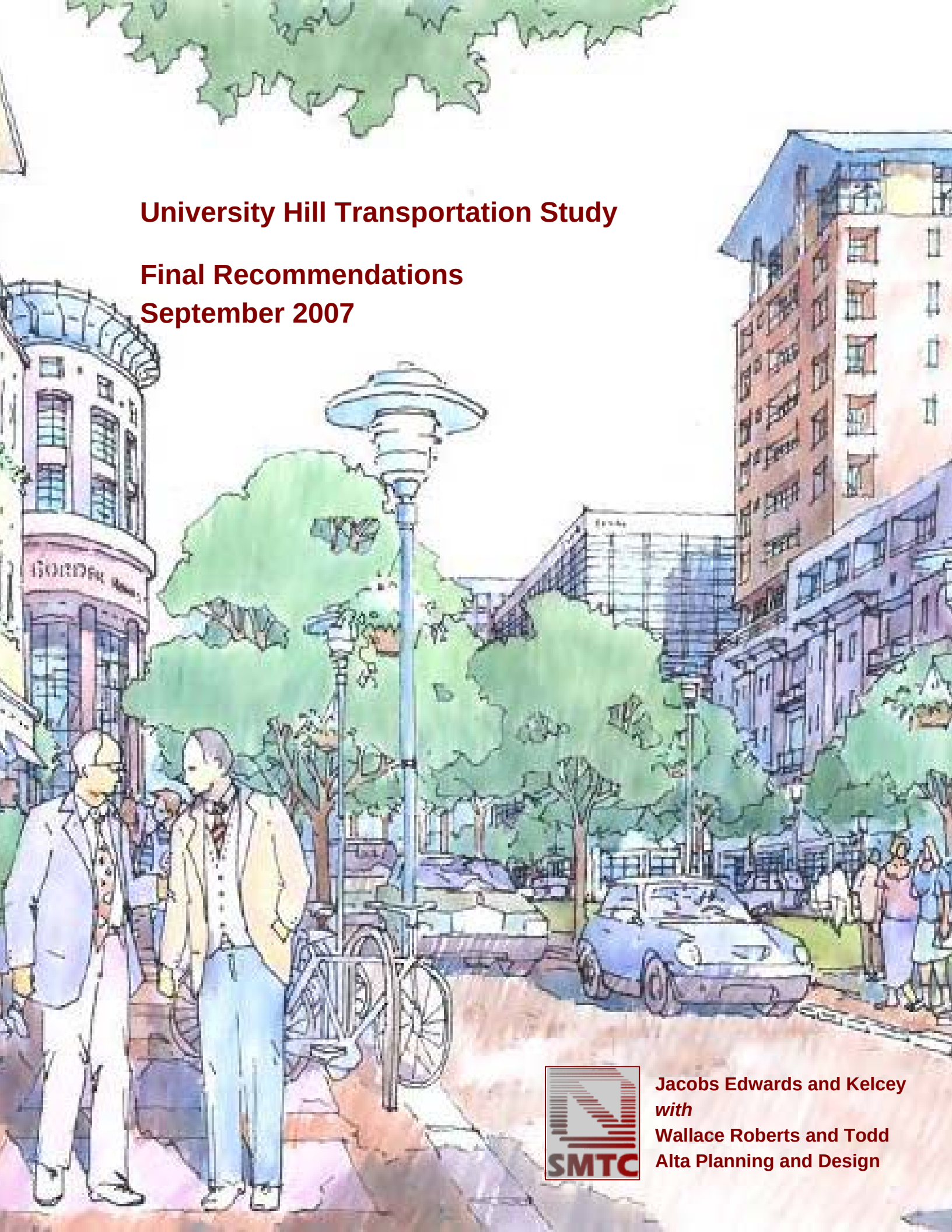
University Hill Transportation Study

Final Recommendations
September 2007



Jacobs Edwards and Kelcey
with
Wallace Roberts and Todd
Alta Planning and Design

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SECTION ONE – INTRODUCTION AND KEY RECOMMENDATIONS

1A. Introduction

University Hill is a thriving educational and institutional center (See Figure 1). Home to Syracuse University, Crouse Hospital, State University of New York (SUNY) Upstate Medical Center, SUNY College of Environmental Science and Forestry, the Veterans Administration Hospital, the Hutchings Psychiatric Center and other important institutions and businesses, this area attracts a significant number of people each day for employment, learning, research and living. The Hill is home to over 16,000 residents, three major education institutions, four major hospitals and healthcare facilities, and the 50,000-seat Carrier Dome located on the Syracuse University Campus.

University Hill is poised for continued development and growth. Each institution has plans for development that will allow them to attain their mission. The purpose of the Study is to create a multi-modal transportation plan that supports existing and future land uses and guides transportation decisions. The goal of the study is to keep the institutions viable by identifying creative land use policies and innovative transportation alternatives, and reduce the need for more cars and parking on University Hill.

Collectively, more than 4 million square feet of development is forecast by the institutions over the next two decades. This growth can contribute significantly to the Central New York economy. For this growth to occur, some important changes are needed in how University Hill is developed and how the transportation infrastructure is provided. First, the community should recognize that the needs of the study area are broader than just supplying more capacity to move and park cars. Second, the impacts of simply providing more automobile capacity to relieve congestion need to be recognized. Third, the relationship between land use and transportation decisions needs to recognized and addressed. Fourth, an emphasis on moving people, goods and minds instead of moving cars is paramount. Each of these four fundamental changes is discussed below.

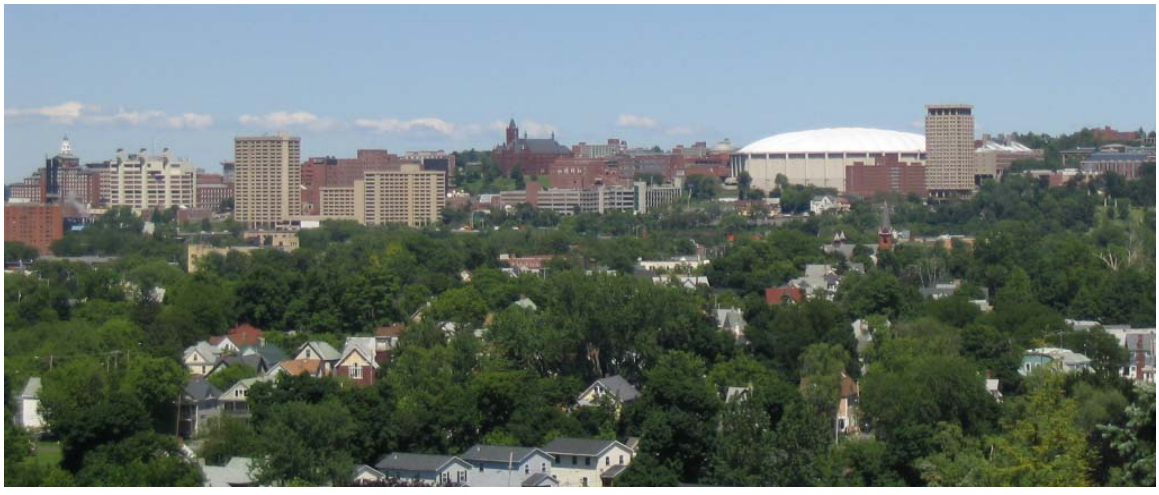


FIGURE 1. UNIVERSITY HILL AREA

Source: WRT November 2006

1B. Recommendations

The forward-thinking vision for University Hill represents a shift from the traditional approach to improving transportation systems to a more comprehensive and coordinated approach to moving people, goods and minds. Thus, a series of innovative concepts are recommended to meet current and future transportation needs of University Hill, including:

- Implementation of a joint, mixed-use development program;
- Creation of a prioritized transit network;
- Reconfiguration of almond street corridor;
- Restoration of two-way Streets;
- Establishment of a bike boulevard network; and
- Adoption of an integrated parking strategy.

Each recommendation is discussed in greater detail in the following chapters.

1C. Needs

The Study examined a number of alternatives for each scenario and has recommended preferred actions based on those needs. The four basic needs that were identified include:

- Accessibility;
- Flexibility;
- Economic viability; and
- Sustainability.

These needs are key considerations for planning for interstate access, street circulation, institutional parking, transit and bicycle and pedestrian uses. As shown further in the report, they are also important when thinking about land uses.

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. Examples of issues pertaining to accessibility include the following:

- Is University Hill adequately accessible from the interstate system and other adjoining neighborhoods?
- Can the elderly or physically handicapped safely cross the street to visit their doctor at one of the medical institutions?
- Are bike storage facilities provided in locations that make sense?

- Could land uses be encouraged that would create more convenient access to (and around) University Hill via a variety of travel modes?

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 everyday of the week, twenty-four hours a day. These employees must have options and flexibility between transportation modes throughout the day. 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?

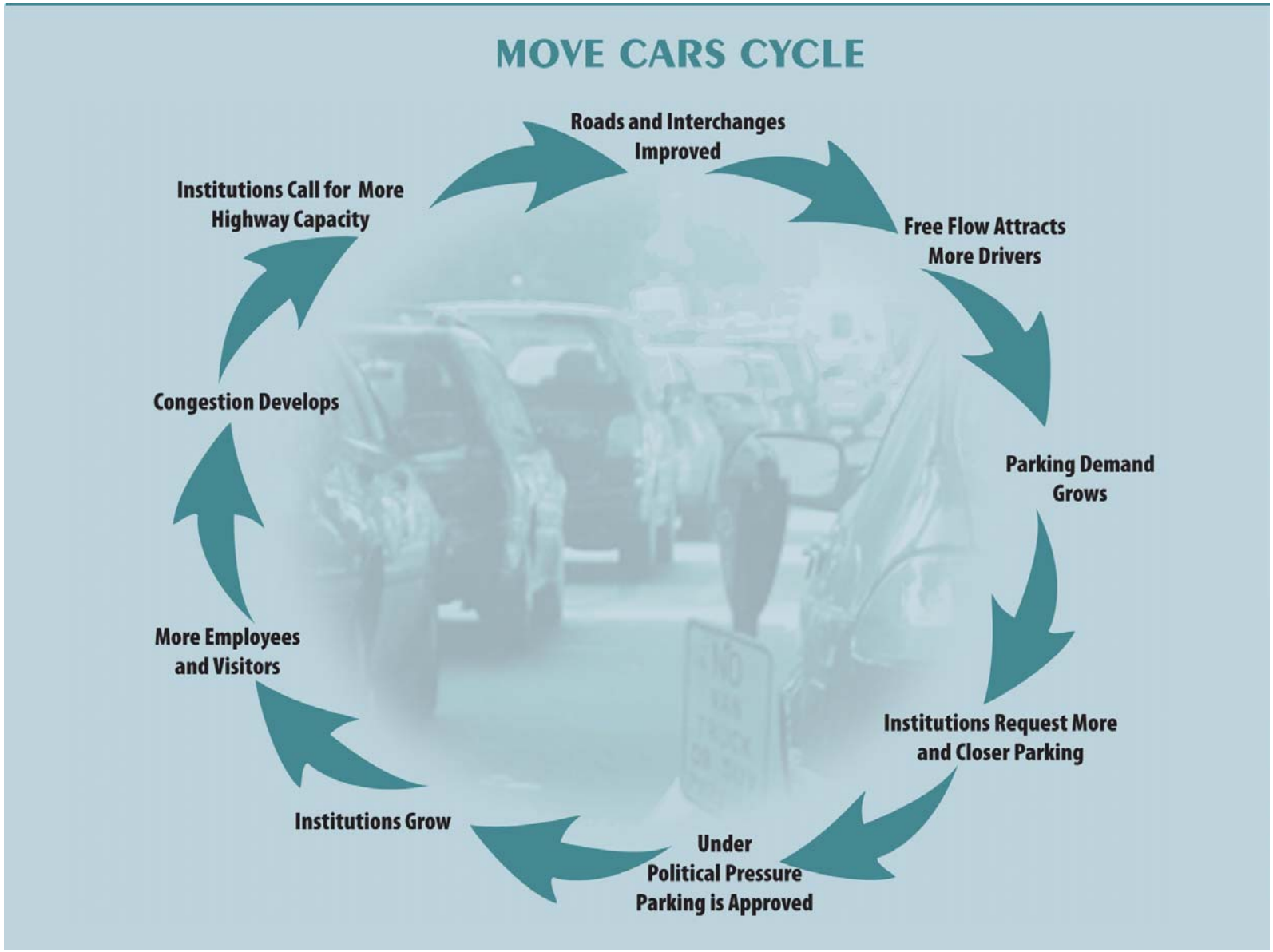
The *economic viability* of the institutions and businesses is critical to the long-term success of University Hill, the City of Syracuse and the surrounding region. A synergy exists between the various institutions located on University Hill that is creating positive growth and a flurry of activity. 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.

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?

1D. Induced Demand

As development increases, the demand for transportation facilities grows accordingly. Typically, the response has been to provide more capacity for cars to meet that growing demand. However, in recent years, we have learned that this additional capacity actually induces unanticipated auto travel demand. This growth can erode the capacity such that roads can quickly become congested again, thereby negating the benefit of a costly investment. An example of how such a cycle might function on University Hill is provided in Figure 2.

FIGURE 2. CYCLE OF LAND USE AND TRANSPORTATION DEMAND



There is intense competition among communities for a very limited amount of funding for transportation infrastructure. Thus, it is important to make investments that have long-term benefits instead of providing only short-term relief.

