University Hill Transportation Study

Technical Memorandum
Alternatives Performance Matrix
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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. Without further infrastructure investment, the anticipated growth of the University Hill area could result in a shift in travel habits, an increase in congestion or exacerbate current parking shortages. This could limit the success of each institution's plans for expansion and development. To support future plans and existing land uses, this Study is seeking to define, balance and respond to the basic needs of the study area.

To date, a long list of possible alternatives (***Emerging Concepts Report***) has been refined into a short list of alternatives that have been modeled and analyzed in the ***Alternative Modeling and Analysis Technical Memorandum***. The study and its partners are currently working to further refine the alternatives that will address the mobility needs of the University Hill area. This Alternatives Performance Matrix will assist in identifying which alternatives will be examined in more detail.

The following matrix and technical memorandum describe how each alternative performs across multiple measures to address the four basic needs of accessibility, flexibility, economic viability and sustainability. The four basic needs are specifically outlined in the ***Needs Assessment*** and are a framework to think about issues related to interstate access, institutional parking, transit and bicycle and pedestrian uses.

The solutions to address one need may conflict with another need. The solutions for one mode may also conflict with the solutions for another mode. As we move through the study, priorities will be established by the Working Group.

The mix of preferred solutions will depend on which needs are considered most important to the future of University Hill. When considering such priorities, consideration must be given to a Move People versus a Move Cars approach. A Move People approach places priority on pedestrians, bicycles, buses and then cars. A Move Cars approach emphasizes the car as a priority.

Within this memorandum, a matrix illustrates a basic need, performance measures for that need according to travel mode and a representation of how each alternative could impact that need. In addition, key findings are discussed for each need within each travel mode.

Table 1 provides a description of each alternative. In addition, Figures 1 through 10 illustrate each alternative that was analyzed in the previous technical memorandum.

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.

