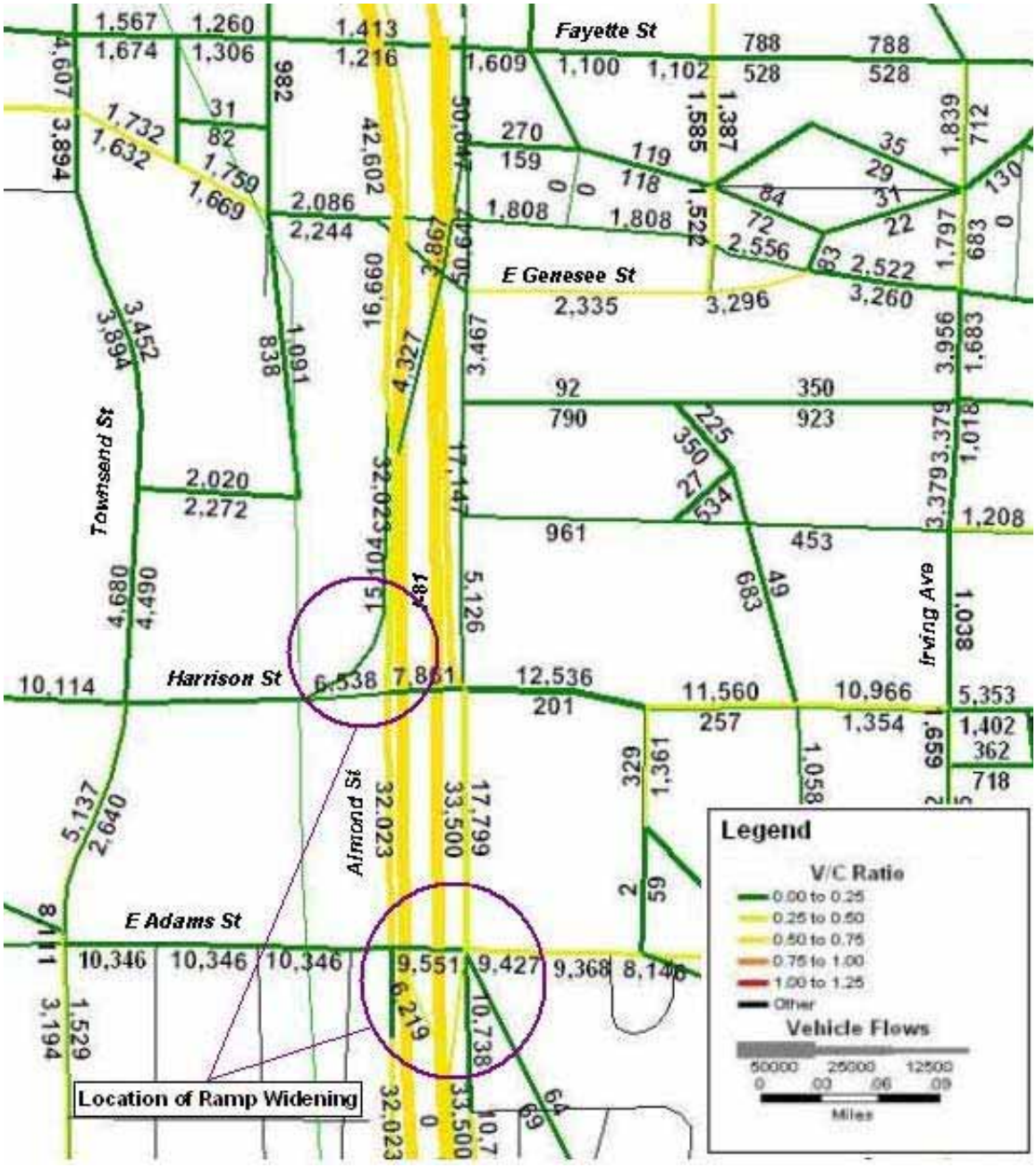
Findings

The scenario resulted in a minor increase in VMT in the University Hill study area, and a corresponding minor decrease regionally. As illustrated in Figure 7, this is because the increased traffic-moving capacity on the ramps allow lower v/c ratios, and can accommodate additional vehicular traffic in the vicinity of University Hill. For example, ADT on the southbound exit ramp onto Harrison Street is forecast to increase from 16,000 to 16,600, and ADT on the northbound exit ramp onto Adams Street is forecast to increase from 10,400 to 10,700.

Changes in 24-hour traffic volumes in the I-81/Almond Street vicinity are shown in Figure 8. As with Alternative 1, the segment immediately west of I-81 on Harrison Street has a significant increase in 24-hour volumes. In addition, East Adams Street experiences significant volume increases west of I-81.

The minor decrease in regional VMT is also related to the reduction in congestion (v/c ratios) on these ramps – motorists take more direct routing paths (and produce fewer VMT) in a less-congested roadway network. The net changes in ADT and VMT, both on University Hill and regionally, however are very minor.

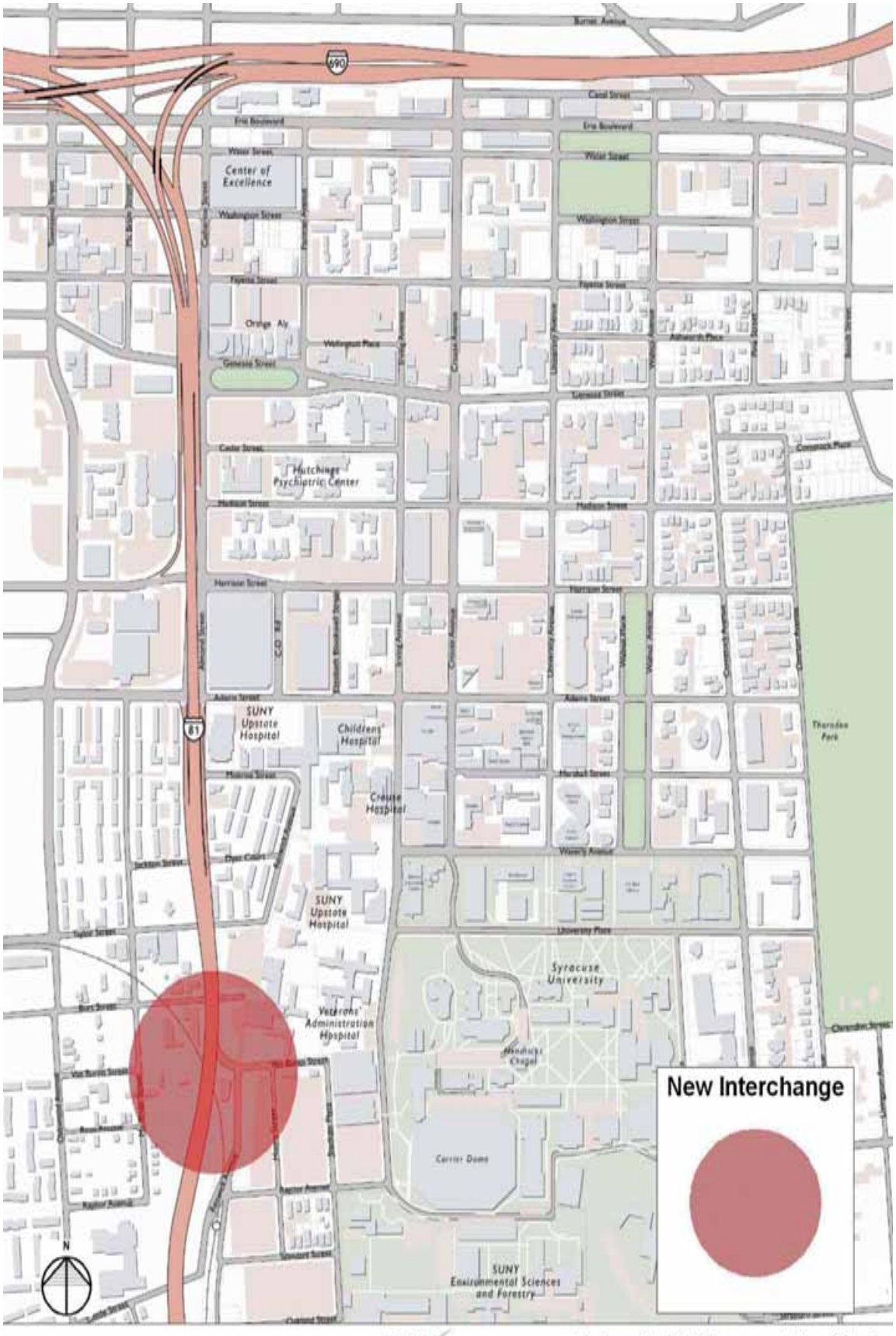
FIGURE 7. ALTERNATIVE # 1A - V/C RATIOS AND ADT VOLUMES FOR 2027



Note: V/C Ratio=volume to capacity ratio. A V/C ratio of 1.00 or greater indicates the roadway segment is at a near capacity. ADT=average daily traffic.

FIGURE 8. ALTERNATIVE #1A - CHANGE IN 24-HOUR TRAFFIC VOLUMES FOR 2027

FIGURE 9. ALTERNATIVE #2 - NEW I-81 INTERCHANGE



ALTERNATIVE #2.

Description

This scenario involved the addition of a new partial interchange between I-81 and East Castle Street, as illustrated in Figure 9. The movements accommodated would be northbound exit (I-81 to East Castle Street) and southbound entrance to I-81 (East Castle Street to I-81).

Findings

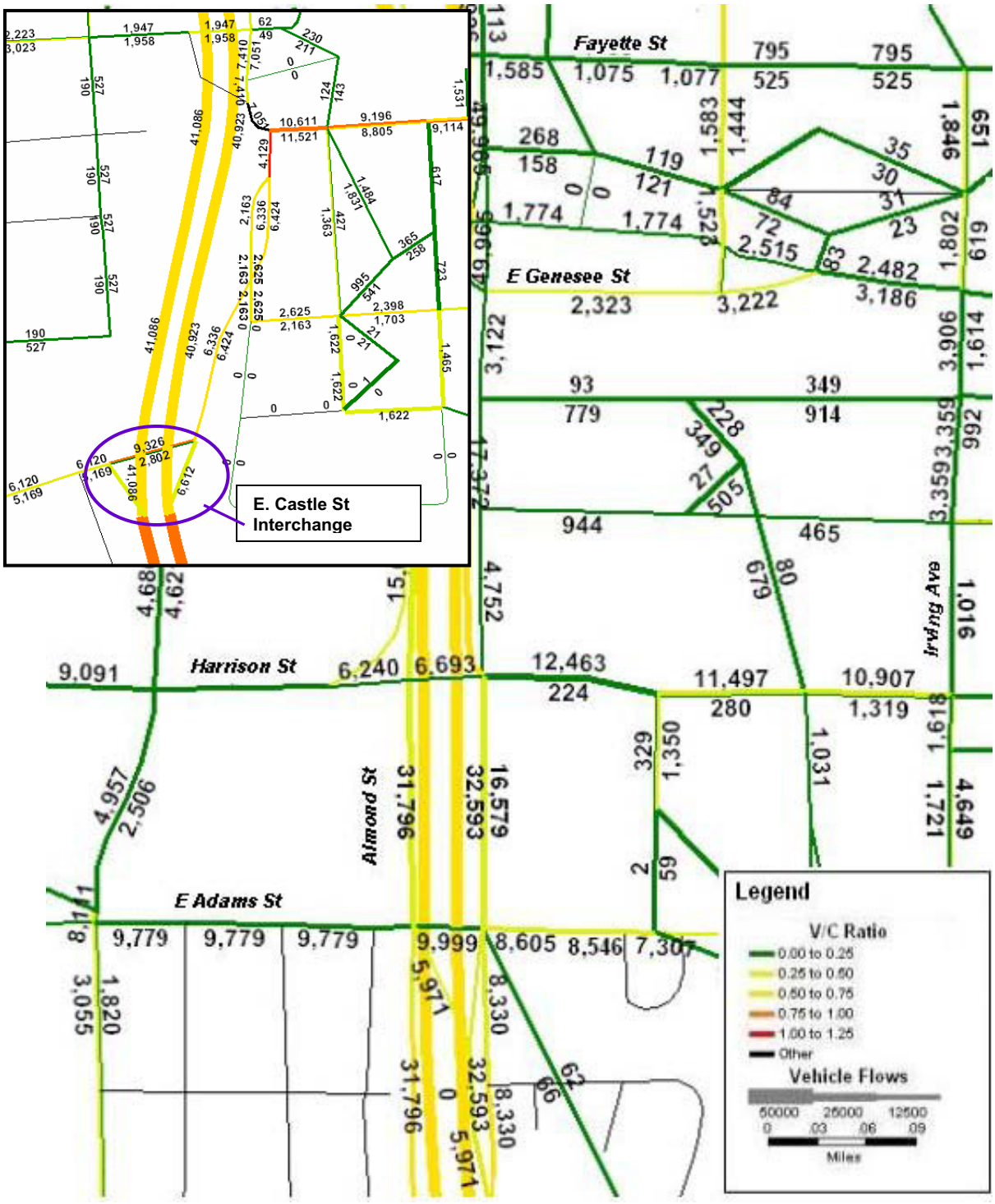
This scenario resulted in reduction in VMT locally within University Hill. This is to be expected as motorists are presented with more options to access destinations within University Hill more directly to/from I-81. Figure 10 illustrated that the two new ramps collectively would carry approximately 12,200 ADT, and would operate at v/c ratios below 0.5 (basically free-flow), even if only one lane in width each.