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. If investments in moving cars are emphasized, we are likely to face an increase in congestion or parking shortages. This could limit the success of each institution's plans for expansion and development.

1E. Integration of Land Use Planning

Initially the Study began with a focus solely on interstate access, institutional parking, transit and bicycle and pedestrian use. While each of these focus areas are addressed, it quickly became evident that an important element was not being addressed– land use.

Coordinated land use can create a synergy among the institutions on University Hill. The concept of mixed-use development can be used as a strategy to mitigate transportation impacts by increasing overall transportation efficiency. For example, mixed use, walkable areas can reduce the overall need for parking, provide convenient services and amenities to users, spread trips over non-peak periods, and support transit, walking, and bicycling as attractive transportation options. Integrating land use and transportation decisions also addresses a larger goal of creating a vibrant district that is an ideal setting for the institutions and the longevity of a successful University Hill.

Therefore, the real starting point for thinking about transportation systems is the way land is developed. Decisions about land uses directly affect the demand for different modes of travel. The form and density of development, for example, are critical in fostering transit use, bicycling and walking.

1F. Future Needs

When planning for future needs, it is common to consider them only in light of today's conditions and trends. However, things change, especially in regards to the economy, demographic trends, environment and technology. This is important since a trend that is moving in one direction right now may change its course, thereby generating a different set of needs. With some forethought, issues that might not have been expected can arise when participants examine emerging trends or other "what ifs."

The possible future needs for University Hill were framed using the process of "scenario planning." This process involved looking at a series of "what ifs" and how it might impact our land use and transportation needs. The result was the determination that University Hill needed to be served by a more flexible transportation system that could better respond to changing conditions. The system would give equal emphasis to "moving

people, goods and minds" when compared to "moving cars," as shown in Figure 3. This means shifting funding and design decisions to strategies that better accommodate walking, bikes and transit. It means improved connectivity between land uses and infrastructure for those who choose or are required to use alternative modes other than cars. It enhances safety and security, especially through better site design and traffic calming. It also requires mixed-land uses on University Hill.

1G. Who Was Involved?

The University Hill Transportation Study (the Study) is a project led by the Syracuse Metropolitan Transportation Council (SMTC), to plan for the future of transportation on University Hill. The study involved the coordination of a Working Group, Institutional Focus Group, the public, and guidance from a consultant team of Jacobs Edwards and Kelcey, Wallace Roberts and Todd, and Alta Planning and Design. The Working Group included the City of Syracuse, Central New York Regional Transportation Authority (CENTRO), the University Hill Corporation, and the New York State Department of Transportation. The Institutional Focus Group consisted of representatives from all the major institutions on University Hill.

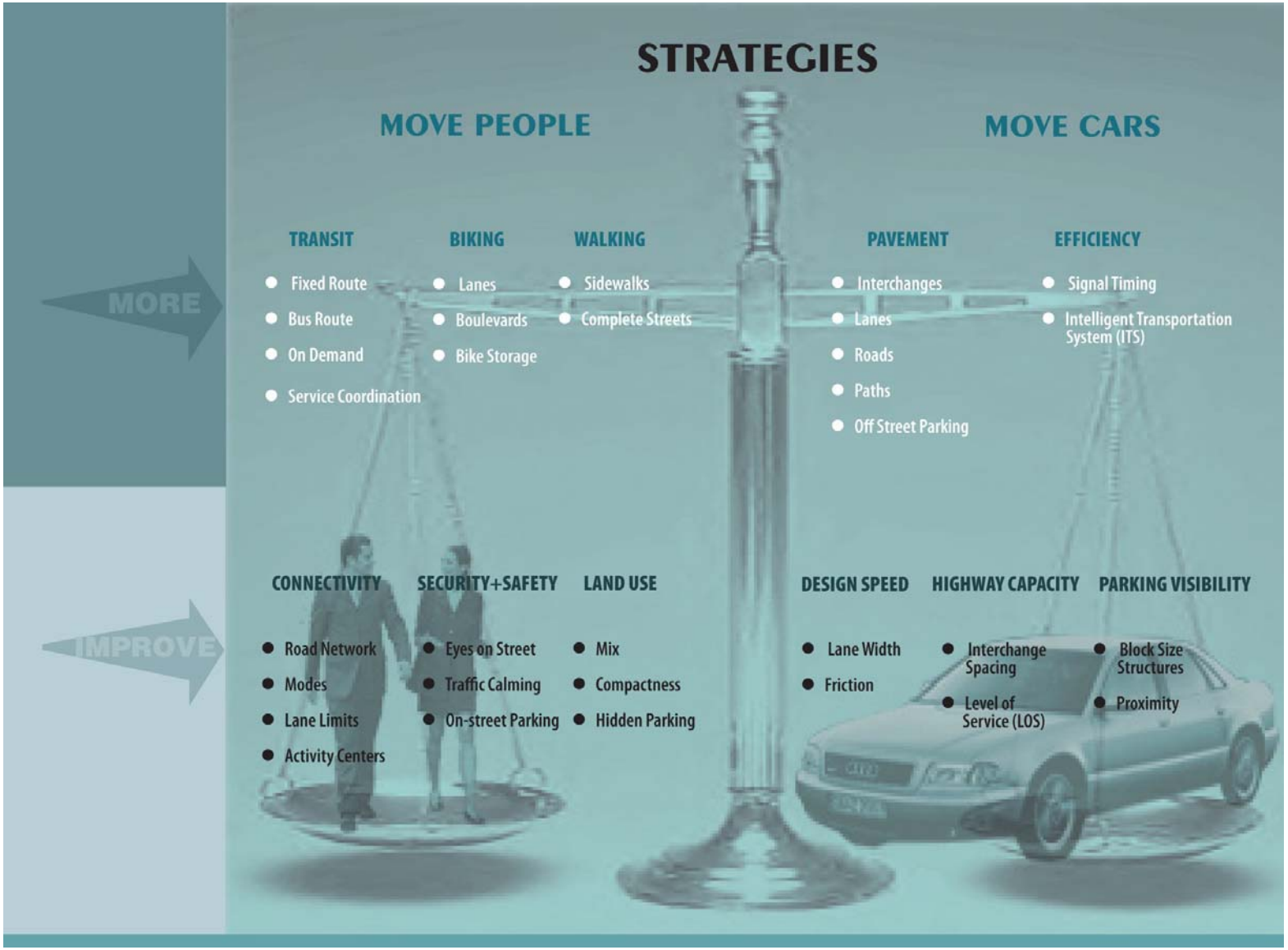
Three public meetings were held to inform the community of the progress of the study, while providing an opportunity for the public to voice their thoughts and concerns regarding University Hill and the direction of the study.

Previous efforts for the University Hill area serve as the foundation of this study. A Special Events Study, as well as an Issues and Existing Conditions Inventory, provided a starting point. The public outreach associated with these previous efforts assisted in identifying issues that have been addressed throughout the study process.