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

FIGURE 2. ALTERNATIVE #1A – WIDEN THREE OF THE I-81 RAMPS

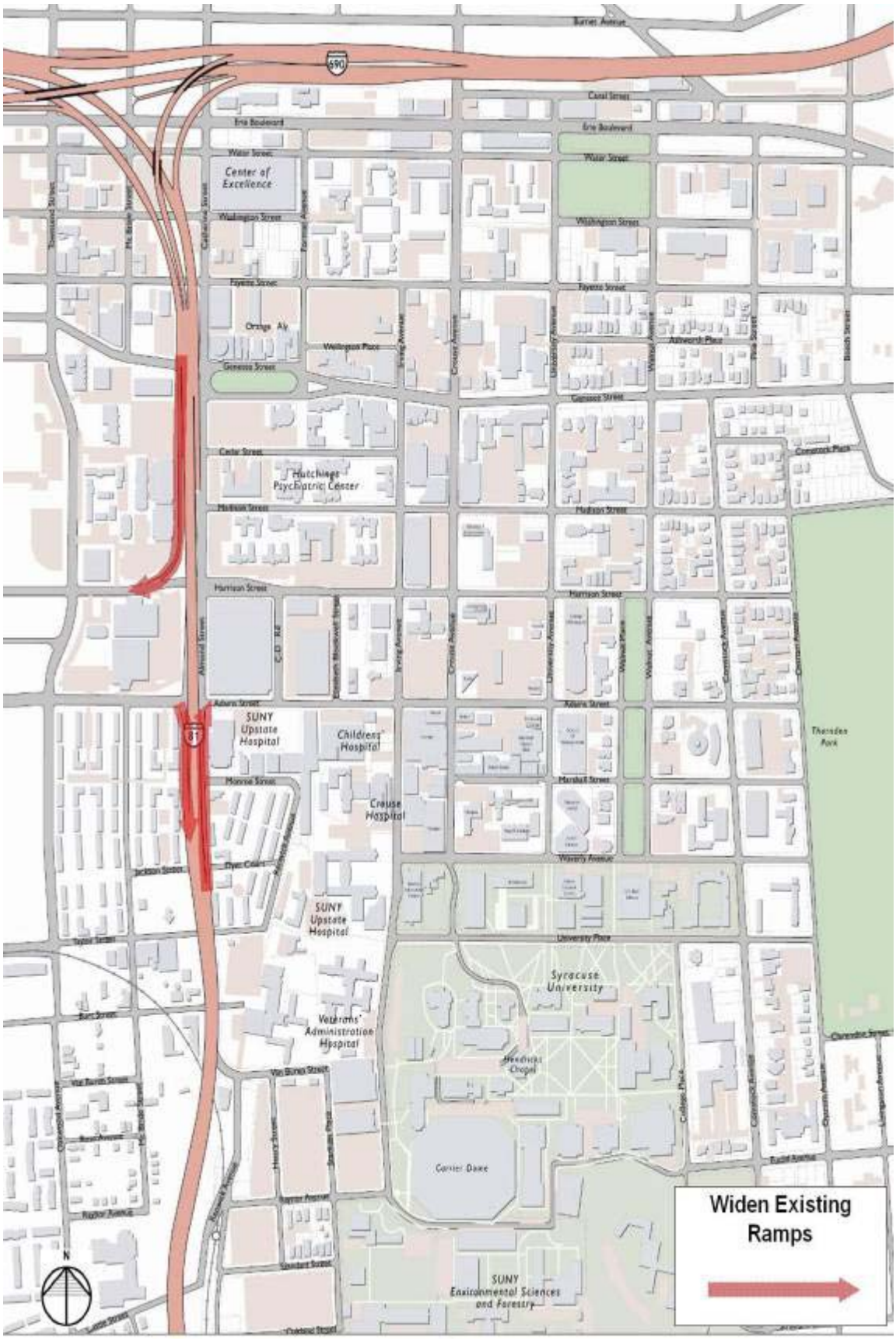


FIGURE 3. ALTERNATIVE #2 – NEW I-81 INTERCHANGE

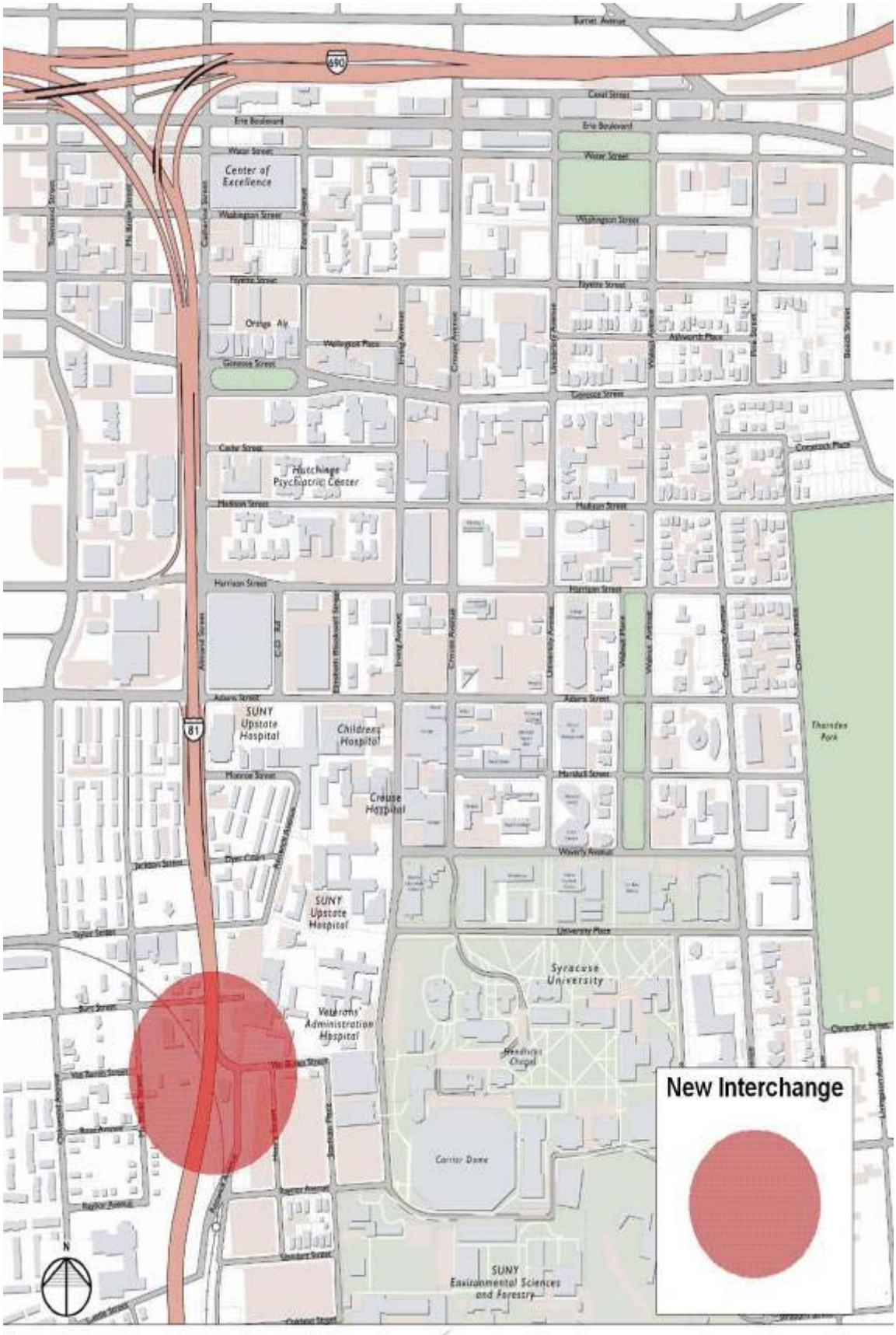