North of the new East Castle Street interchange, ADT on I-81 would decrease from 87,100 to 82,000. This reflects traffic that is currently using the Almond Street ramps instead routing via the new interchange.

The analysis showed that the location of the new interchange would require some improvements to Castle Street/Renwick Avenue, and significantly change local traffic circulation patterns west of I-81. For example, ADT on Oakwood Avenue north of Castle Street would nearly double from 3,600 to 6,100.

The effects of the proposed new interchange on 24-hour traffic volumes are illustrated in Figure 11. Alternative 2 will result in significant decreases in 24-hour volumes, particularly along East Adams Street and west of I-81 on Harrison Street. Volumes also decreased significantly along Townsend Street between Harrison Street and East Adams Street.

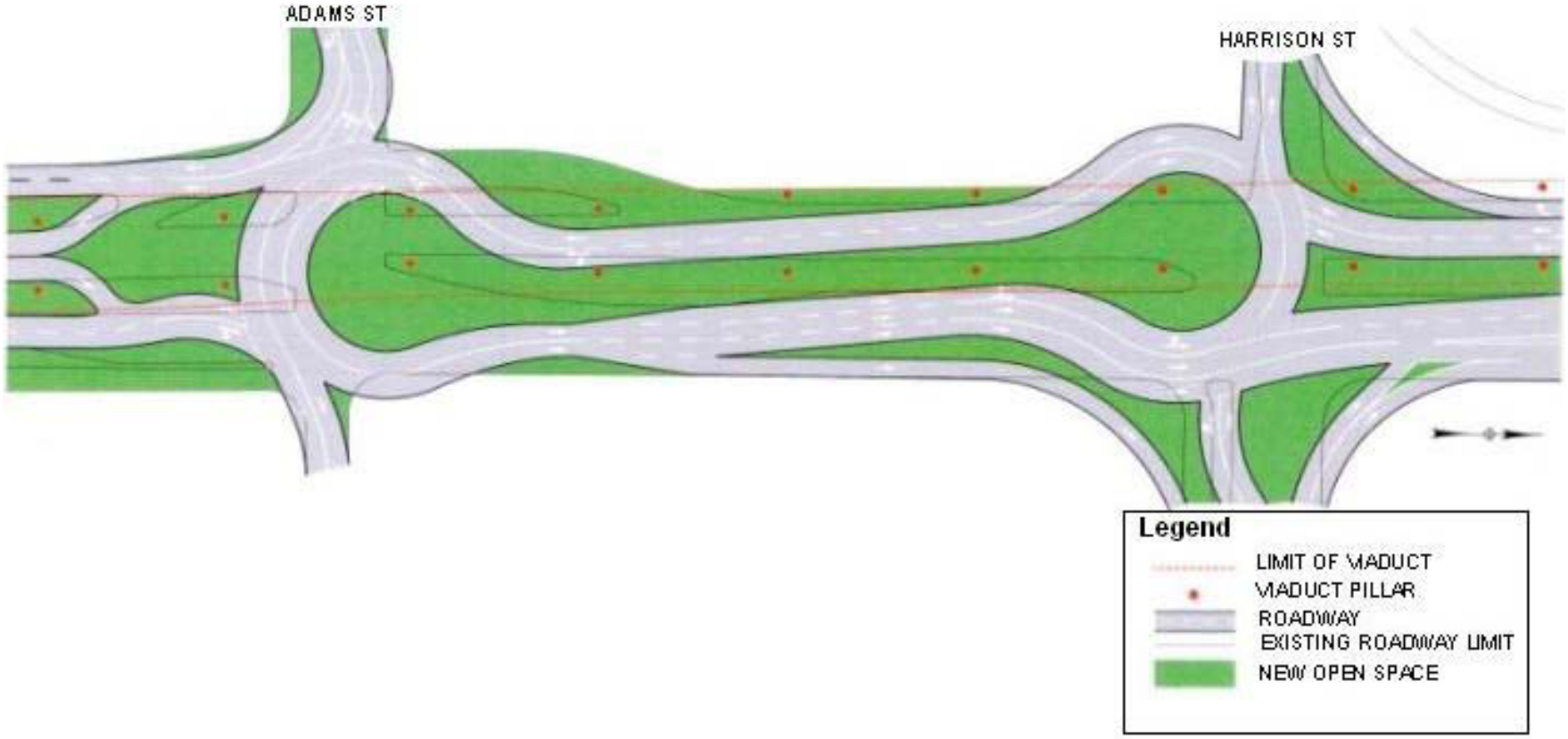
FIGURE 10. ALTERNATIVE #2 - V/C RATIOS AND ADT VOLUMES FOR 2027



Note: V/C Ratio=volume to capacity ratio. A V/C ratio of 1.00 or greater indicates the roadway segment is at a near capacity. ADT=average daily traffic.

FIGURE 11. ALTERNATIVE #2- CHANGE IN 24-HOUR TRAFFIC VOLUMES FOR 2027

FIGURE 12. ALTERNATIVE #3-ALMOND STREET DUAL TEAR DROPS



ALTERNATIVE #3.

Description

Figure 12 illustrates Alternative #3. In this scenario the traffic signals on Almond Street at Adams and Harrison Streets are removed, and the intersection geometry is modified such that both intersections operate as roundabouts. This configuration is known as a double-teardrop, because both roundabouts circulate on only three legs.

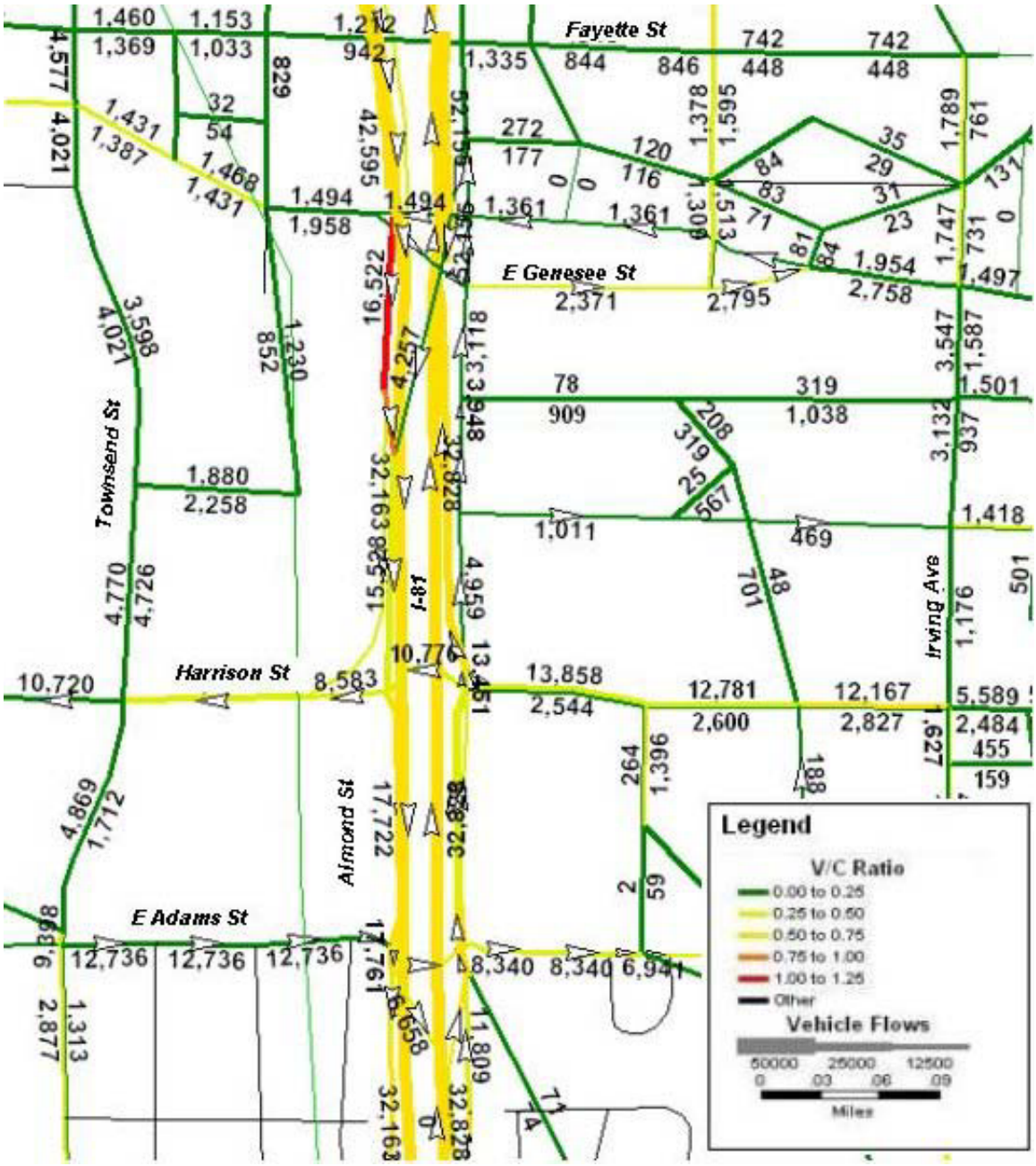
Findings

Traffic volumes on each of the I-81 on/off-ramps and arterial streets increase in this scenario, as the double-teardrop configuration provides greater capacity to accommodate traffic demands than the existing signalized roadway network. This results in marginally higher VMT in the study area, but (for reasons explained above) lower VMT regionwide. Figure 13 shows how the double-teardrop roundabouts would impact v/c ratios and ADT volumes on adjacent streets.

Figure 14 illustrates the changes in 24-hour traffic volumes. This alternative results in extremely significant increases in 24-hour volumes on Harrison Street and East Adams Street (west of I-81). However, large decreases in volumes occur on East Genesee Street, Erie Boulevard, Townsend Street and East Adams Street (east of I-81).

As analysis of this scenario is closely related to traffic operations at the two critical intersections, an operational analysis using roundabout analysis software would be useful to substantiate these findings.