1H. Technical Memos and Reports Completed

The Draft Final Recommendations is a collection of information gathered, and suggested transportation improvements that have been derived from the completed technical memos and reports thus far. The foundation of the Study was the ***Current Planned Vision*** (CPV). The CPV was a confidential document completed in June 2006. It is a summary of land use changes identified during a confidential interview process which involved representatives of University Hill organizations, including Syracuse University and various hospitals. Information gathered through the interviews included square footage of development, number of additional beds where appropriate, number of residential units and number of parking spaces. Approximately 4.2 million square feet (sf) of proposed development is scheduled for University Hill by the institutions and other major property owners over the next twenty years. The proposed development includes medical-related, university-related, commercial and residential uses, as well as over 2,000 new parking spaces.

FIGURE 3. ALTERNATIVE PRIORITIES



The ***Pedestrian and Bicyclist Issues Assessment*** was completed in April 2006. Alta Planning and Design identified the existing conditions for bicycling and walking in the University Hill study area. Significant pedestrian activity was observed in areas of the Hill; however, in general, only a few sections within the project area were considered pedestrian and bicycle-friendly.

Case studies of two communities similar to Syracuse were examined for strategies for increasing bicycling and walking on the Hill. The two communities researched were Ithaca, NY and Madison, WI. As a third case study, a series of elevated highway projects were investigated as possible models for treatment of the I-81 viaduct, including the Burnside Bridge in Portland, OR, Queensboro Bridge in New York, NY, as well as various others.

A ***Needs Assessment*** report was completed in November 2006. The report summarized the transportation and mobility needs and issues of University Hill related to institutional parking, transit and bicycle and pedestrian facilities in relation to the four basic needs: accessibility, flexibility, economic viability and sustainability.

The WRT team completed two ***Land Use Concept Technical Memorandums*** in August and November 2006. In the memorandums, land use concepts were presented that focused on creating synergy among the institutions on University Hill, as well as mitigating transportation impacts by increasing overall transportation efficiency. The concepts presented in the memos were just initial diagrams and illustrations for discussion and did not reflect actual plans or proposals.

The ***Emerging Concepts Report***, completed in January 2007, identified a long list of alternative transportation concepts to be considered in the University Hill Transportation Study. The list was then categorized according to the three scenarios discussed earlier, Move Cars, Move People, and Move Carbon. Each alternative was then examined compared to the four basic needs: accessibility, flexibility, economic viability, and sustainability.

From the ***Emerging Concepts Report,*** seven bundles of transportation alternatives were analyzed using the SMTC Regional Travel Demand Model which was refined for use within the University Hill study area. The findings were presented in a technical memorandum called ***Alternatives Modeling and Analysis***, completed in March 2007. The key findings were discussed based on impacts on vehicle-miles traveled (VMT) and average daily traffic (ADT) and volume to capacity ratio (V/C) for the study area and SMTC planning region. Except for the removal of I-81 from the core of Syracuse's Downtown and University Hill, the alternatives did not have significant impacts on total miles traveled in the study area.

The modeling results memorandum was followed by the ***Alternatives Performance Matrix***, completed in May 2007. The memorandum describes how each transportation alternative performed across multiple measures to address the four basic needs of accessibility, flexibility, economic viability and sustainability. A matrix was provided to illustrate the basic need, performance measures for that need according to travel mode, and a representation of how each alternative could impact that need. A summary matrix illustrates how each alternative improves or degrades the existing conditions on University Hill based on the four basic needs. This analysis was used to select the recommendations presented herein.

Additionally, a website was created to provide information about the study in a way that could be accessed by the public. The site contains an explanation of the study purpose, its history, the agencies and parties which have been involved, the status of the study, the most recent finalized documents and information for the public to get involved. The website can be found at ***www.universityhillstudy.com***.

SECTION TWO – MIXED USE DEVELOPMENT

The vision for University Hill involves creating vibrant, walkable streets with a diverse mix of land uses that supports the planned growth. The vision also includes an efficient and attractive multi-modal transportation system that provides users with choices and can assist in mitigating parking impacts. This will require the implementation of an alternative land use vision for University Hill based on the principles included in this report.

The mixed-use concept relies on joint development of property and shared parking among the various institutional uses. Importantly, the land use concept principles have been endorsed by the participating institutions (Appendix A) and should serve as the basis for future updates to the City's Master Plan for this area.

Currently, there is only a limited number of buildings that could be considered "mixed-use" within the study area. The concept consolidates the proposed development identified within the CPV within a 5 minute walking distance centered on Adams Street (between Irving Avenue and University Avenue). The mixed-use development includes approximately 2.4 million square feet. This excludes development of the Syracuse University West Campus and the redevelopment of the Kennedy Towers site at the north end of the study area.

2A. Land Use and Urban Design Framework Plan

The Land Use Concept (Figure 8) is made up of individual land uses that are organized within the urban design framework plan to create a strong sense of place and logical circulation system. The Land Use Concept allows the following development plus associated parking:

- **Retail** 280,950 sq. ft.
- **Cinema** 45,000 sq. ft.
- **Medical** 400,000 sq. ft.
- **Daycare** 7,000 sq. ft.
- **Housing** 970 units (1.2 million sq. ft.)
- **Office** 55,000 sq. ft.
- **Academic** 384,000 sq. ft.