FIGURE 4. ALTERNATIVE #3 – ALMOND STREET DUAL TEAR DROPS

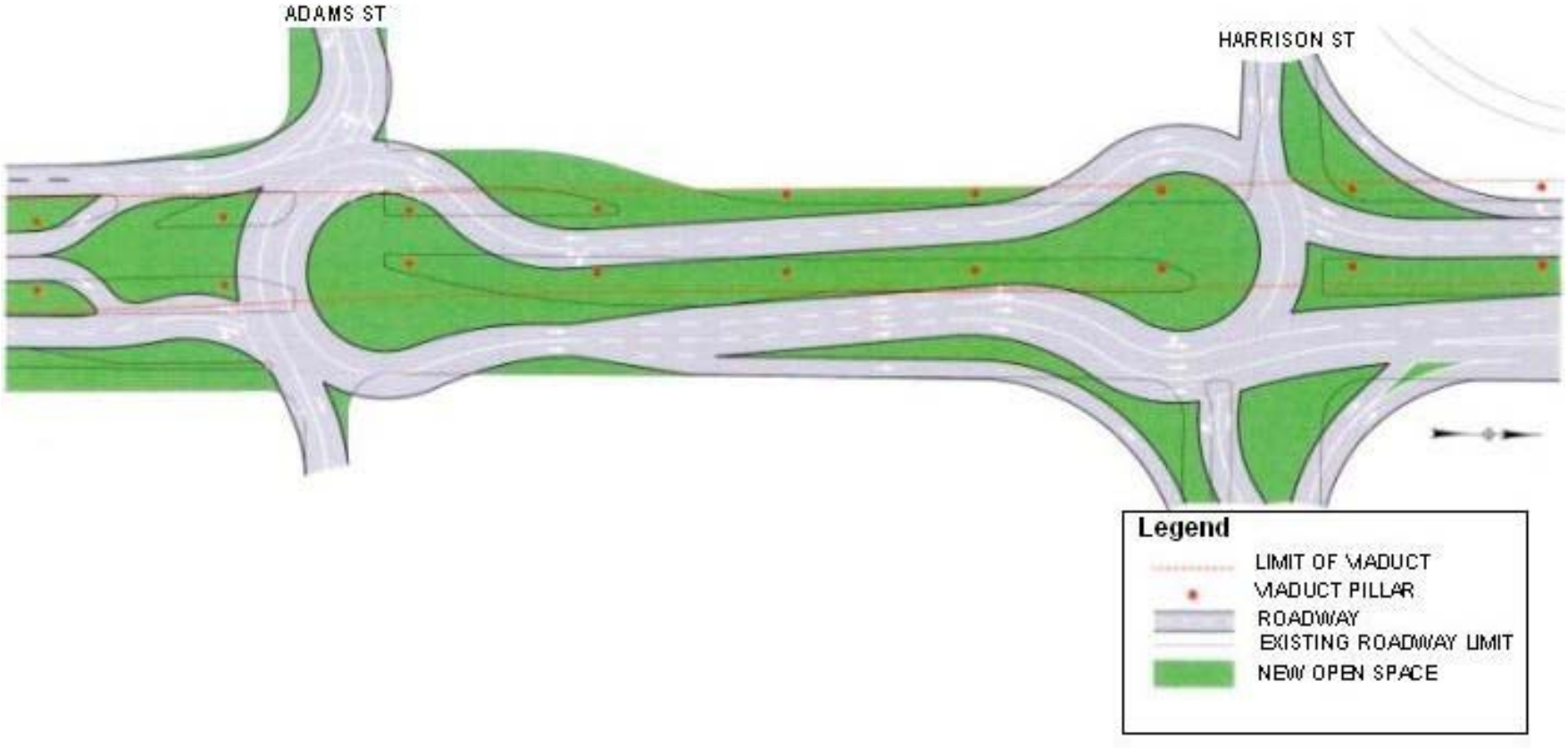


FIGURE 5. ALTERNATIVE #3A – ALMOND STREET ROUNDABOUT TEARDROPS

FIGURE 6. ALTERNATIVE #4 – NARROWING OF ALMOND STREET BY ONE LANE AT TWO LOCATIONS