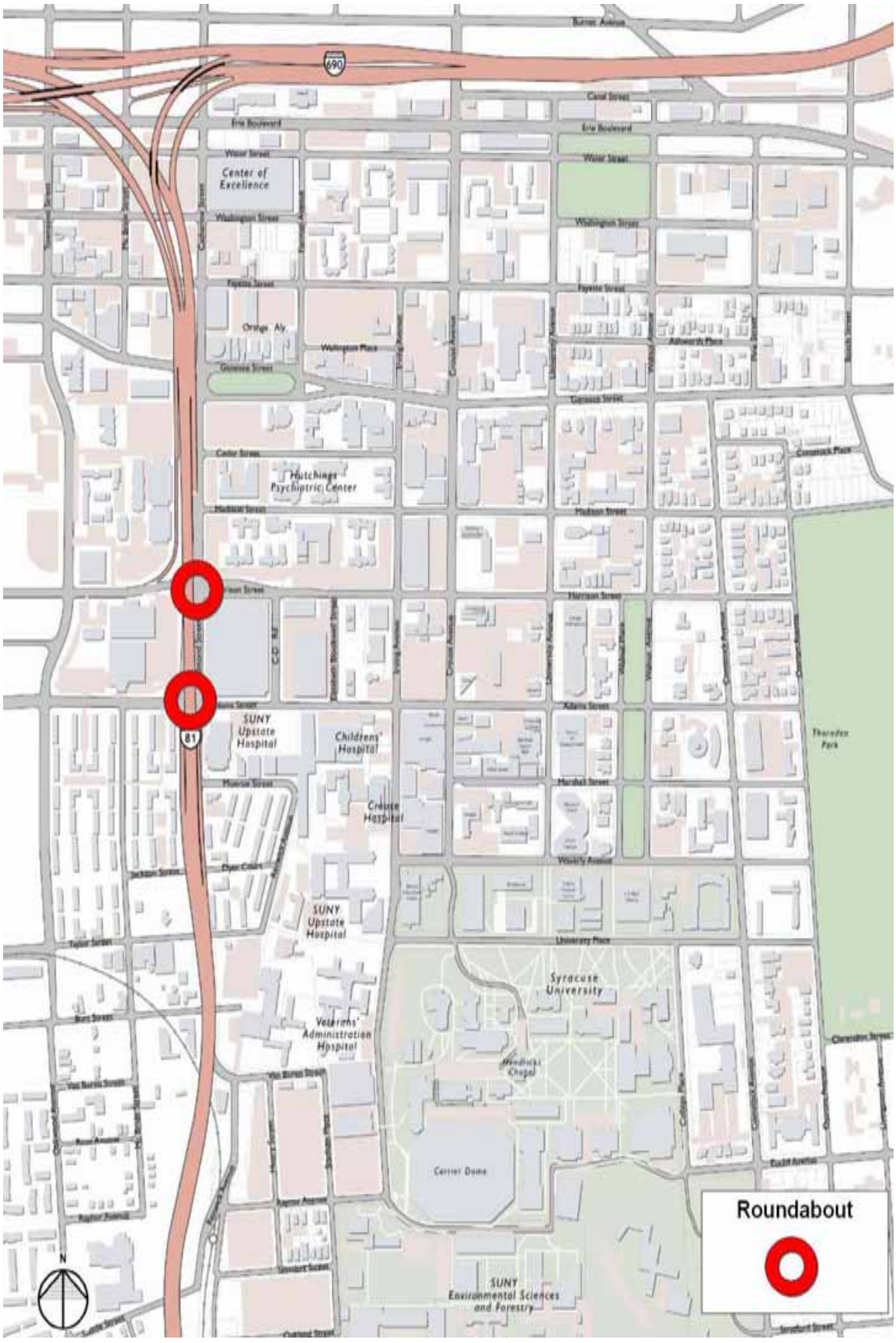
FIGURE 13. ALTERNATIVE #3 - V/C RATIOS AND ADT VOLUMES FOR 2027



Note: V/C Ratio=volume to capacity ratio. A V/C ratio of 1.00 or greater indicates the roadway segment is at a near capacity. ADT=average daily traffic.

FIGURE 14. ALTERNATIVE #3- CHANGE IN 24-HOUR TRAFFIC VOLUMES FOR 2027

FIGURE 15. ALTERNATIVE #3A - ALMOND STREET ROUNDABOUT TEARDROPS



ALTERNATIVE #3-A.

Description

This scenario is a modification of the initial Alternative #3 (see Figure 15), with the additional components of:

- A fourth leg on the proposed roundabout at Harrison/Almond, permitting traffic southbound on Almond Street access to eastbound Harrison Street.
- The traffic lanes on Harrison Street between Almond Street and Crouse Avenue are balanced to 2 in each direction
- A BRT system, keeping 1-way circulation on Harrison Street west of Almond Street, but adding a contraflow BRT lane on Harrison Street and narrowing Harrison Street on sections carrying the BRT to 3 westbound traffic lanes. This BRT system connects between Syracuse University and the Centro Common Center at Salina/Fayette Street. This is the same BRT alignment tested in the initial Alternative #7

Findings

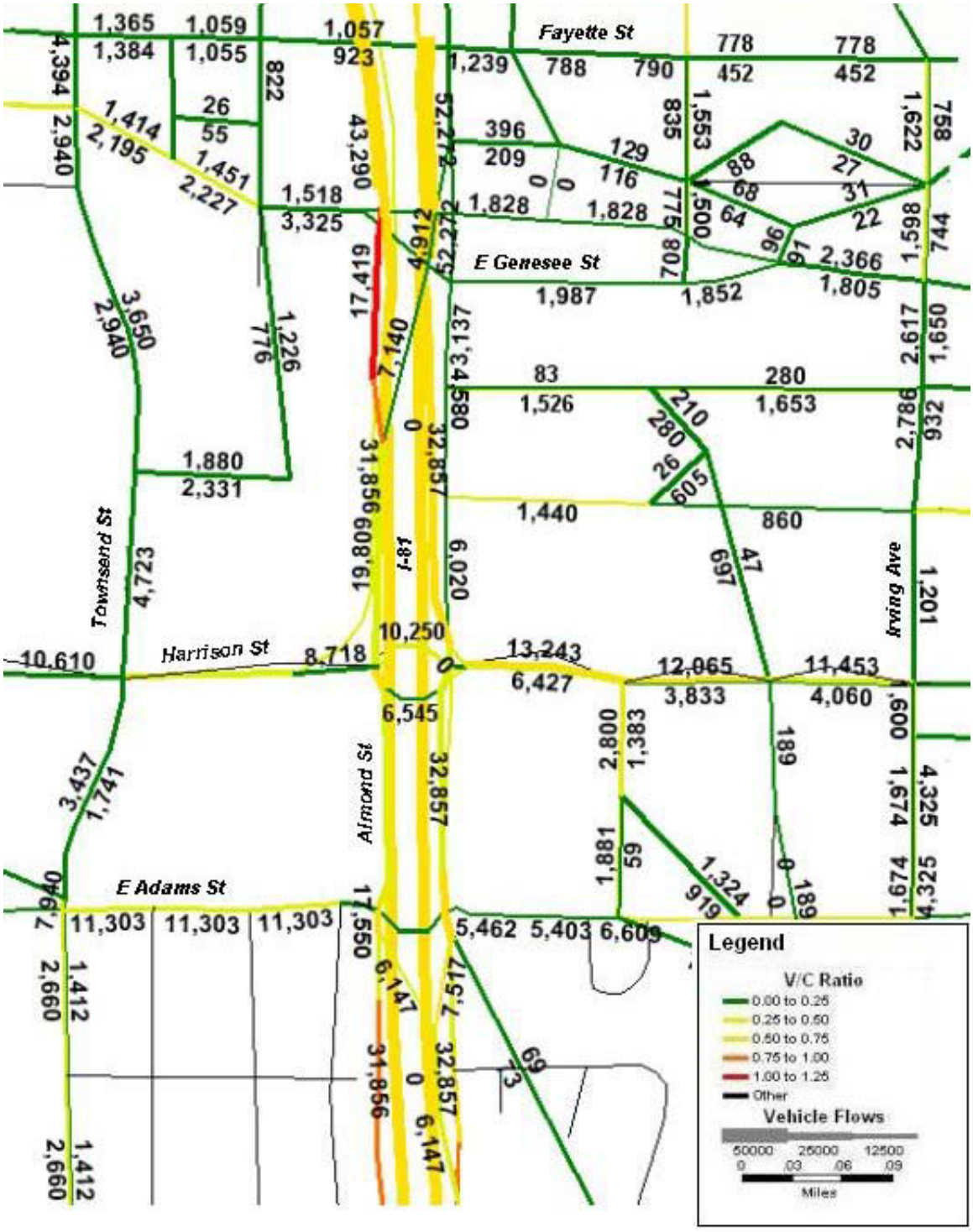
The modeling results indicated that the movement from southbound Almond Street onto eastbound Harrison Street is relatively heavy, with an addition of almost 7,000 motorists using it on a daily basis. There is a corresponding reduction in the traffic volume on both eastbound Adams Street underneath I-81 and southbound Almond Street between Harrison and Adams Streets. ADT on Adams Street drops from 12,700 in the initial Alternative #3 to 8,600 and ADT on Almond Street drops from 17,700 to 14,800. The green segments in Figure 16 represent low levels of congestion and progressively get more congested as the color changes to red (yellow being more congested than green and orange being less congested than red). There is also a reduction of approximately 500 vehicles on southbound Almond Street south of Adams Street and an increase of approximately 1,000 vehicles on northbound Almond Street north of Harrison Street.

Figure 17 illustrates the change in 24-hour traffic volumes. The 24-hour traffic volume increases and decreases resulting from Alternative 3 along Harrison Street, East Adams Street and Townsend Street are further exacerbated with Alternative 3A.

The BRT system would attract approximately 500 riders from the automobile modes– essentially the same mode shift as that in Alternative #7, which initially tested this BRT alignment without the roundabout treatments on the Almond Street corridor.

As analysis of this scenario is closely related to traffic operations at the two critical intersections, an operational analysis using roundabout analysis software would be useful to substantiate these findings.

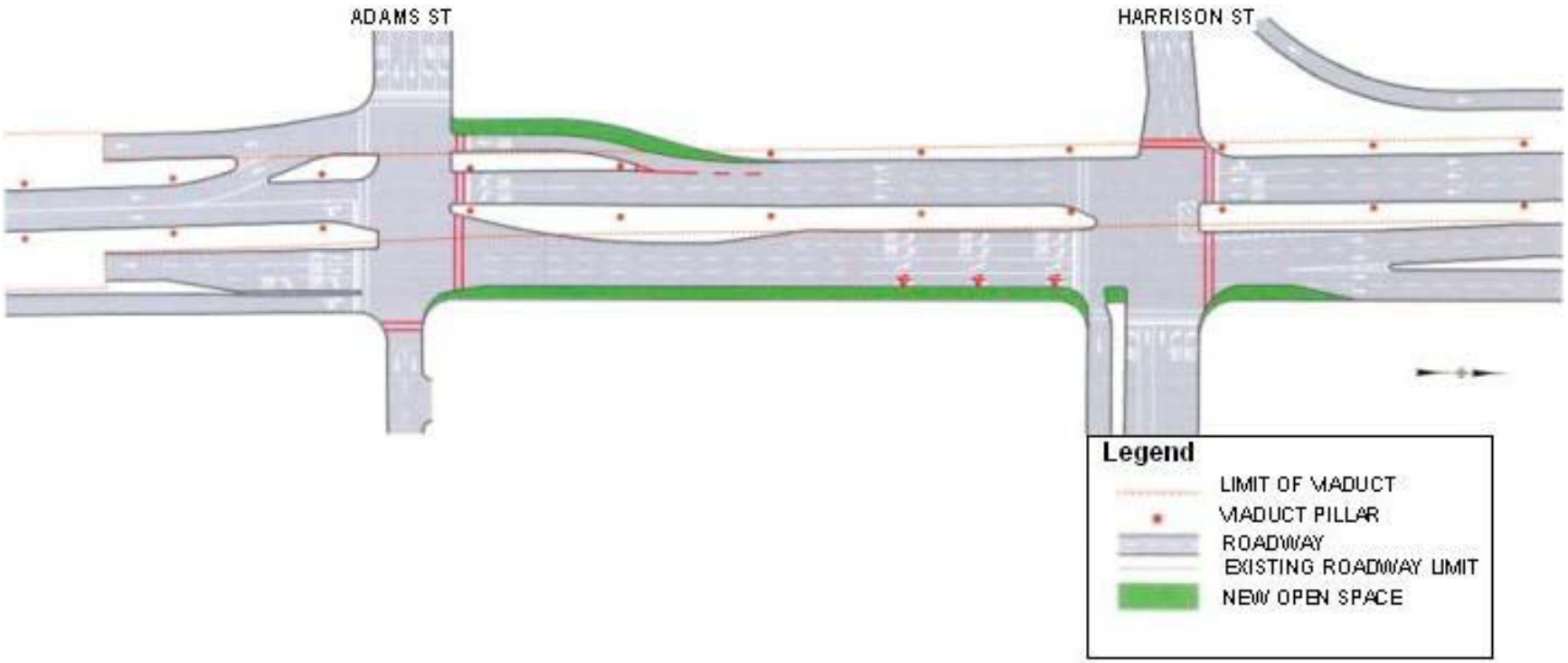
FIGURE 16. ALTERNATIVE # 3A - V/C RATIOS AND ADT VOLUMES FOR 2027



Note: V/C Ratio=volume to capacity ratio. A V/C ratio of 1.00 or greater indicates the roadway segment is at a near capacity. ADT=average daily traffic.