FIGURE 4. UNIVERSITY HILL LAND USE CONCEPT

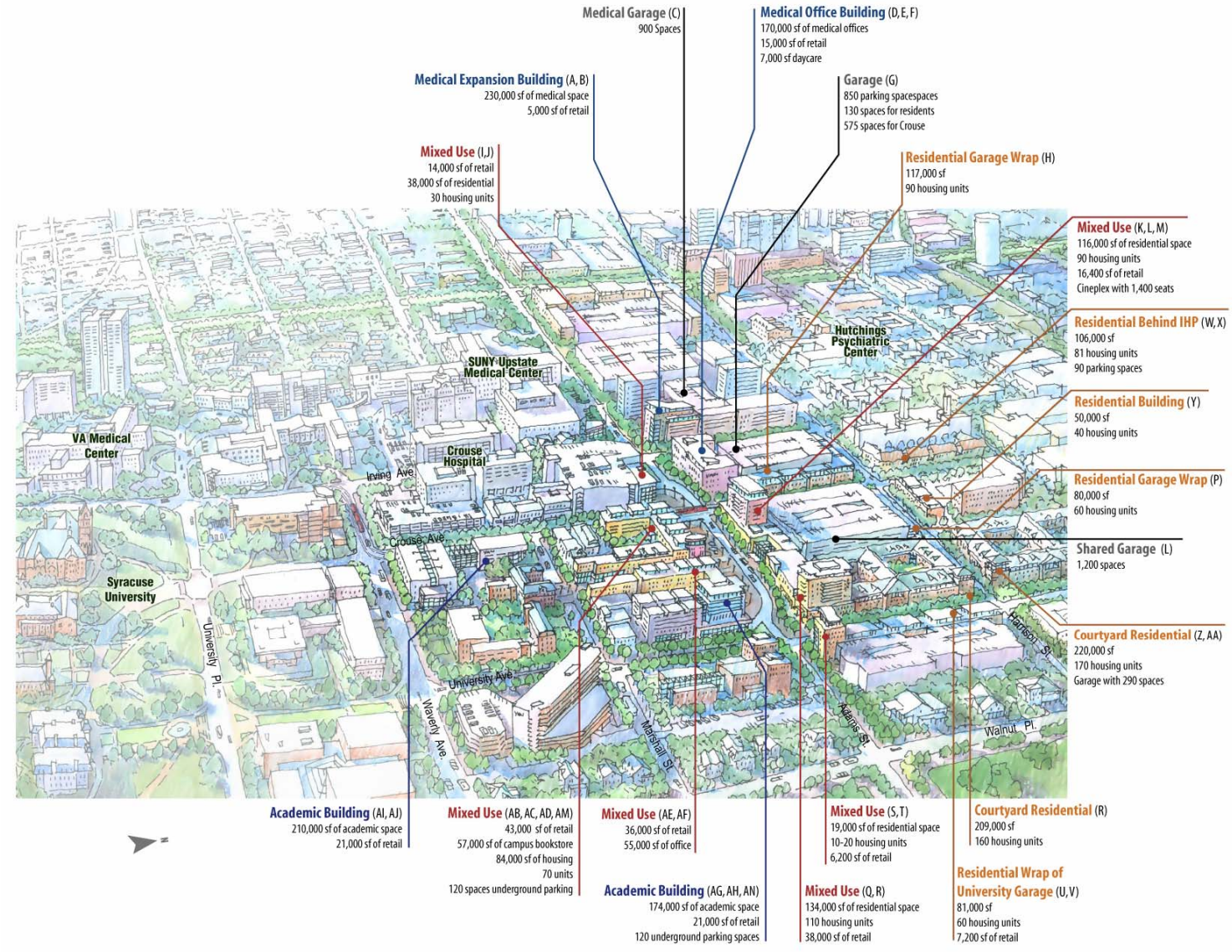
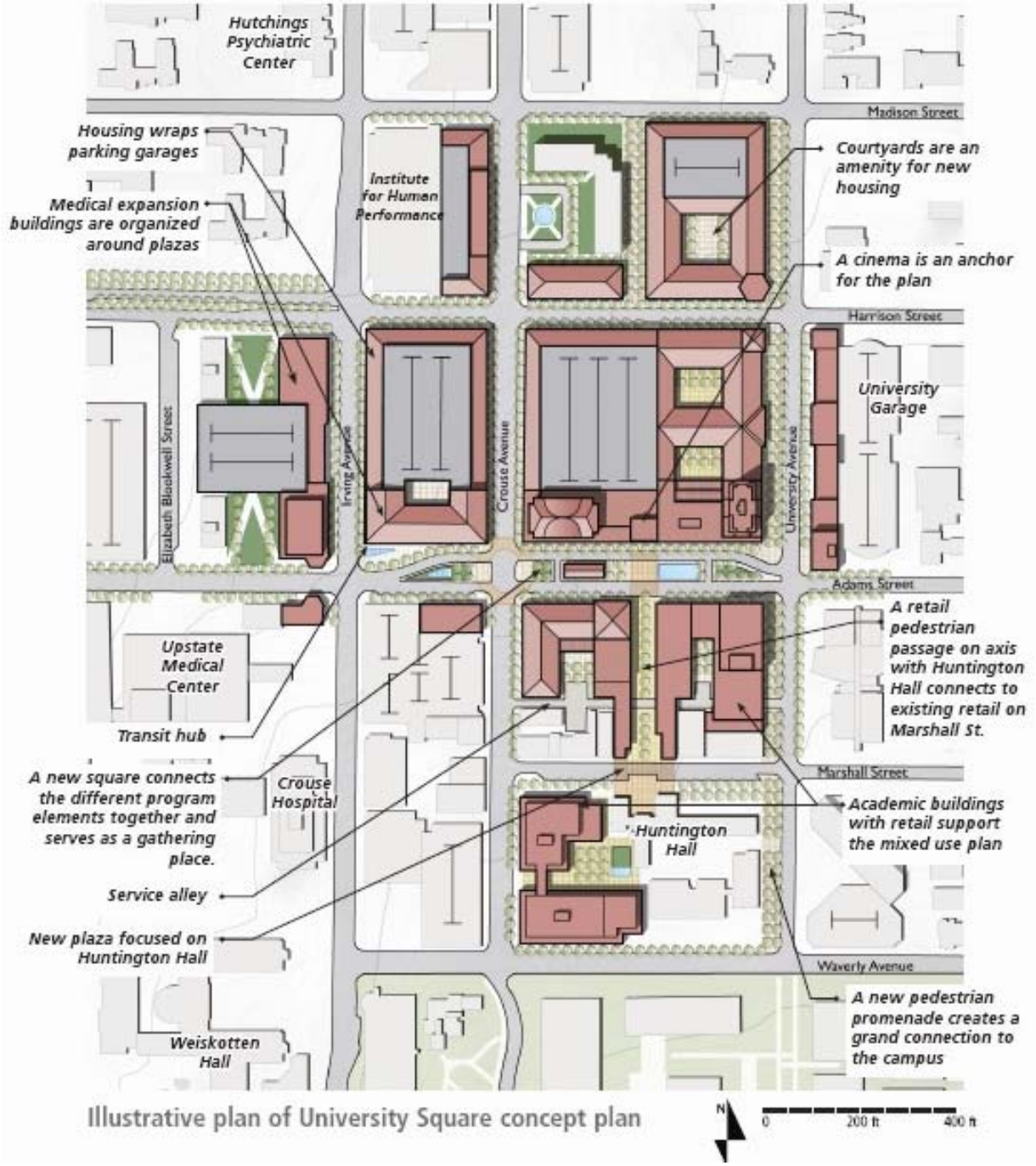


FIGURE 5. ILLUSTRATIVE PLAN OF UNIVERSITY SQUARE CONCEPT PLAN



The concept plan is organized around key elements:

Central Square – The central square on Adams Street serves as a new primary public space for University Hill. The square ties all the different land uses together so they are connected as one place. Retail, housing and institutional uses all draw strength from this vibrant open space that can be used year-round. A pedestrian passage or gallery connects the square to Marshall Street so that the two spaces can operate in tandem.