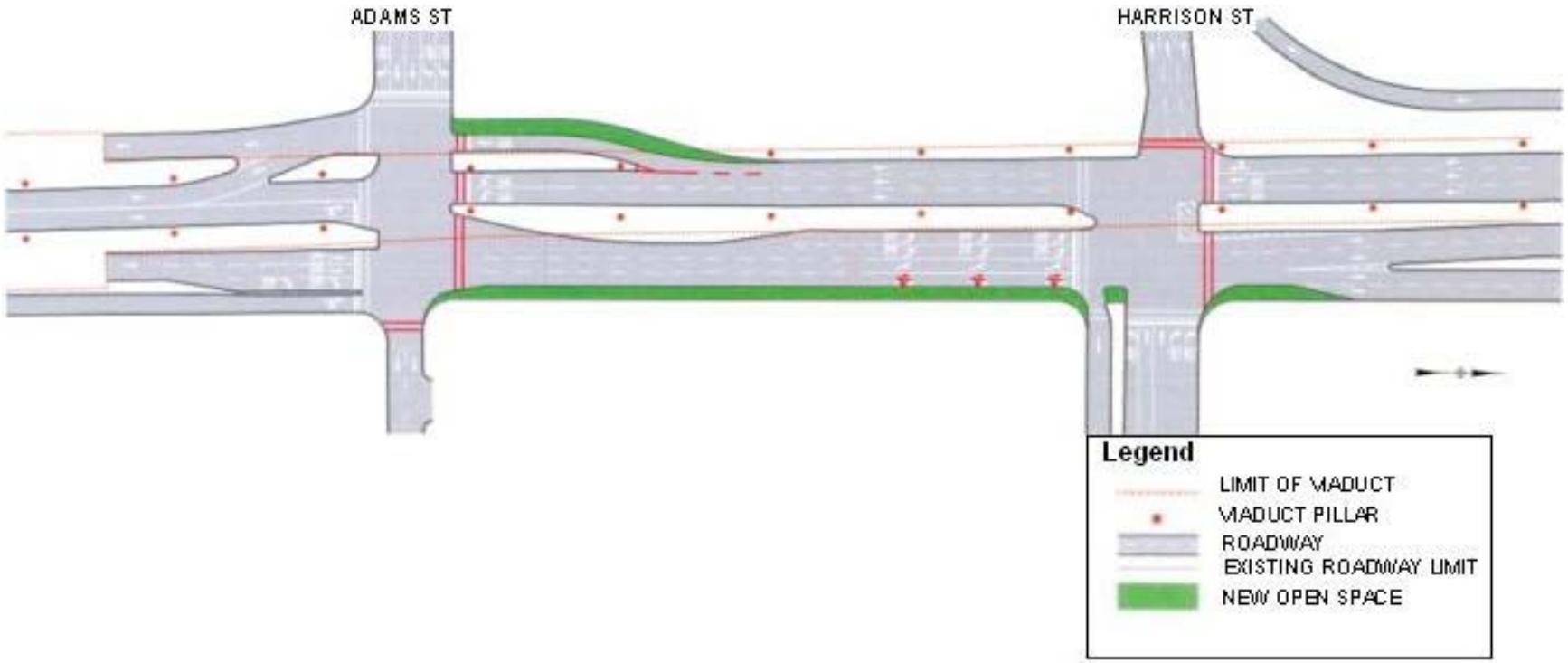


FIGURE 7. ALTERNATIVE #5 – ALMOND STREET BOULEVARD

N

E. Genesee

Harrison

Adams

Van Buren

East Castle

FIGURE 8. ALTERNATIVE #5A – ALMOND STREET BOULEVARD WITH A THREE LANE CONFIGURATION