FIGURE 17. ALTERNATIVE #3A - CHANGE IN 24-HOUR TRAFFIC VOLUMES FOR 2027

FIGURE 18. ALTERNATIVE #4 - NARROWING OF ALMOND STREET BY ONE LANE AT TWO LOCATIONS



ALTERNATIVE #4.

Description

Figure 18 illustrates Alternative #4, which involves the narrowing of Almond Street by one lane at two locations–northbound from Adams to Harrison Street, and southbound approaching Adams Street. This scenario is intended to improve pedestrian connectivity east-west across the Almond Street corridor by reducing the number of moving lanes to be crossed, and an attendant reduction in capacity approaching the intersections.

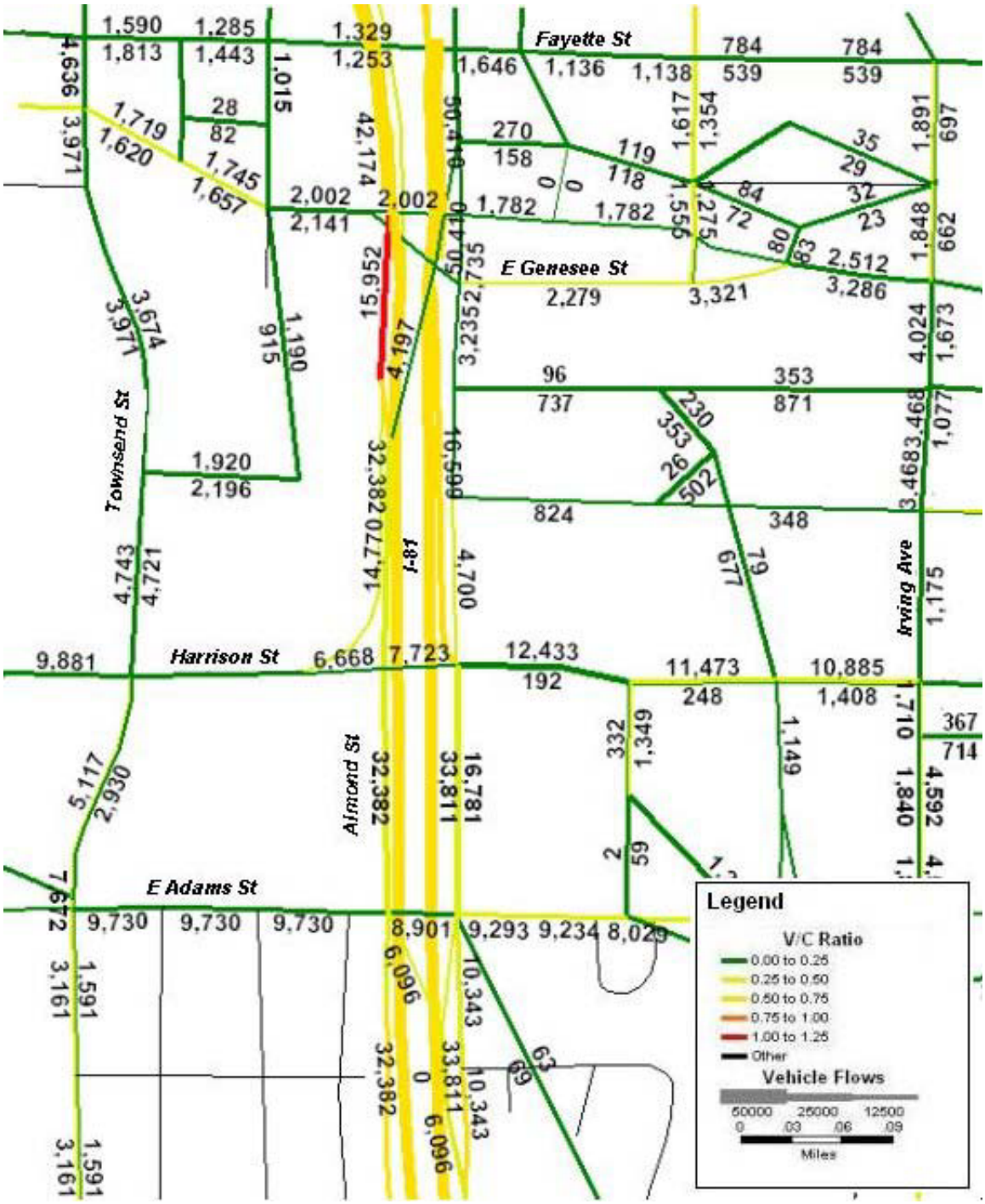
Findings

The analysis in the demand model found very minor changes in both ADT and VMT in this scenario for the baseline year 2027 transportation system (see Figure 19). For example, ADT on the affected sections of Almond Street (between Adams and Harrison streets) decreased less than 3% – from 33,500 to 32,600.

Changes in 24-hour traffic volumes, based on this scenario, are shown in Figure 20. The narrowing of Almond Street results in a significant decrease in 24-hour volumes on East Adams Street, west of I-81. Townsend Street experiences a significant increase in volumes.

This scenario, similar to Alternative #3, is highly dependent on traffic operations at the two key intersections, and the analysis would benefit from verification of the findings with intersection-specific traffic operations analysis.

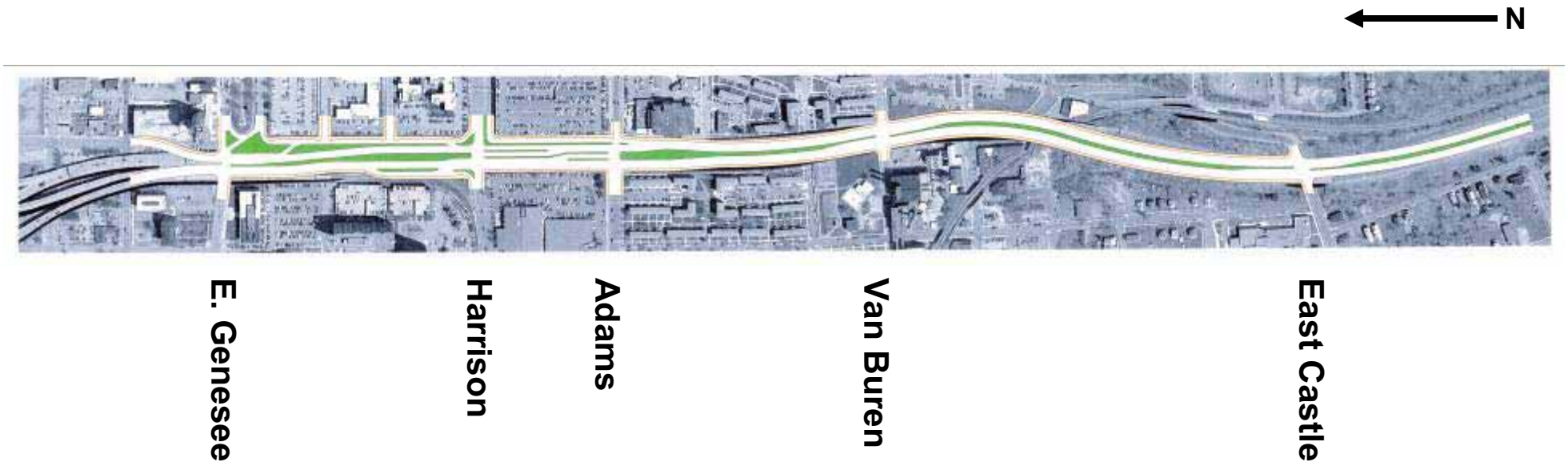
FIGURE 19. ALTERNATIVE #4 - V/C RATIOS AND ADT VOLUMES FOR 2027



Note: V/C Ratio=volume to capacity ratio. A V/C ratio of 1.00 or greater indicates the roadway segment is at a near capacity. ADT=average daily traffic.

FIGURE 20. ALTERNATIVE #4 - CHANGE IN 24-HOUR TRAFFIC VOLUME FOR 2027

FIGURE 21. ALTERNATIVE #5 - ALMOND STREET BOULEVARD



ALTERNATIVE #5.

Description

This scenario analyzed effects of reconstructing the Almond Street corridor to an at-grade boulevard (see Figure 21). The Almond Street Boulevard has signalized intersections with Castle, Taylor, Adams, Harrison, and Genesee streets. The boulevard was coded with a speed of 35 mph, and three lanes of traffic in each direction, with auxiliary turning lanes at intersections. The ramp system between I-690 and I-81 is preserved in this scenario.