FIGURE 6. UNIVERSITY OF PENNSYLVANIA/SANSOM COMMONS MIXED-USE DEVELOPMENT, PHILADELPHIA, PA

Source: WRT

Retail – Retail is one of the primary tools for creating walkable streets. Window displays and sidewalk cafes make walking more enjoyable. In addition, retail is an amenity for employees, students and residents. The concept plan creates new retail frontages on the central square, Marshall Street, the pedestrian passage and along University Avenue at selected locations. Smaller corner stores would be appropriate in virtually any location on University Hill. The Land Use Concept proposes approximately 281,000 square feet of total retail (including the new campus bookstore). The Land Use Concept proposes to replace approximately 90,000 square feet of existing retail, for a net gain of 211,000 square feet.

FIGURE 7. CONCEPTUAL RENDERING FOR ADAMS STREET AT CROUSE AVENUE

Source: WRT

FIGURE 8. EXISTING CONDITIONS ALONG ADAMS STREET AT CROUSE AVENUE

Campus Bookstore – Following a model established at similar universities, a new campus bookstore serves as a retail anchor and a community gathering point. With a size of 50,000 square feet, the store occupies three floors of a new mixed-use building. However, it does not occupy the entire street frontage. The store is pulled back away from the street to allow for smaller stores to line the outside of the building to create more retail variety. Similar bookstores have been constructed at many college campuses.

Cinema – Movie theaters help to support retail, restaurants, bookstores and night life. A new multi-screen theater provides another retail anchor and amenity for University Hill. The Land Use Concept proposes a theater with eight to ten screens and approximately 1,400 seats. The theater can share parking with other uses, since many patrons arrive after work or on weekends, when office employees have left. The cinema requires approximately 45,000 square feet of space. The theater employs a special design to minimize its impact on the district. The lobby faces the street, but the bulk of the theaters back up to the parking garage and is located on the second and fourth flours of a mixed-use structure. In this way, the ground floor is reserved for more productive retail space and the theater spaces can be wrapped with apartments.

Academic Space – Two major new academic buildings are accommodated within the Land Use Concept. These new buildings provide more than 380,000 square feet of academic space, replacing approximately 50,000 square feet in the existing buildings (Hoople and University College) on the site. In addition to academic space, the new buildings have 42,000 square feet of retail space and 220 underground parking spaces.

Medical Space – The Land Use Concept shows two new medical-related buildings in the heart of University Hill, containing 400,000 square feet of medical space, 20,000 square feet of retail, and a new daycare center. The new medical space gains value from being located on active streets that have amenities for patients, family and staff.

Office Space – The Land Use Concept shows a nominal amount of general office space (55,000 square feet). A need for this land use category was not emphasized by the institutions during the interviews with the institutions. However, more office space and less residential could be provided by reducing the residential or medical program or by increasing the density of the land use concept.

Housing – Housing is critical to creating a mixed-use University Hill, because it provides local places for employees and students to live, evening activity, a base of customers for retail, and reduces the numbers of commuters who are driving to University Hill. The Land Use Concept provides for approximately 970 housing units at an average size of approximately 1,100 square feet within each unit (as well as additional space for corridors and services). The housing is built within three types of structures: buildings

which wrap garages, low-rise courtyard residential buildings, and mixed use towers with ground floor retail. These building types can employ different construction types and be targeted at different market segments. High-rise apartments provide sweeping views and a high level of amenity. Courtyard apartments offer intimate spaces and a connection to street life. The residential that wraps the garages can be designed as townhouses or as flats. These buildings can create a pleasing streetscape of individual stoops, porches and entrances.

Artists' Studios and Galleries – Ground level space not desired for retail can be used as artist studio space. Any retail space can be left in a mostly “raw” state (that is to say, with very little tenant fit-out), and function very well as an artist co-op. For example, a pottery co-op requires only working space and machines, storage space, bathrooms, a kiln and a minimal office. Creating low-cost studio space that is open to artists can help to support a gallery district that becomes an area attraction, while providing an interesting environment at sidewalk level. Since many artists work in the evenings, this will also provide evening sidewalk activity.

2B. Establishing the Character of a Mixed-Use District

Mixed-use is an important strategy for creating walkable districts that are both efficient and vibrant. Mixing different land uses together creates the opportunity for contact and interaction (sometimes called co-presence) of individuals who would not otherwise be in proximity. In economic terms, it means that a variety of mutually supporting activities are accessible. In social terms, it means that there is an opportunity for people-watching and socializing in a shared environment. This pays dividends in terms of employee satisfaction and attractiveness to talent.

While the development program provides the basic ingredients for development, the sense of place is created partly through the execution of the architecture. Each building in the development ensemble has a part to play in defining spaces that are active. Building façades form the walls of an outdoor room. In order to encourage pedestrian activity and a sense of place, the buildings must be designed to provide a sense of “eyes on the street.” There must be a sense of psychological connection between pedestrians and the people they imagine to be watching from nearby windows. This feeling of surveillance—of space being monitored—contributes greatly to a sense of safety and well being of pedestrians. Designing buildings with numerous entryways, stoops, porches and courtyard breezeways will enable many people to enter and exit the sidewalk, and provide visual interest and a lively to-and-fro activity.

It is not necessary for any one building to rise to the level of architectural greatness or notoriety in order to achieve a great street. It is far more important that buildings create enjoyable places to meet friends and have lunch or see a movie than it is for them to impress the architectural elite. In the end, a dynamic sidewalk life is an important factor

that will entice people to choose University Hill as a place to work, study, live or just visit. One way to help ensure that new buildings provide a pedestrian-oriented character is through design guidelines. Such guidelines are a help to architects in creating buildings that meet the goals for the overall district.

On the following pages are illustrations of the components of mixed use and the way that a space can be shared by different types of users.

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FIGURE 9. THE ELEMENTS OF MIXED USE