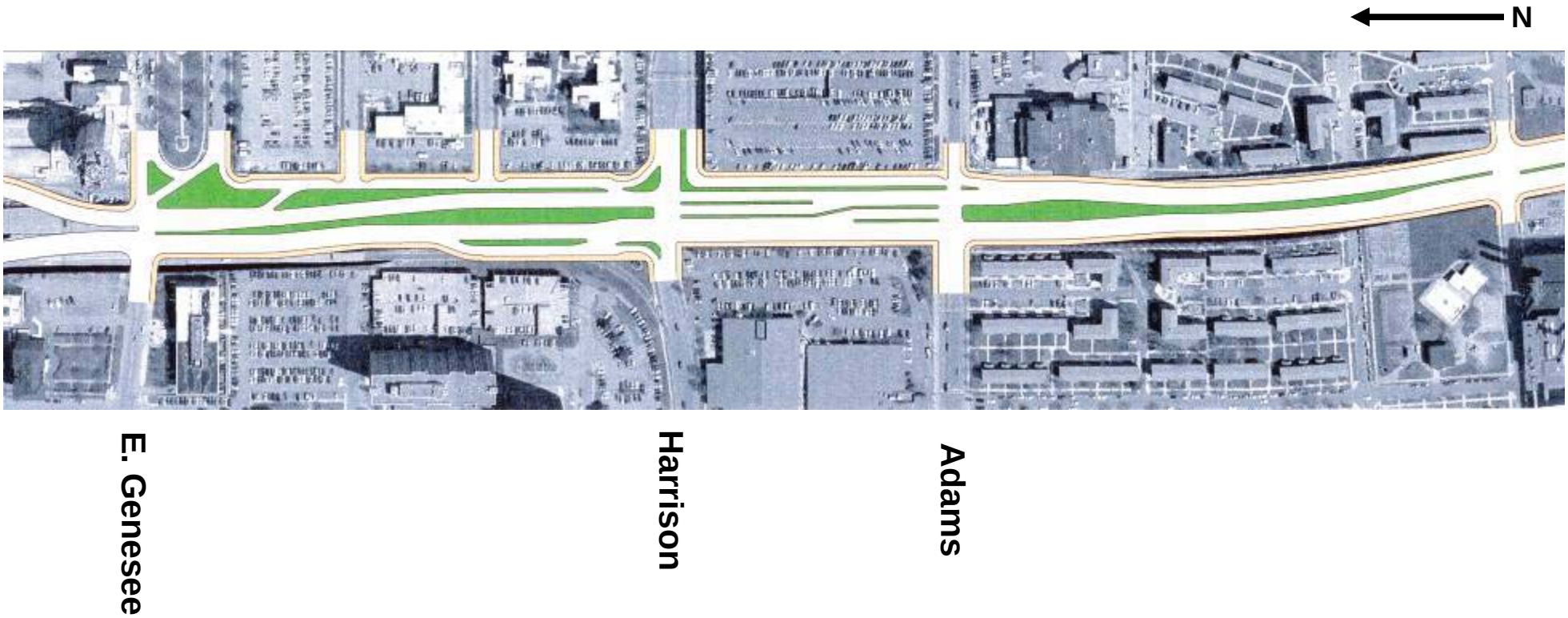


FIGURE 9. ALTERNATIVE #6 – ALMOND STREET BOULEVARD WITH I-81 / I-690 RAMP RECONSTRUCTIONS

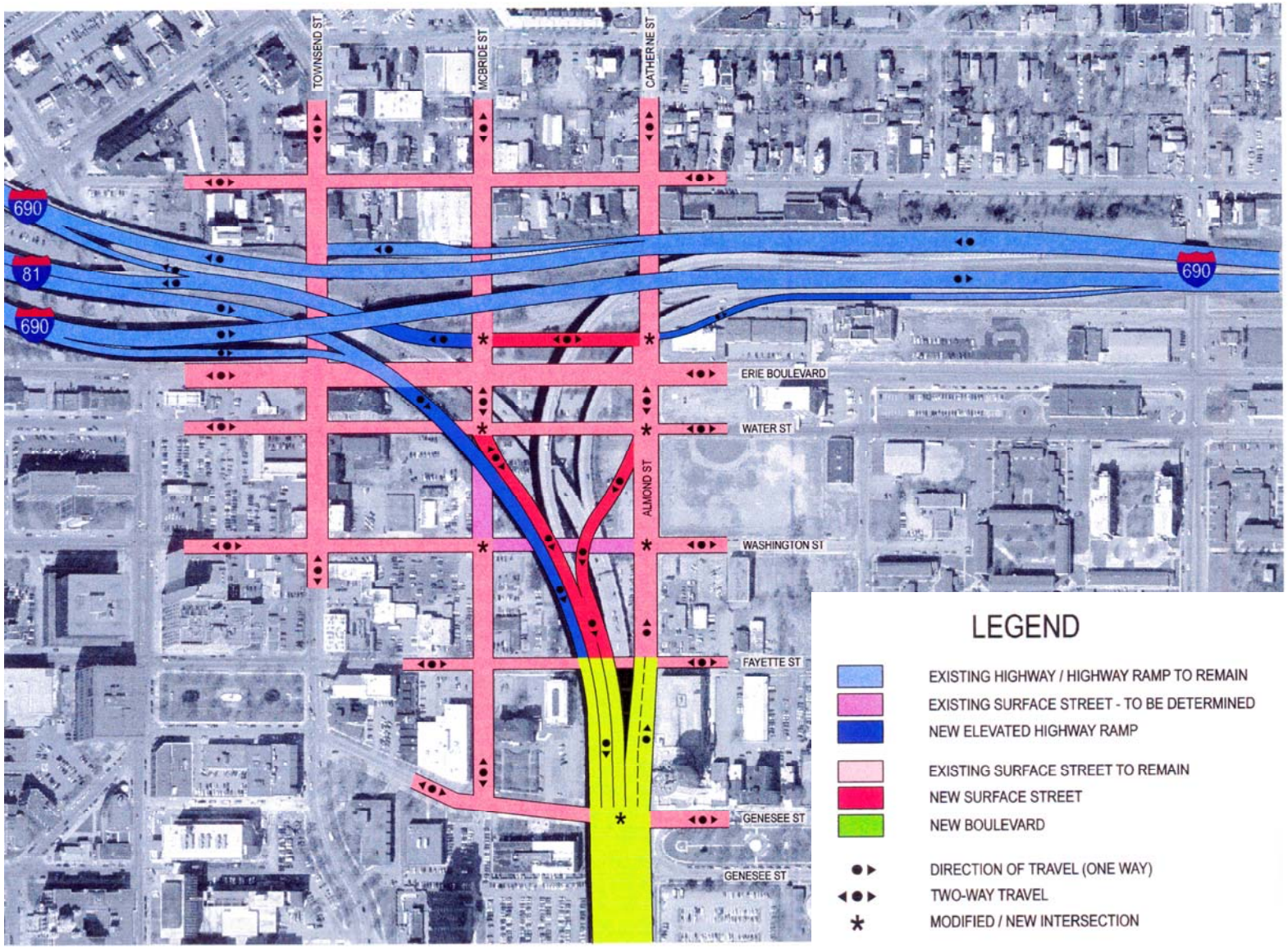
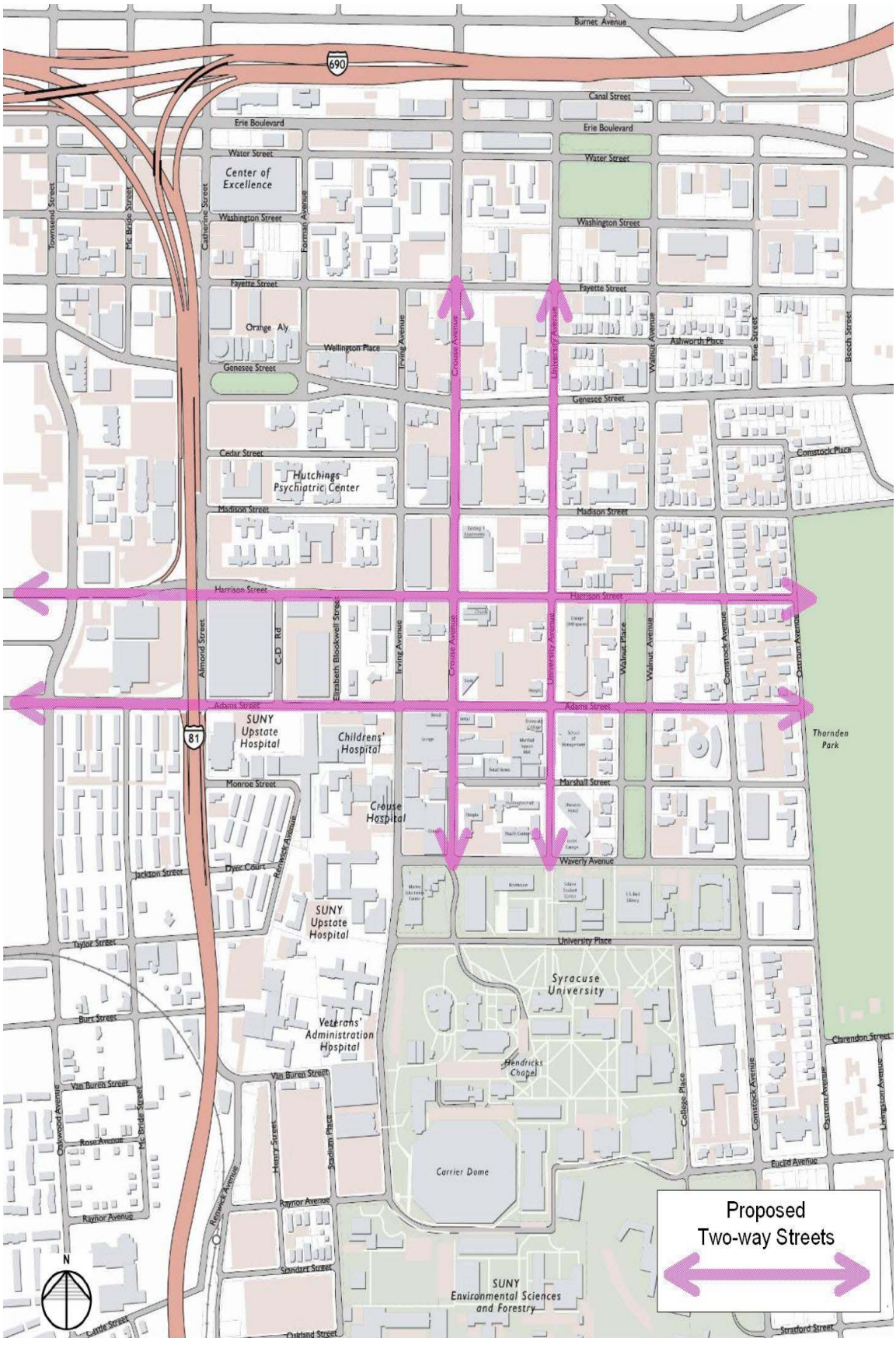