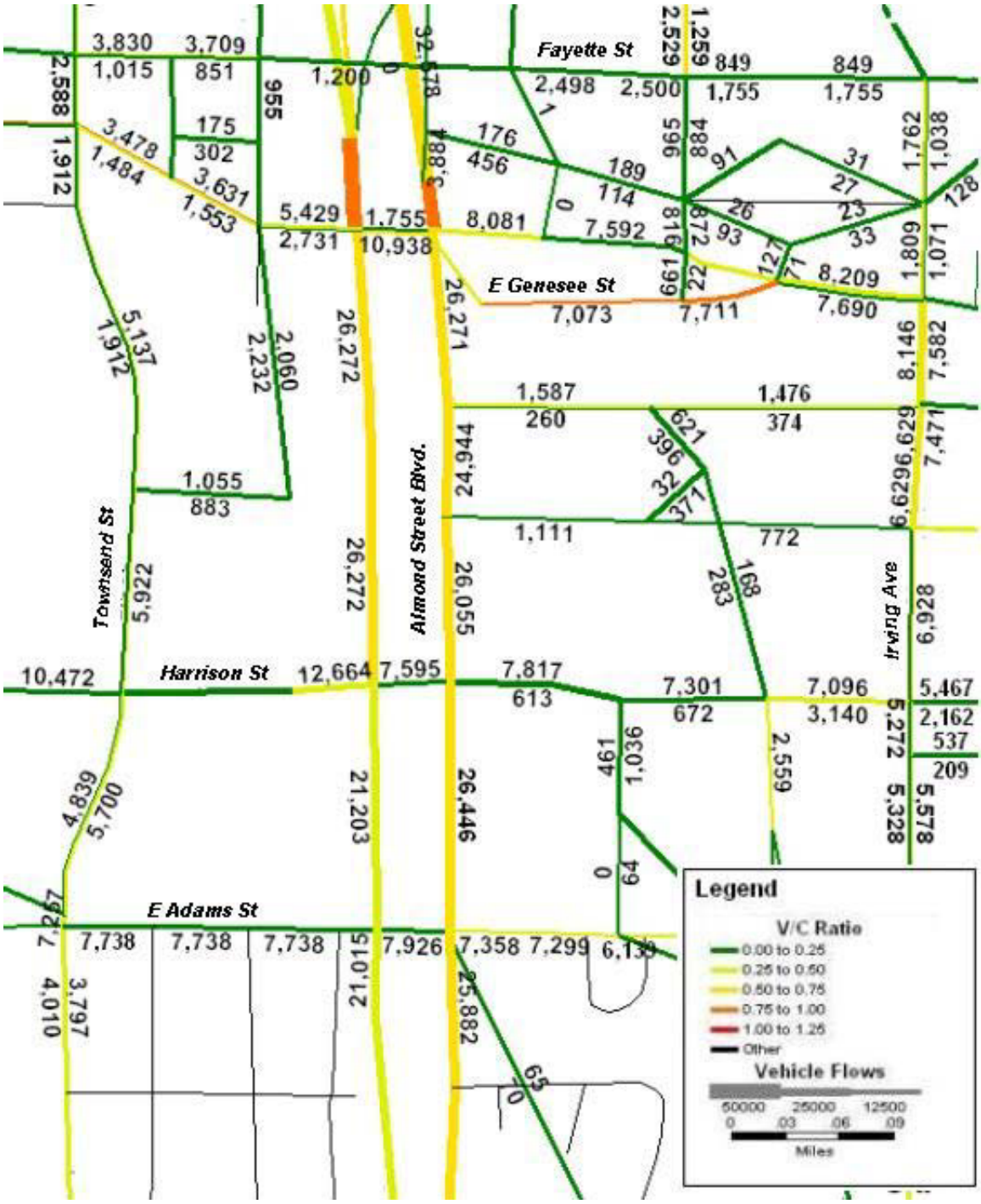
In conjunction with the re-routing of I-81 onto the I-481 alignment, the ramp now accommodating through traffic on I-81 north of Syracuse was improved to form a direct flyover connection, and free-flow speed was increased to 70 mph. In order to ensure that all through traffic re-routed onto I-81, free-flow speeds on the I-481 alignment were increased to 75 mph.

Findings

As expected, VMT in the region increases as I-81 through traffic is routed along the I-481 alignment, which is approximately three miles longer. Although Almond Street Boulevard would operate at acceptable v/c ratios, the removal of the I-81 elevated section results in additional travel on the arterial street network, and results in traffic volumes exceeding capacity in some locations, particularly east and south of the study area on sections of Warren and Clinton streets and Raynor Avenue.

Figure 22 illustrates anticipated v/c ratios and ADT volumes along the Almond Street corridor and adjacent streets. Figure 23 shows the changes in 24-hour traffic volumes. Twenty-four hour traffic volumes increase dramatically along East Genesee Street, Irving Street and Townsend Street. Significant decreases in 24-hour volumes occur along Harrison Street east of the Almond Street Boulevard and along East Adams Street.

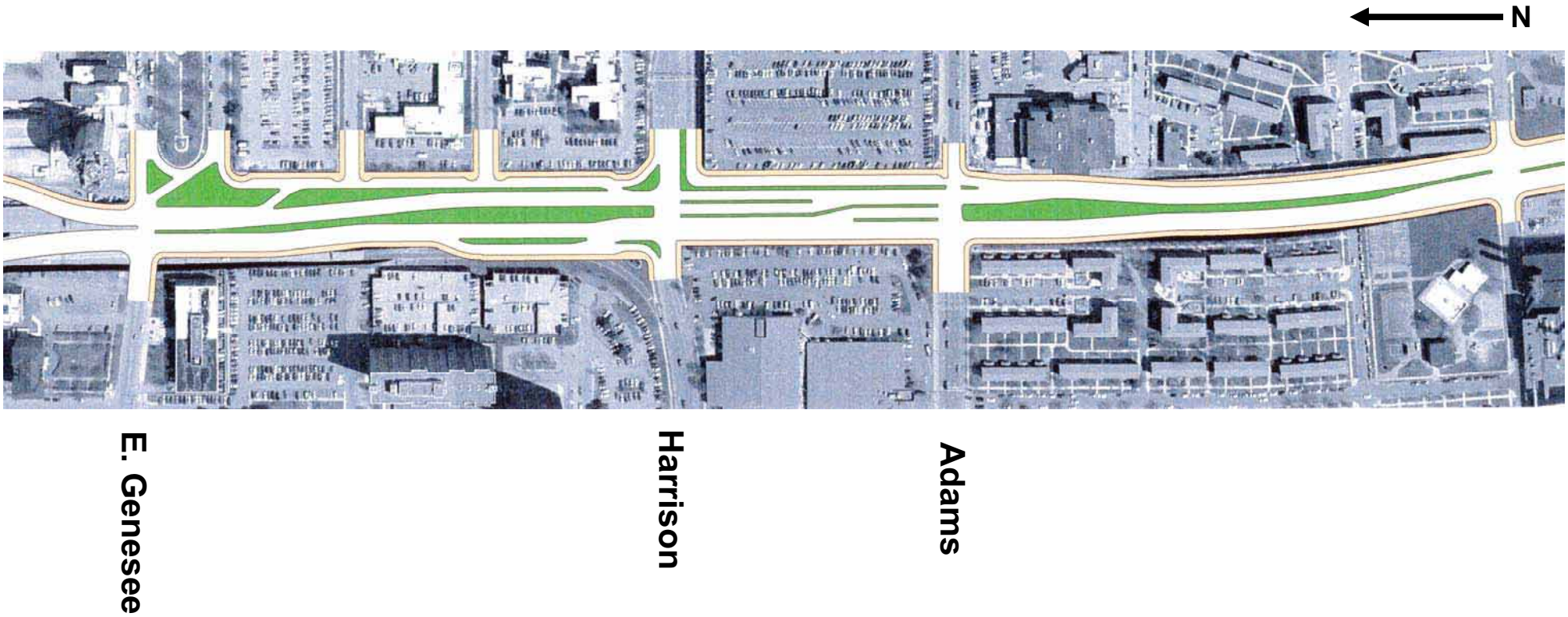
FIGURE 22. ALTERNATIVE #5- V/C RATIOS AND ADT VOLUMES FOR 2027



Note: V/C Ratio=volume to capacity ratio. A V/C ratio of 1.00 or greater indicates the roadway segment is at a near capacity. ADT=average daily traffic.

FIGURE 23. ALTERNATIVE #5- CHANGE IN 24-HOUR TRAFFIC VOLUMES FOR 2027

FIGURE 24. ALTERNATIVE #5A - ALMOND STREET BOULEVARD WITH A THREE LANE CONFIGURATION



ALTERNATIVE #5-A.

Description

This scenario analyzed the effects of reconstructing the Almond Street corridor to an at-grade boulevard, with the same alignment as Alternative #5, as illustrated in Figure 24.

The differences in Alternatives #5 and #5-A are in the capacity and speed attributes of the proposed Almond Street Boulevard. In Alternative #5, the Almond Street Boulevard received a free-flow speed attribute of 35 mph and 3 traffic lanes in each direction. In Alternative #5-A, it received a free-flow speed attribute of 45 mph, and 4 traffic lanes in each direction. Alternative #5-A was developed to perform a basic sensitivity test of traffic patterns with respect to the characteristics of the Almond Street Boulevard.

Findings

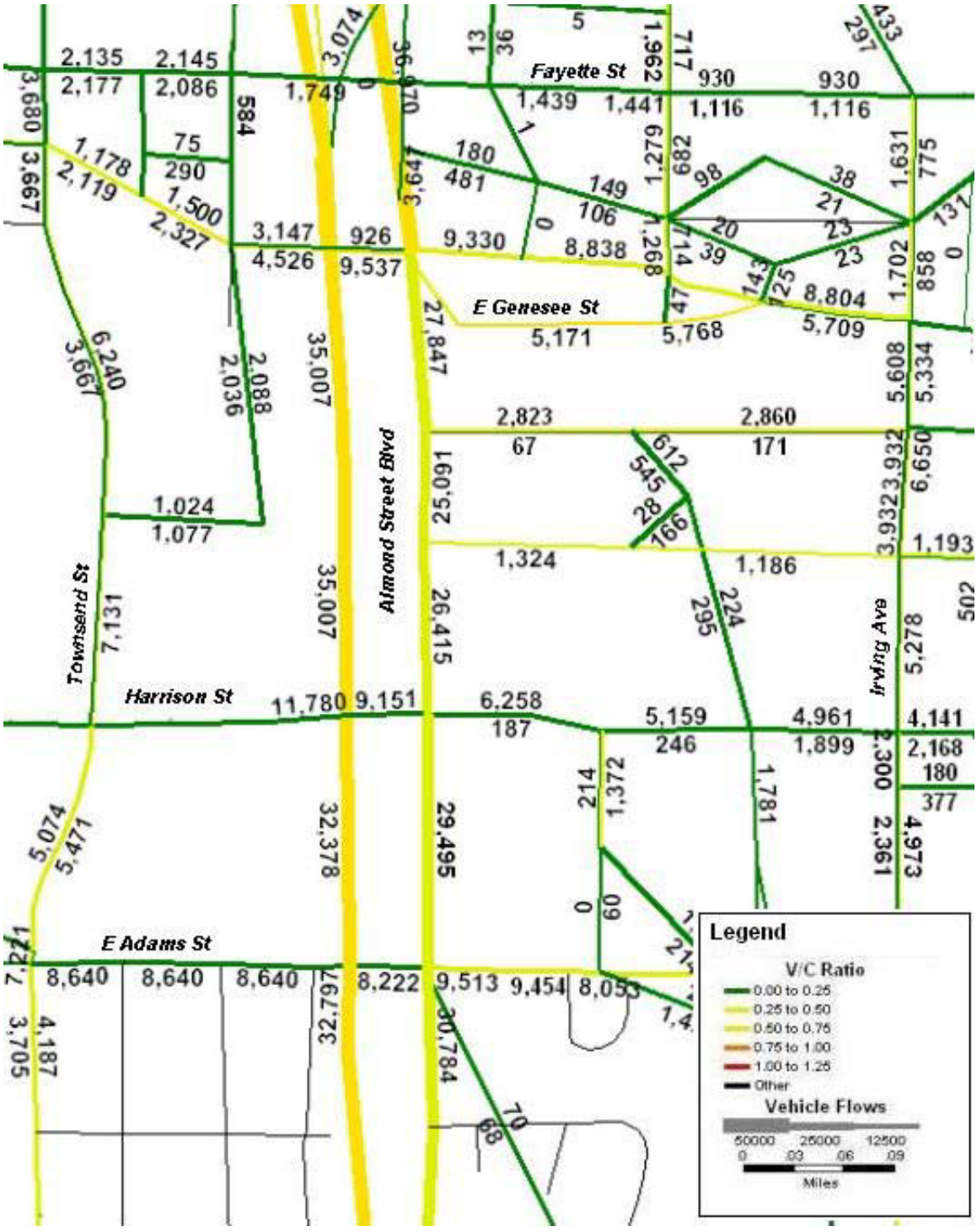
The provision of a higher-capacity, higher-speed Almond Street Boulevard resulted in a significantly higher level of traffic on the proposed Boulevard than in Alternative #5.

For example, the Almond Street Boulevard's bi-directional ADT for the segment between Harrison and Adams Streets would increase from 47,600 in Alternative #5 to 61,900 – a 30% difference in traffic volumes. The baseline ADT – with the viaduct in place – for this section of the Almond Street corridor (Almond Street + I-81) is 99,600.