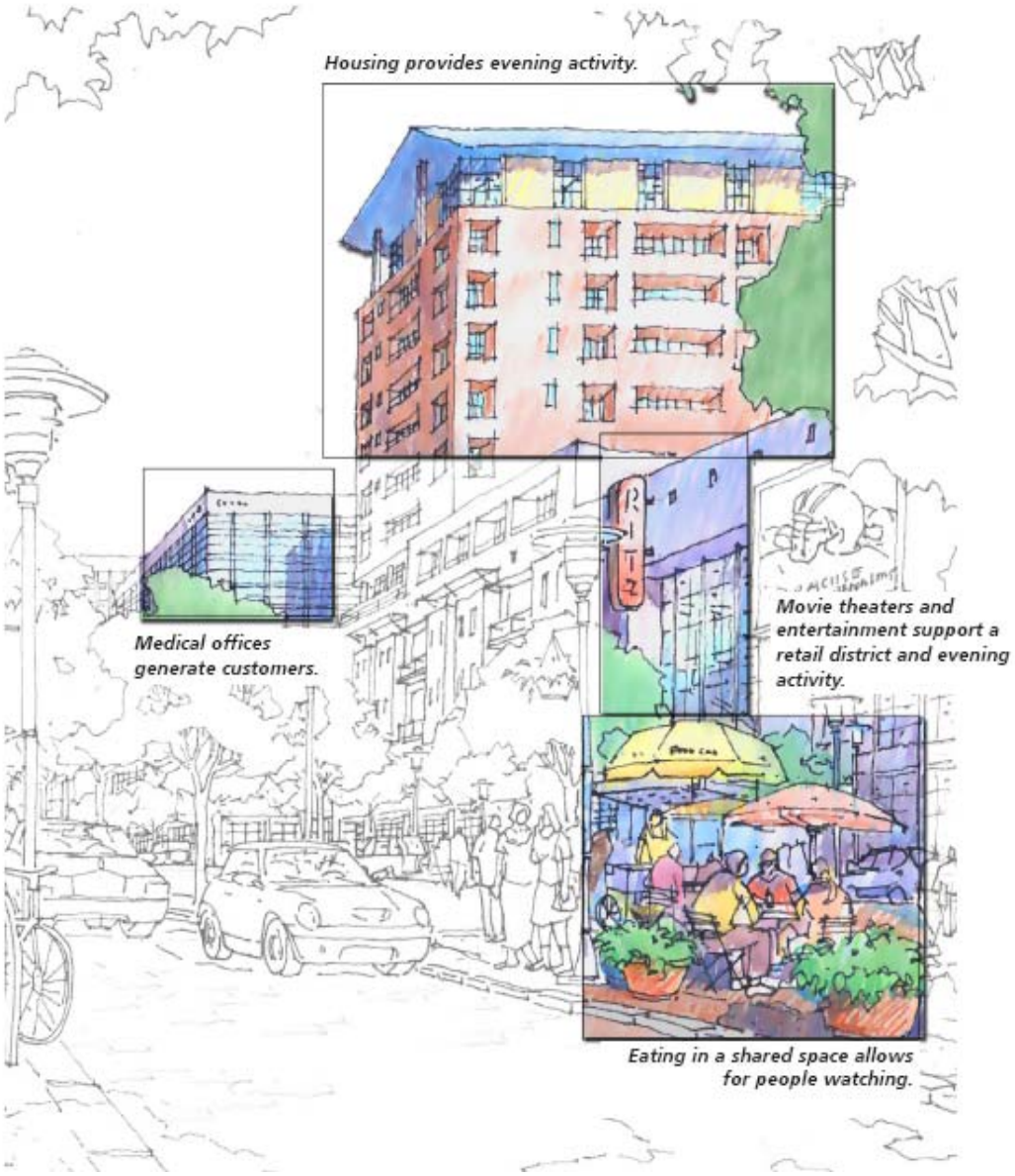
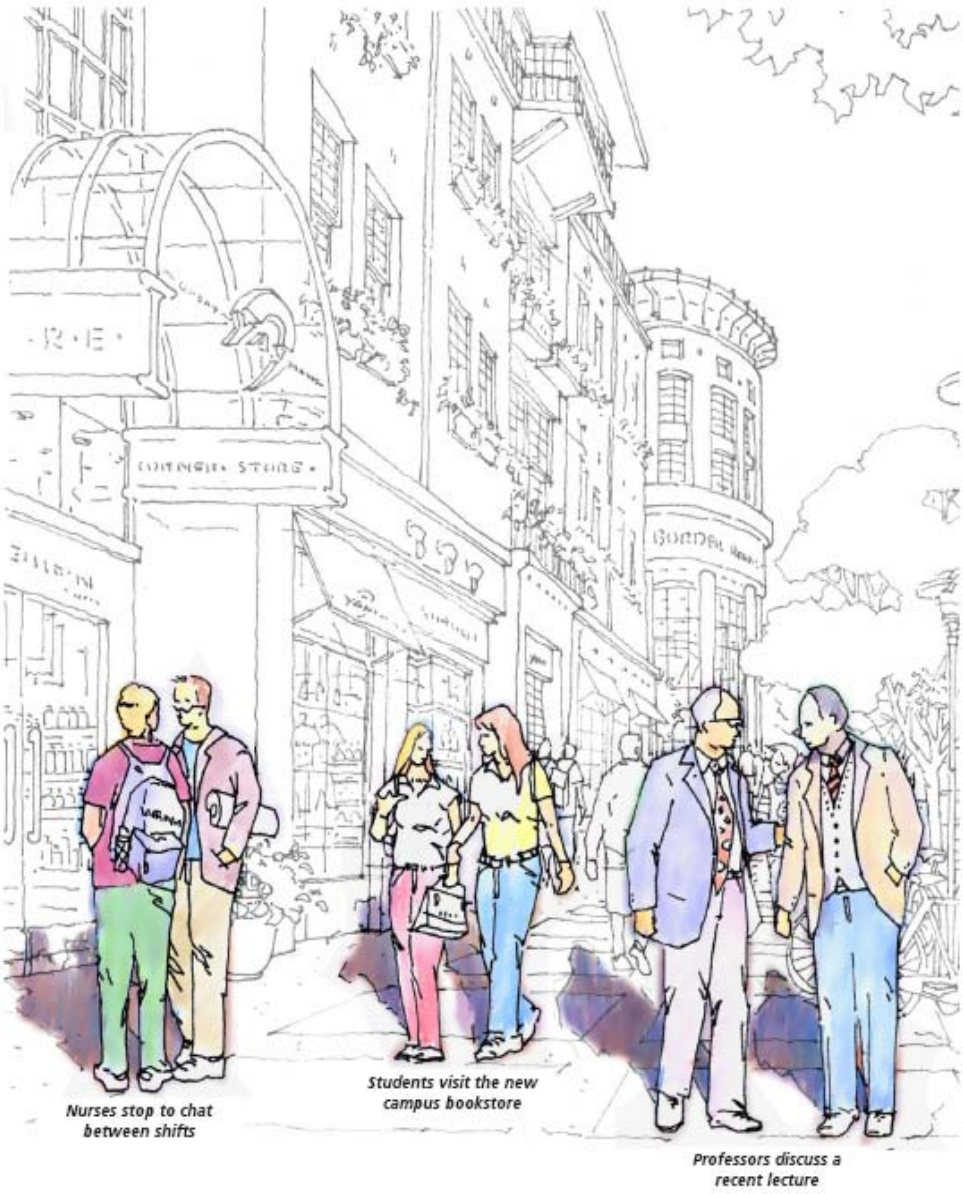
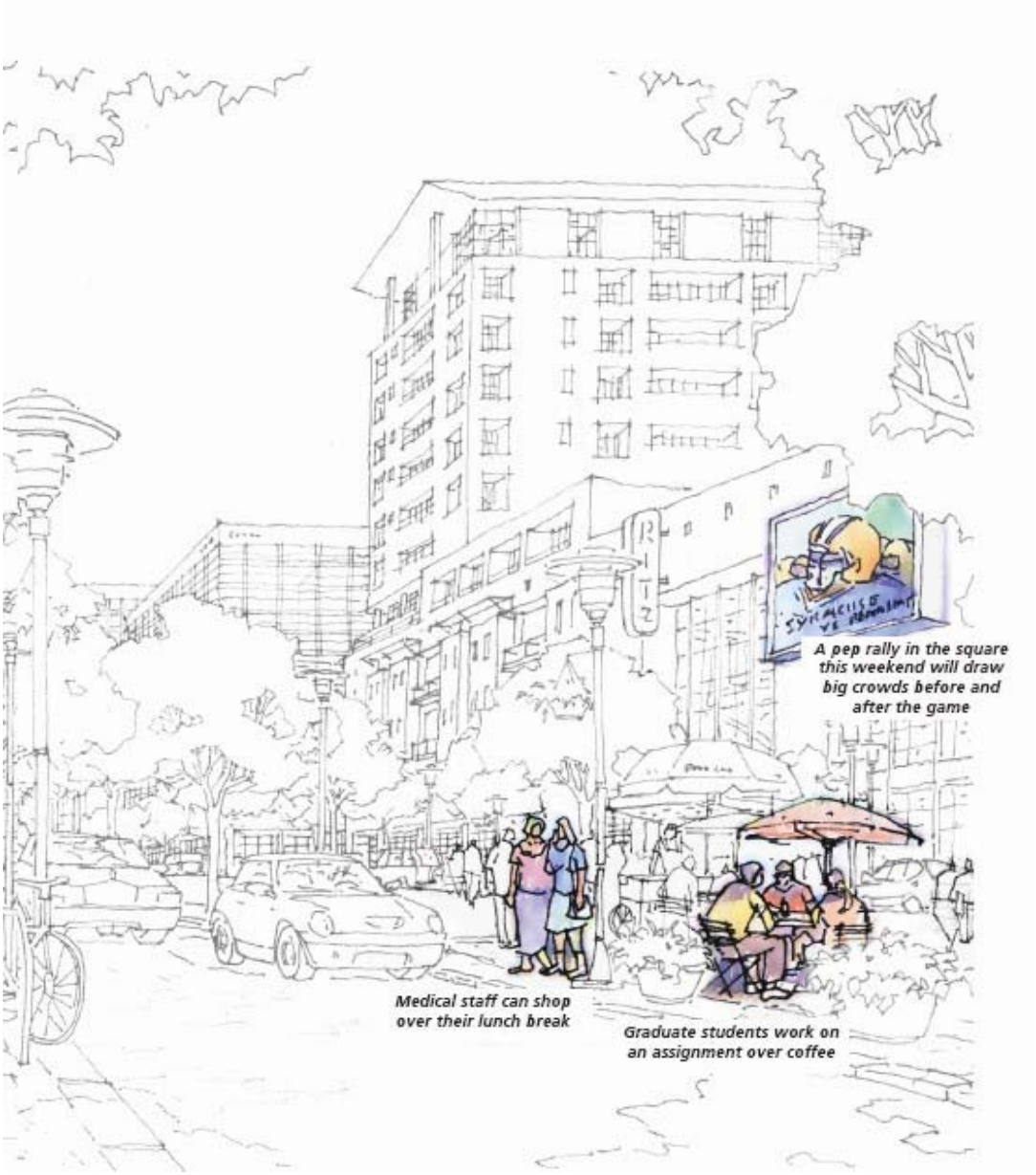