FIGURE 10. ALTERNATIVE #7 – TWO-WAY STREETS



SECTION TWO – ACCESSIBILITY

Accessibility to University Hill and accessibility to the transportation system is essential for the area's economic viability. It is important for all residents and visitors, regardless of age, race or physical condition to have easy, safe and convenient access to the businesses and institutions on University Hill.

Table 2 shows the comparison of alternatives for accessibility. To understand how the alternatives impacted interstate access, several performance measures were used including ramp volumes, number of v/c hotspots, vehicle hours of delay, households within 30 minutes, overall interstate volume (within Study Area), and local street volumes (within Study Area).

Transit service was measured by ridership and pedestrian access to bus stops, while parking was measured by fluxes in parking demand. Impacts to bicycle and pedestrian facilities were measured by the ease of crossing Almond Street and Harrison Street and at Adams Street.

Key Findings – Interstate Access

- Ramp volumes increase with Alternatives 1, 1A and 3.
- The number of v/c hotspots decrease with Alternatives 1, 1A and 2, while increasing with Alternatives 5, 5A and 6.
- Overall interstate volume in the study area decreases with most alternatives.
- Local street volume increase significantly with Alternatives 5, 5A and 6.

Key Findings – Transit

- Transit ridership increases significantly with Alternatives 3A and 7 and decreases with Alternatives 1, 1A and 3.
- Pedestrian access to bus stops increases significantly with Alternative 7 and increases for all other alternatives except Alternatives 1, 1A and 3.