Relatively little of this increased traffic volume on the Almond Street Boulevard corridor would come from I-81 "through" traffic passing through the region. For example, on the ramps connecting I-481 northbound to I-81 northbound and I-81 southbound to I-481 southbound, ADT would decrease by only 700 or 2.5% between Alternatives #5 and #5-A. Rather, the increased traffic on the Almond Street Boulevard would be associated with changes in intra-regional traffic patterns in the SMTC region (and predominantly the City of Syracuse.)

Figure 25 shows in red roadway segments with increased traffic volume in Alternative #5-A with respect to Alternative #5. The green roadway segments represent segments with decreased traffic volume. Note that the increased traffic volume is much greater in the southbound direction than the northbound direction of the Almond Street Boulevard. This appears to be related to an interaction with the Clinton Street corridor, which carries one-way southbound traffic.

FIGURE 25. ALTERNATIVE #5A - V/C RATIOS AND ADT VOLUMES FOR 2027



Note: V/C Ratio= volume to capacity ratio. A V/C ratio of 1.00 or greater indicates the roadway segment is at a near capacity. ADT=Average Daily Traffic.

FIGURE 26. ALTERNATIVE #5A - CHANGE IN 24-HOUR TRAFFIC VOLUMES FOR 2027

Figure 26 illustrates the changes in 24-hour traffic volumes on roadway segments adjacent to the Almond Street Boulevard. Alternative 5A also results in significant volume increases along East Genesee, however not as significant as Alternative 5. Significant increases occur on Irving, Townsend and East Adams Street east of Almond Street Boulevard. Volume decreases are evident on Harrison Street and also on East Adams Street west of Almond Street Boulevard.

The effects on VMT are, logically, in the middle between the baseline condition (of leaving the interstate I-81 viaduct in place) and Alternative #5 (lower-speed, lower-capacity Almond Street Boulevard.) Regionally, the VMT increase associated with Alternative #5-A is less than that of Alternative #5 – as traffic patterns would change less from the baseline. The converse is true on University Hill, where the calculated VMT is higher than that for Alternative #5, but still less than that of the baseline.

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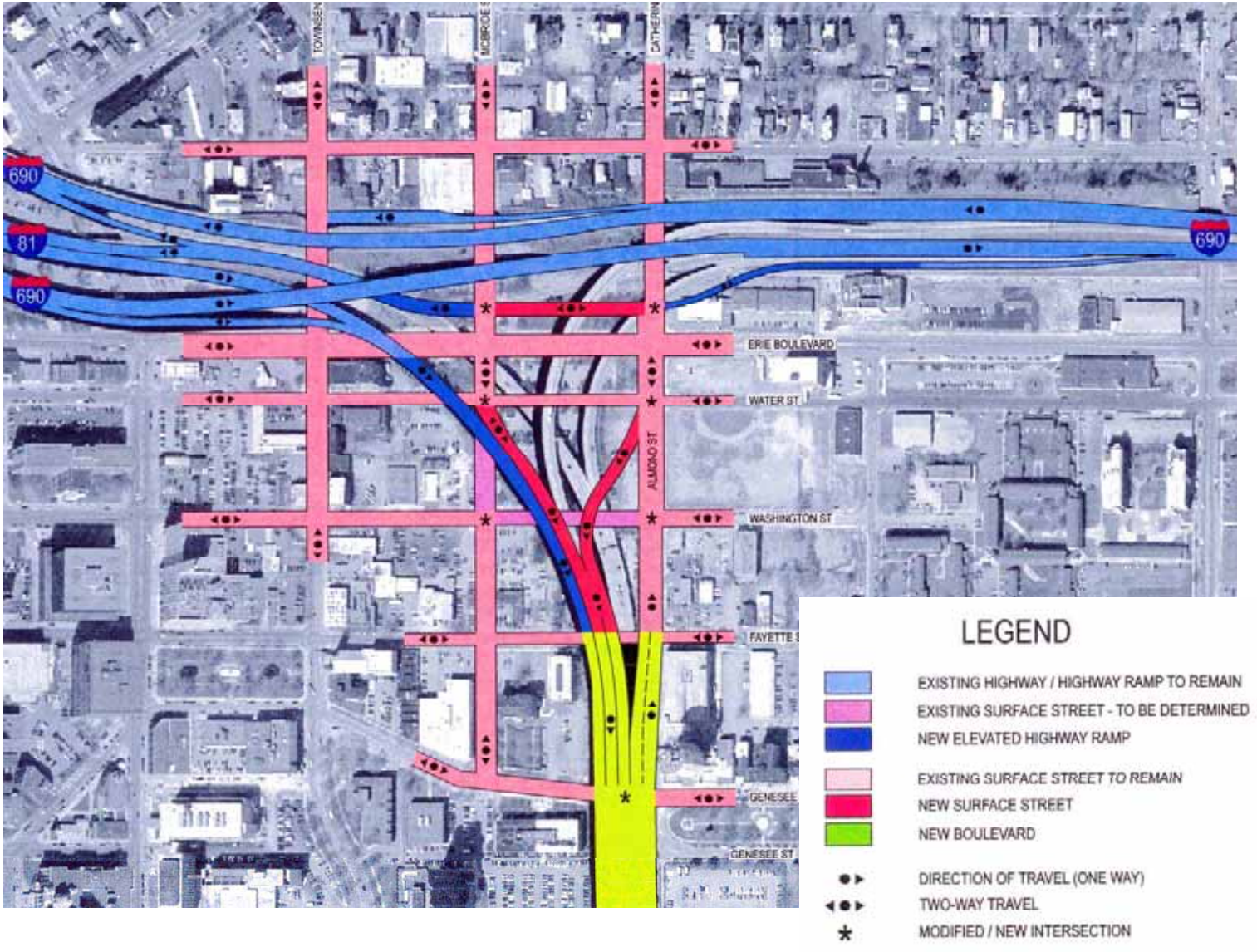
FIGURE 27. ALTERNATIVE #6 - ALMOND STREET BOULEVARD WITH I-81 / I-690 RAMP RECONSTRUCTIONS



ALTERNATIVE #6.

Description

Figure 27 illustrates a slightly more radical change to the I-81/Almond Street corridor than Alternative #5. In this alternative, the ramp system between I-81 (now the Almond Street Boulevard) and I-690 is modified. Three ramps which currently provide direct connections between I-81 and I-690 are removed:

- The ramp from westbound I-690 to southbound on former I-81,
- The ramp to continue northbound on I-81 from former I-81, and
- The ramp from northbound former I-81 to eastbound I-690.

These movements between I-690 and the Almond Street Boulevard would be accommodated by arterial streets in this scenario.

Findings

The effects of this scenario are similar to those in Alternative #5, but more pronounced. VMT in the University Hill study area is reduced further, but regionally it increases to a greater degree. Figure 28 illustrates the change in V/C ratios and ADT volumes that are anticipated under the reconstruction of the Almond Street corridor in the Alternative #6 scenario.

Figure 29 illustrates the current condition of I-481 and Figure 30 illustrates traffic conditions in 2027 with improvements. As illustrated, ADT increases in both directions on I-481 as a result of Alternative #6. Existing areas of congestion reach higher levels of congestion.

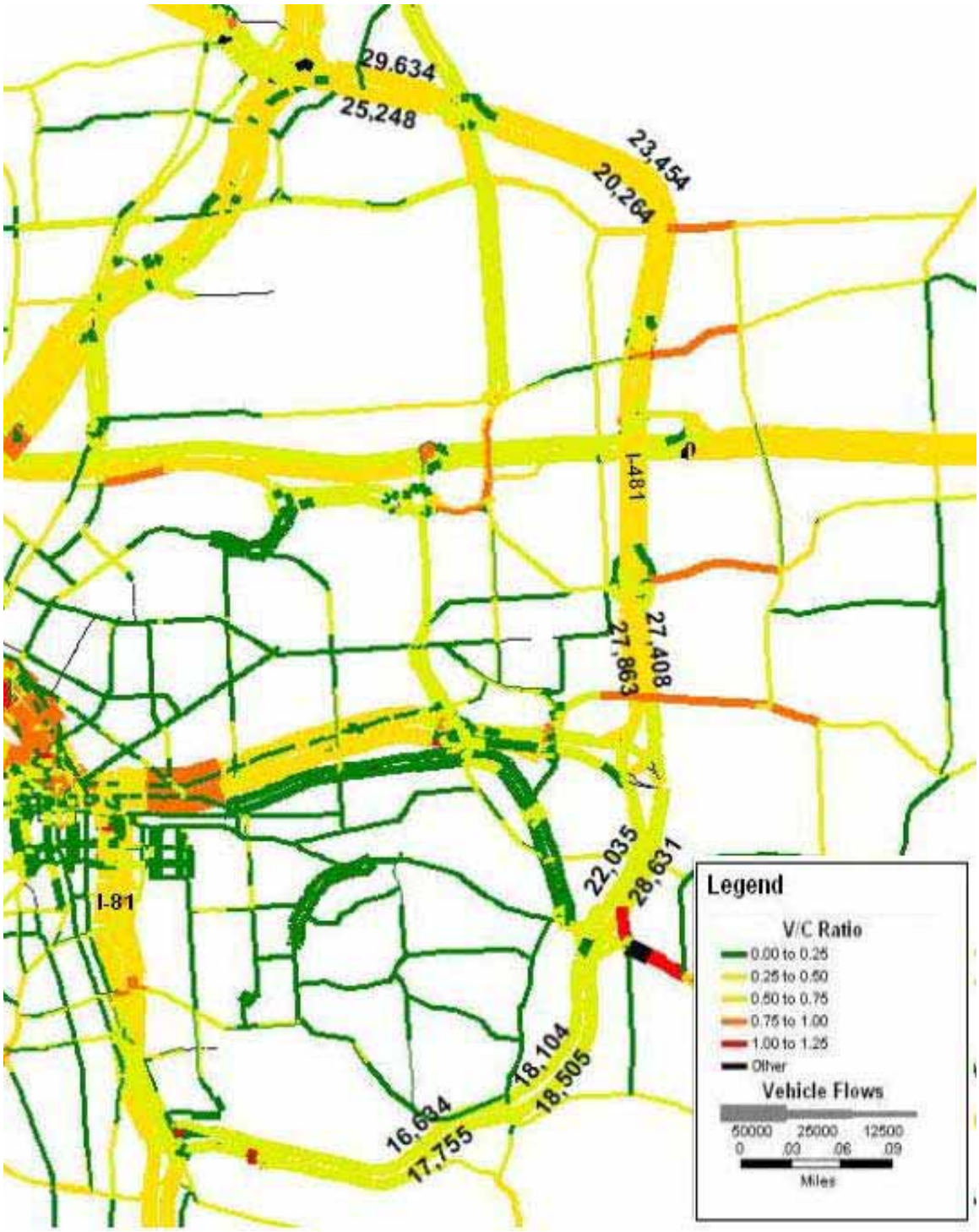
ADT on the segment of the Almond Street Boulevard between Adams and Harrison Street, which is 47,600 in Alternative #5, drops to 43,700 in this alternative (see Figure 30). This is because the corridor is less attractive to vehicular traffic as the connections to the interstate system (I-81 and I-690) to the north, west, and east are slower and less direct.

Figure 31 shows the effects of this scenario on 24-hour traffic volumes. This alternative results in significant decreases in 24-hour volumes on East Adams and Harrison Street, while causing significant increases on East Genesee Street, Townsend Street and Irving Street.