Key Findings – Parking

- Parking demand increase with Alternatives 1, 1A, 3 and 3A.
- Demand remains constant for Alternative 4, 5, 5A and 6.
- Demand decreases for Alternative 7.

Key Findings – Bicycle and Pedestrian Facilities

- Ease of crossing decreases significantly with Alternative 3 and also decreases with Alternatives 1 and 1A.
- Ease of crossing increases with Alternative 4, 5, 5A, 6 and 7.

SECTION THREE – FLEXIBILITY

The flexibility of the transportation system to serve surrounding land uses to accommodate all users and all mobility modes is another important basic need. In addition, the ability of the transportation system to accommodate shifting trends in culture and technology is considered with this need. It is also important to create flexibility between modes. The variety and number of institutions in University Hill create a considerable number of employees who work different shifts every day of the week, twenty-four hours a day. These employees must have options and flexibility between transportation modes 24/7. Students are another example of this need. For example, if a student residing off campus wishes to take a bus from their residence and bring a bike to negotiate through campus after getting off the bus, is the system flexible enough to allow for this?

Table 3 shows the comparison of alternatives for flexibility. The performance measure used to understand interstate access includes local routing options to access I-81. Transit service and access to parking was also measured by route options. Impacts to bicycle and pedestrian facilities were measured by enhancement of the walking environment.

Key Findings – Interstate Access

- Local routing options increase with Alternatives 1, 1A and 2 and increase significantly with Alternative 5, 5A and 6.

Key Findings – Transit

- Transit routing options increase for Alternatives 3A, 5, 5A, 6 and 7.

Key Findings – Parking

- Routes to parking facilities increase significantly with Alternatives 5, 5A and 6.

Key Findings – Bicycle and Pedestrian Facilities

- The walking environment is enhanced significantly with Alternatives 5, 5A and 6.

SECTION FOUR – ECONOMIC VIABILITY

The economic viability of the institutions and businesses is critical to the long-term success of University Hill, the City of Syracuse and the surrounding region. A synergy exists between the various institutions located on University Hill that is creating positive growth and a flurry of activity. Coordinating development efforts between institutions can create a unified University Hill. Mixed-use development will create vibrant 24-hour activity and a world-class institutional center that attracts and retains new employees, students, residents and businesses.

To continue to build upon that synergy, the area must be accessible and the transportation system flexible. If it becomes more difficult for patrons, patients, employees and students to access University Hill, the institutions will be unable to grow, compete, and attract workers. While addressing the other basic needs, the economic viability of the area must also be considered.

Table 4 shows the comparison of alternatives for economic viability. Competition for goods movement and travel time were the performance measures used to understand interstate access. The perception of transit service was used to understand impacts to transit. For parking, competition for existing spaces was used as a performance measurement, and mode share was the measurement for bicycle and pedestrian facilities.

Key Findings – Interstate Access

- Competition for goods movement increases as a result of all alternatives except Alternatives 2, 3A, 4 and 7 (competition remains constant).
- Travel time is reduced for Alternatives 1, 1A, 2, 3 and 3A.

Key Findings – Transit

- Perception of transit is significantly enhanced with Alternatives 3A and 7.
- Perception of transit is also enhanced with Alternatives 5, 5A and 6.

Key Findings – Parking

- Competition for existing parking spaces increases as a result of Alternatives 1, 1A, 3 and 3A.

Key Findings – Bicycle and Pedestrian Facilities

- Mode share increases with all alternatives except Alternatives 1, 1A and 3.

SECTION FIVE – SUSTAINABILITY

The sustainability of the transportation system and supporting land uses is closely tied to the economic viability and the quality of life on University Hill. The ability to pay for infrastructure improvements to support economic development is currently being challenged by more competition for less funding. Therefore, it is necessary to examine more sustainable and less cost-intensive options of mobility than what is currently practiced. In addition, it is important to consider the impact of the transportation system on environmental and public-health-related issues such as air emissions, obesity rates and asthma rates. This raises the question: "Is there a more sustainable way to travel to and through University Hill?"

Table 5 shows the comparison of alternatives for sustainability. Performance measures for interstate access include the impact to regional VMT (and greenhouse gases), local VMT and FHWA interchange spacing conflicts. Travel time was used to understand impacts to transit. Land used for parking was the performance measurement utilized for parking. Bicycle and pedestrian facilities were measured by mode conflict, urban revitalization and Environmental Justice conflict.

Key Findings – Interstate Access

- Regional VMT and greenhouse gases were reduced as a result of Alternatives 1A, 3, 3A and 7.
- Regional VMT significantly increased as a result of Alternatives 5 and 6.
- Local VMT decreased with Alternatives 2, 5, 5A and 6.
- Alternatives 1 and 1A caused an increase in local VMT.
- Significant interchange space conflicts result from Alternative 1 and to a lesser degree Alternatives 3 and 3A.

Key Findings – Transit

- Travel time is reduced significantly with Alternative 3A and also reduced with Alternatives 2 and 3.

Key Findings – Parking

- Land used for parking increases with Alternatives 1, 1A, 3 and 3A.