FIGURE 28. ALTERNATIVE #6 - V/C RATIOS AND ADT VOLUMES FOR 2027

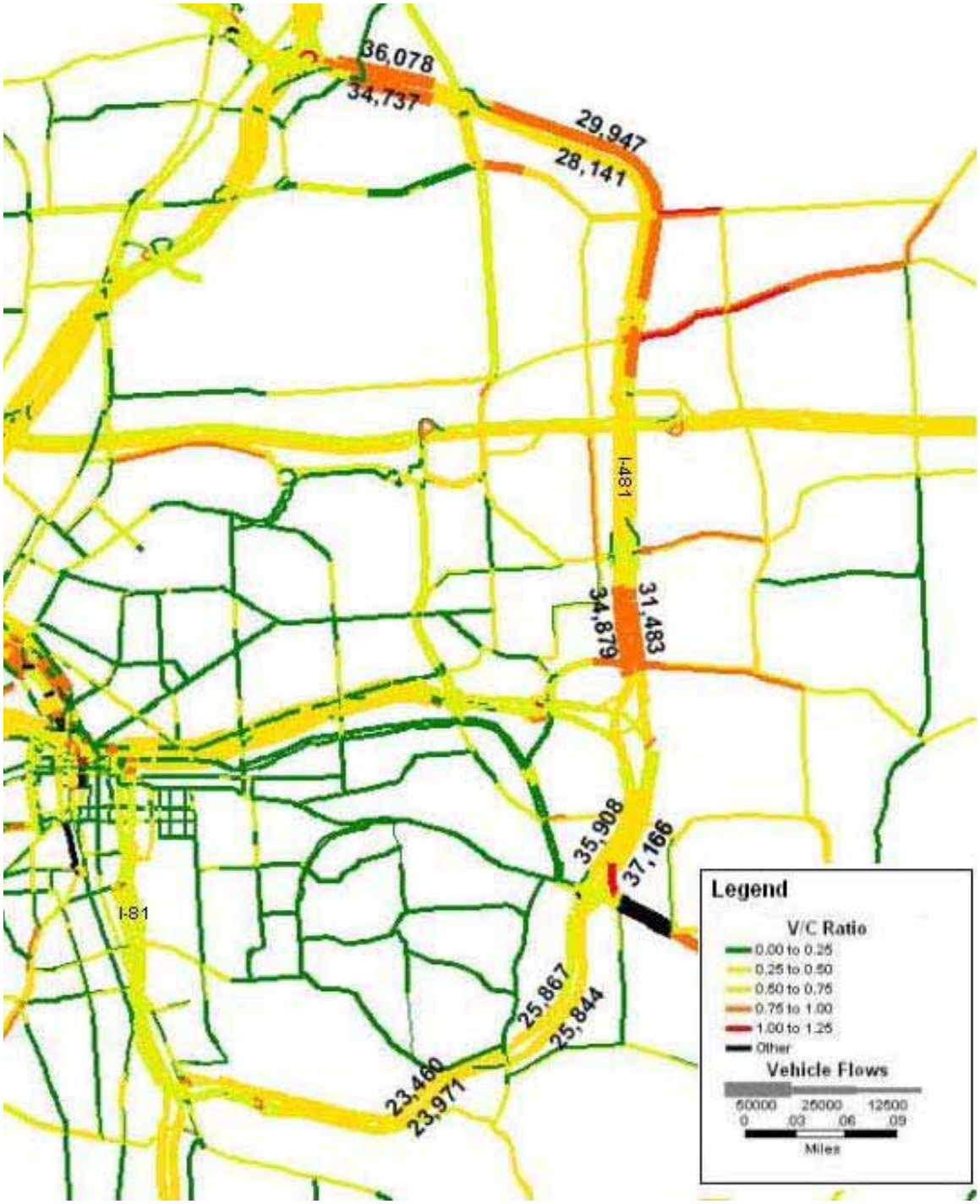
Note: V/C Ratio=volume to capacity ratio. A V/C ratio of 1.00 or greater indicates the roadway segment is at a near capacity. ADT=average daily traffic.

FIGURE 29. CURRENT TRAFFIC CONDITIONS ON I-481



Note: V/C Ratio=volume to capacity ratio. A V/C ratio of 1.00 or greater indicates the roadway segment is at a near capacity. ADT=average daily traffic

FIGURE 30. TRAFFIC CONDITIONS ON I-481 IN 2027 WITH IMPROVEMENTS



Note: V/C Ratio=volume to capacity ratio. A V/C ratio of 1.00 or greater indicates the roadway segment is at a near capacity. ADT=average daily traffic

FIGURE 31. ALTERNATIVE #6 - CHANGE IN 24-HOUR TRAFFIC VOLUMES FOR 2027

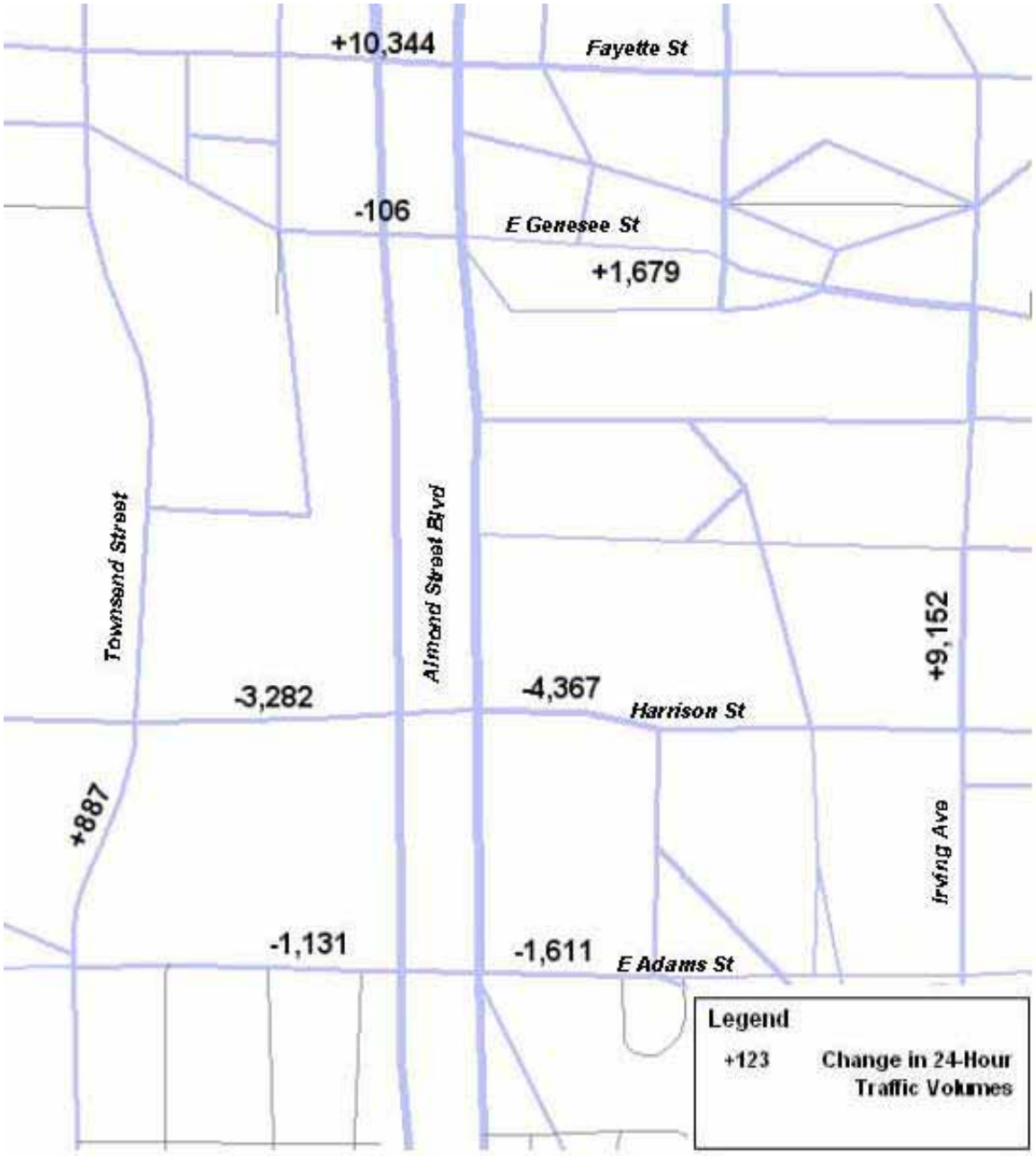
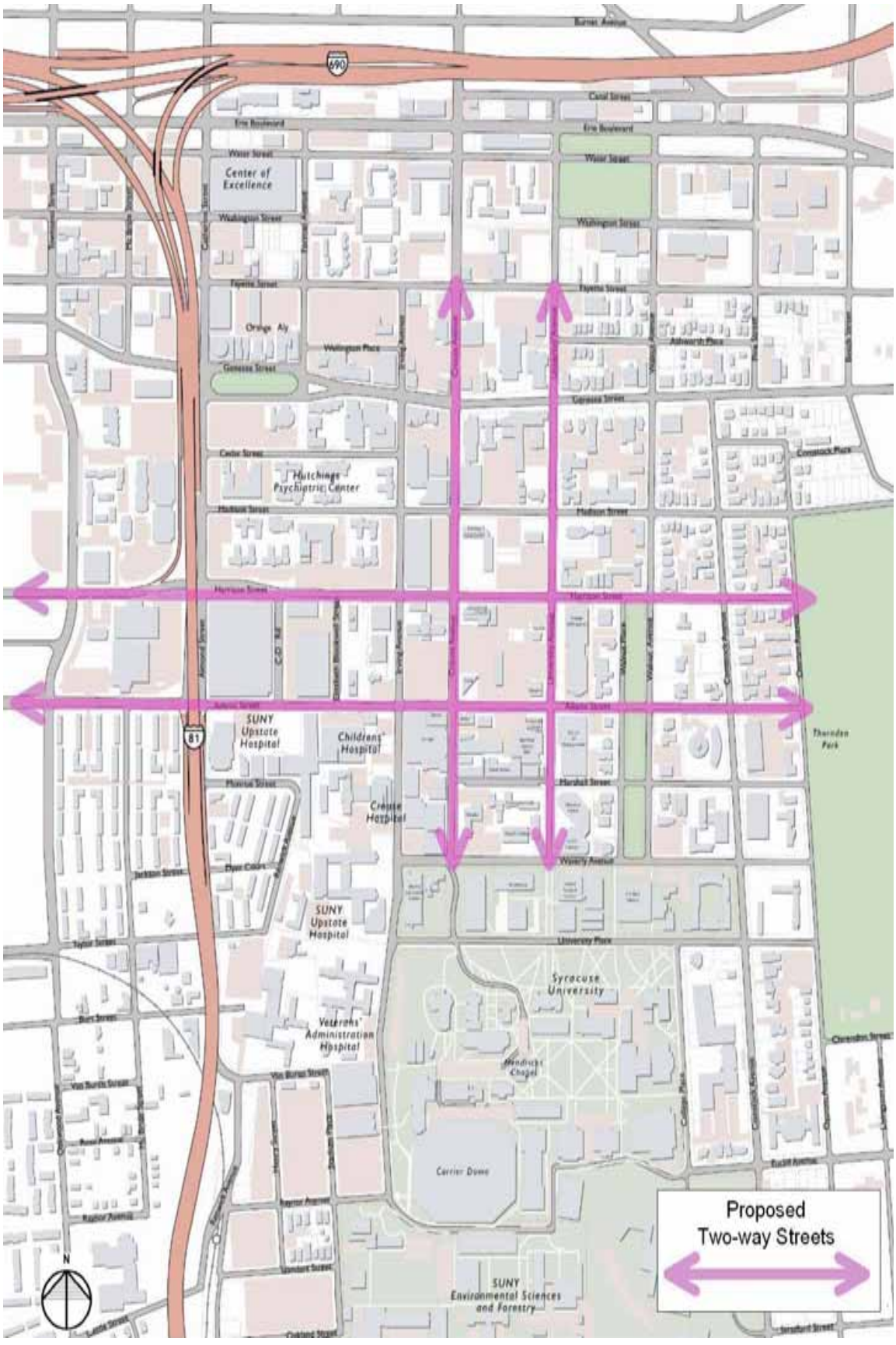


FIGURE 32. ALTERNATIVE #7 - TWO-WAY STREETS



ALTERNATIVE #7.

Description

In this scenario, all sections of Adams/Harrison streets and Crouse/University Avenues were converted to 2-way traffic operation (see Figure 32). For planning purposes, it was estimated that there would generally be one lane in each direction on University and Crouse Avenues, and two lanes in each direction on Harrison and Adams Streets. (Harrison Street east of Crouse Avenue had one lane in each direction.)

This scenario also included a bus rapid transit (BRT) alignment running generally from University Hill to the transit center at Salina/Fayette Streets (See Figure 33). This bus-only alignment was coded with a 35-mph free-flow speed (other city streets in the vicinity have 30-mph free-flow speeds), yielding approximately an 8-minute travel time (including stops) for the 2-mile ride between University Hill and the transit center.

Findings

The proposed BRT system was found to increase overall transit ridership by 500 daily trips or 2%, from 25,000 daily linked trips to 25,500. It also attracted approximately 1,000 daily trips from existing Centro bus routes, for a total daily ridership of approximately 1,500.

The conversion to two-way streets had the most pronounced effects in the vicinity of I-81/Almond Street, Adams Street, and Harrison Street. ADT on Almond Street between Adams and Harrison is forecast to be reduced from 33,500 to 23,500. East-west ADT on Adams and Harrison streets underneath the I-81 viaduct would correspondingly increase from 17,200 to 25,400 (see Figure 34).

This reflects an effect of the Almond Street corridor functioning less as a service road for the I-81 entering/exiting traffic, as the two-way east-west circulation on the arterial streets provides more direct paths to/from University Hill and the CBD.

The changes to 24-hour traffic volumes are shown in Figure 35. Significant increases result on Harrison Street and East Adams Street (west of I-81). Significant decreases in 24-hour volumes occur on East Adams Street, east of I-81 as well as Irving, Townsend and East Genesee Streets.

FIGURE 33. ALTERNATIVE #7 – TRANSIT ALIGNMENT

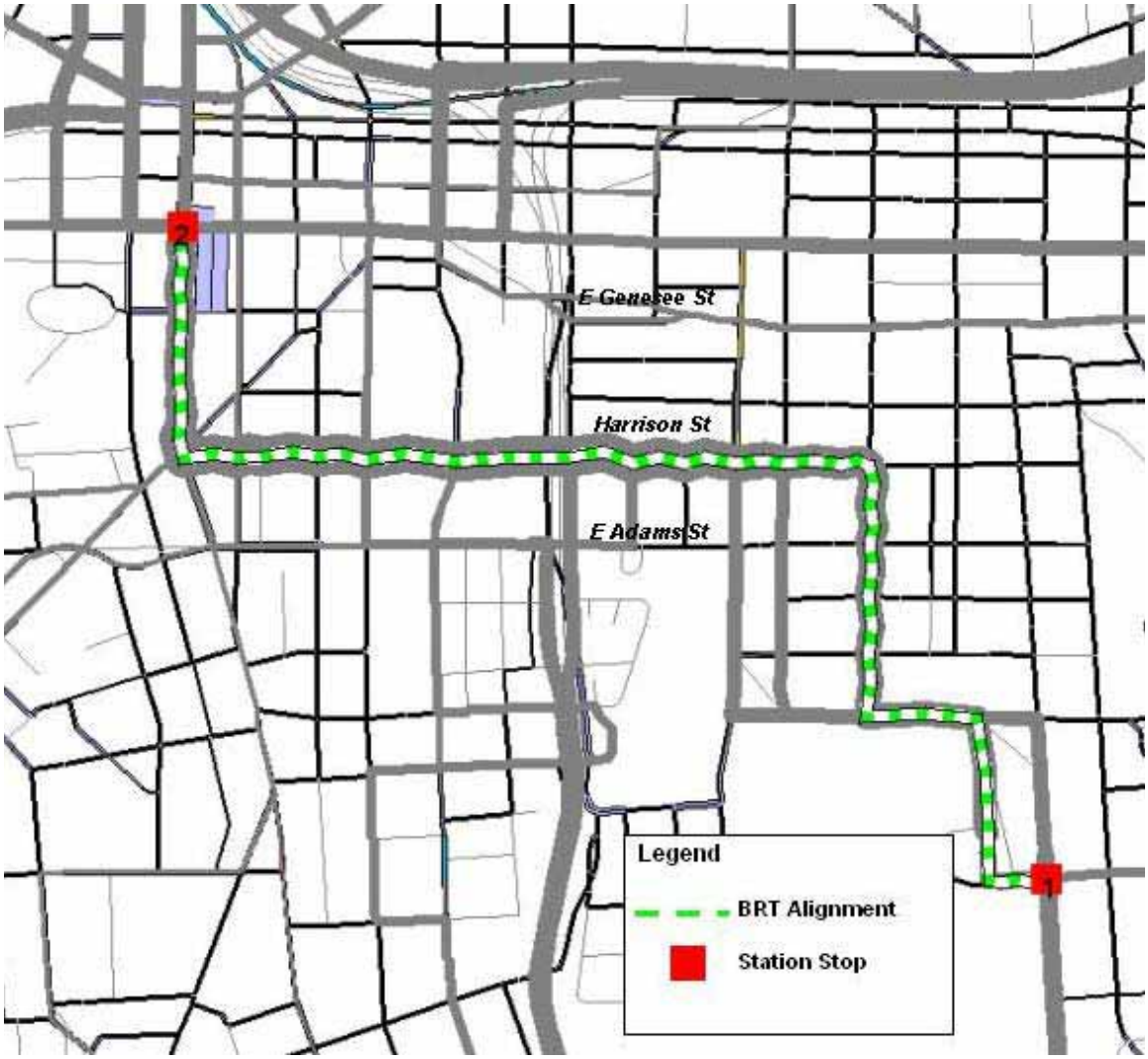
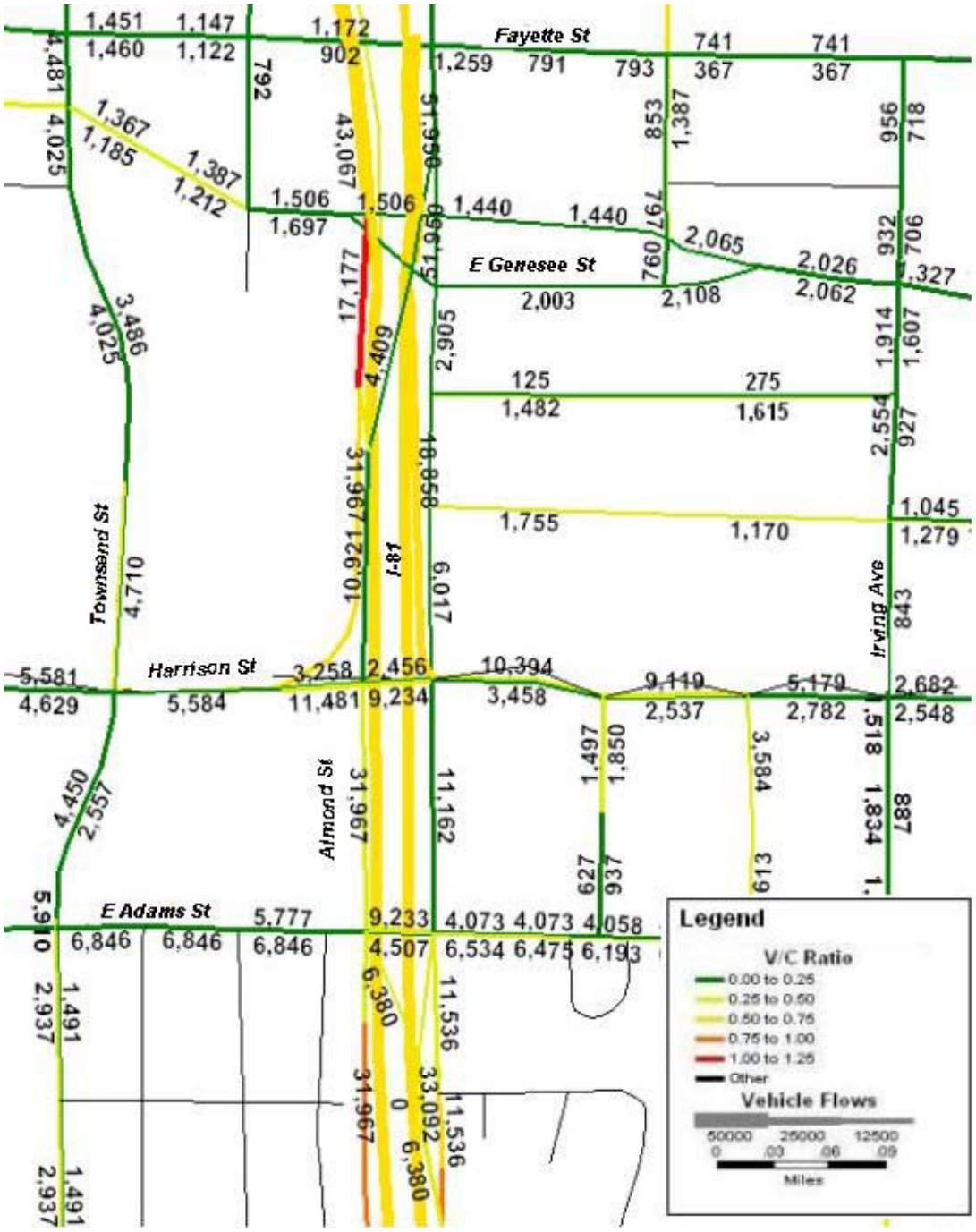


FIGURE 34. ALTERNATIVE #7 - V/C RATIO AND ADT VOLUMES FOR 2027



Note: V/C Ratio=volume to capacity ratio. A V/C ratio of 1.00 or greater indicates the roadway segment is at a near capacity. ADT=average daily traffic

FIGURE 35. ALTERNATIVE #7- CHANGE IN 24-HOUR TRAFFIC VOLUME FOR 2027

SECTION THREE - SUMMARY OF VEHICLE-MILES OF TRAVEL

VMT was calculated for each of the alternatives analyzed in the demand model.

Effects on VMT were generally minor for the first four alternatives, which involved reconfiguring the I-81/Almond Street corridor while maintaining the elevated interstate section. The two scenarios involving the removal of the elevated freeway section, Alternative #5 and #6, resulted in significant decreases in VMT within the University Hill study area, and significant increases regionwide. The only scenario to result in a moderate decrease in VMT is Alternative 7, which involves the conversion of several one-way streets to two-way operation and a new BRT alignment.

TABLE 2. VEHICLE MILES OF TRAVEL SUMMARY

Alternative	VMT Within University Hill Study Area	Regional VMT	VMT Within Downtown
Baseline – No Improvements	289,863	14,613,326	50,344
Alternative #1	290,233	14,613,024	50,366
Alternative #1-A	290,262	14,613,478	50,319
Alternative #2	286,340	14,613,888	49,827
Alternative #3	291,963	14,612,680	49,801
Alternative #3-A	292,636	14,611,713	49,058
Alternative #4	289,612	14,613,262	50,551
Alternative #5	233,842	14,870,248	63,697
Alternative #5-A	249,677	14,685,333	52,383
Alternative #6	227,740	14,880,855	63,921
Alternative #7	289,888	14,610,442	50,588

SECTION FOUR- NEXT STEPS

The Working Group will next assess the results of this analysis in comparison with the four basic needs of accessibility, flexibility, economic vitality and sustainability. The resulting matrix will further refine the list of possible alternatives that could successfully address the needs of the University Hill area. The Working Group will then select three options for further modeling and develop order of magnitude cost estimates based on standard Federal Highway Administration procedures.

It is important to note that this transportation modeling analysis is one of several items the Working Group is using in its decision-making process. Travel demand depends on the type and intensity of the various land uses as well as the design of the transportation system and modes used. As a result, a mixed-use land use scenario with shared parking is also being considered as part of the Study. In addition, a bicycle boulevard network, gateways, a car sharing/parking price programs and grid connections are also being considered.