Key Findings – Bicycle and Pedestrian Facilities

- Mode conflict increases as a result of Alternatives 1, 1A, and 3. It is reduced with all other alternatives.
- Opportunities for urban revitalization improve significantly with Alternatives 5, 5A, 6 and 7. These opportunities decrease with Alternatives 1 and 1A.
- Environmental Justice conflicts increase significantly with Alternatives 1 and 1A as well at Alternative 2.

SECTION FIVE – SUMMARY AND RECOMMENDATIONS

As noted previously, the solutions to address one need may conflict with another need. The solutions for one mode may also conflict with the solutions for another mode. The benefits of each alternative must be carefully weighed and balanced with the potential impacts that alternative.

Table 6 graphically summarizes how each alternative improves or degrades the current conditions on University Hill based on the four basic needs. The following text identifies potential near-term, mid-term and long-term recommendations for the Working Group to consider for further refinement as the next step in the Study.

TABLE 6 – SUMMARY OF ALTERNATIVES PERFORMANCE

	ALTERNATIVE									
BASIC NEED	**1**	**1A**	**2**	**3**	**3A**	**4**	**5**	**5A**	**6**	**7**
ACCESSIBILITY										
INTERSTATE ACCESS	🟢	🟢	🟢	🔴	🟢	🟠	🔴	🔴	🔴	🟢
TRANSIT	🔴	🔴	🟢	🔴	🟢	🟢	🟢	🟢	🟢	🟢
PARKING	🔴	🔴	🟠	🔴	🔴	🟠	🟠	🟠	🟠	🟢
BICYCLE AND PEDESTRIAN	🔴	🔴	🟢	🔴	🔴	🟢	🟢	🟢	🟢	🟢
FLEXIBILITY										
INTERSTATE ACCESS	🟢	🟢	🟢	🟠	🟠	🟠	🟢	🟢	🟢	🟠
TRANSIT	🟠	🟠	🟠	🟠	🟢	🟠	🟢	🟢	🟢	🟢
PARKING	🟠	🟠	🟢	🟠	🟢	🟠	🟢	🟢	🟢	🟢
BICYCLE AND PEDESTRIAN	🔴	🔴	🟢	🔴	🔴	🟢	🟢	🟢	🟢	🟢
ECONOMIC VIABILITY										
INTERSTATE ACCESS	🟢	🟢	🟢	🟢	🟢	🔴	🔴	🔴	🔴	🟠
TRANSIT	🔴	🔴	🟠	🔴	🟢	🟠	🟢	🟢	🟢	🟢
PARKING	🔴	🔴	🟠	🔴	🔴	🟠	🟠	🟠	🟠	🟠
BICYCLE AND PEDESTRIAN	🔴	🔴	🟢	🔴	🟢	🟢	🟢	🟢	🟢	🟢
SUSTAINABILITY										
INTERSTATE ACCESS	🔴	🔴	🟢	🟢	🟢	🟠	🟢	🟢	🟢	🟢
TRANSIT	🔴	🔴	🟢	🟢	🟢	🟠	🟠	🟠	🟠	🟢
PARKING	🔴	🔴	🟠	🔴	🔴	🟠	🟠	🟠	🟠	🟠
BICYCLE AND PEDESTRIAN	🔴	🔴	🟢	🔴	🟢	🟢	🟢	🟢	🟢	🟢

🟢 = *Positive Impact*

🔴 = *Negative Impact*

🟠 = *Negligible Impact*

Near-Term Recommendations

It is recommended that Alternative 4 be considered as a near-term recommendation. Alternative 4 includes the narrowing of Almond Street by one lane. This alternative addresses nearly all of the basic needs and had primarily positive or negligible impacts.

In addition to this alternative, a BRT system connecting the transit center and University Hill could enhance the transportation system and encourage new development in University Hill. A BRT system, alone, was not specified as an alternative, but was included in tandem with other alternatives. It is strongly recommended that this be evaluated in further modeling and analysis.

Mid-Term Recommendations

It is recommended that Alternative 7 and Alternative 3A be examined further as mid-term recommendations. Alternative 3A would create double roundabouts on Almond Street at Harrison and Adams Streets, modify current vehicle circulation on Harrison Street and implement a BRT alignment connecting the transit center and University Hill via Harrison Street. Modeling results for 3A had positive impacts on interstate access and transit. However, the roundabout concept would need additional modeling and conceptual design revisions to ensure the roundabouts are two lanes or less to safely accommodate pedestrians.

Alternative 7 includes a BRT alignment along Harrison and conversion to two-way streets. Alternative 7's BRT alignment had positive impacts on all transportation modes in the modeling process.

Longer-Term Recommendations

The Almond Street Boulevard concept, which is modeled in Alternatives 5, 5A and 6, should be considered in the future I-81 Corridor Study as a long-term transportation improvement. Although modeling results yielded unfavorable impacts to interstate access under the boulevard concept and placed additional pressure on the regional transportation system, it is recommended that this concept be examined in combination with other transportation improvements as part of the I-81 Corridor Study.