Housing provides evening activity.
Medical offices generate customers.
Movie theaters and entertainment support a retail district and evening activity.
Eating in a shared space allows for people watching.

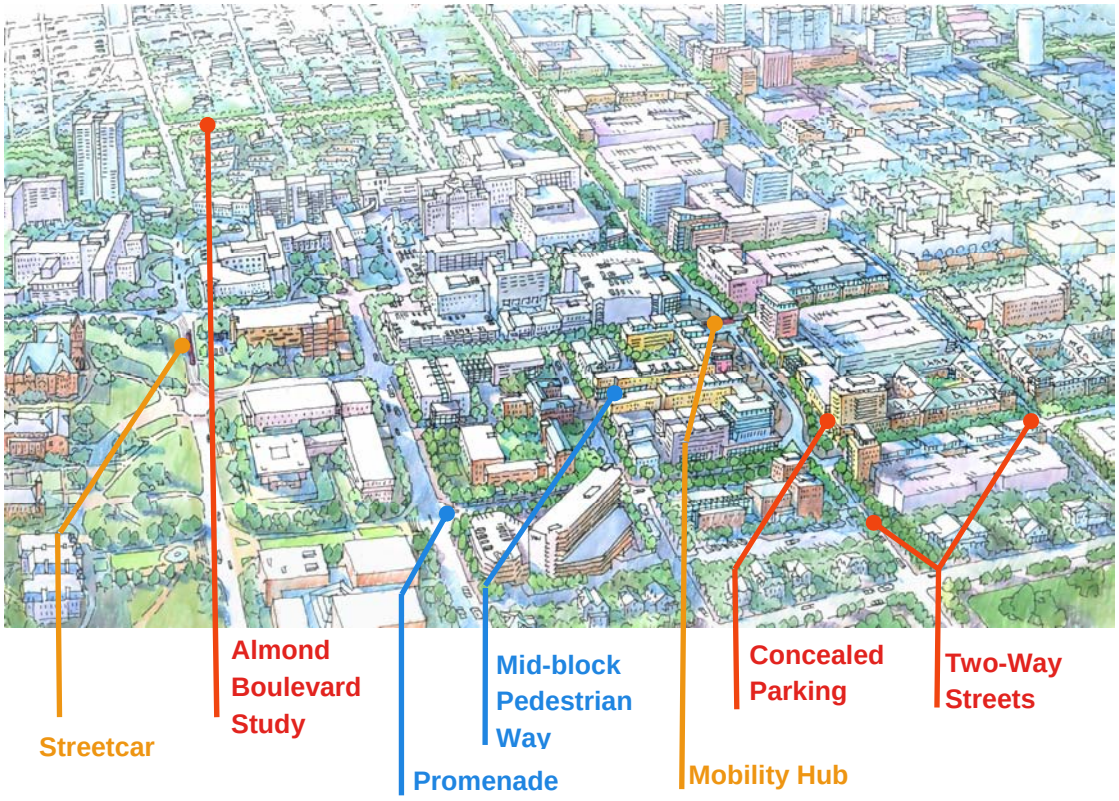
FIGURE 10. THE ELEMENTS OF MIXED USE




A pep rally in the square this weekend will draw big crowds before and after the game
Medical staff can shop over their lunch break
Graduate students work on an assignment over coffee

Mixing land uses is a critical component of achieving better places to live. Putting uses close together makes alternatives to driving, such as walking or biking, more viable and provides a more diverse and sizable population and commercial base for supporting viable public transit. Mixing land uses is a strategy for accommodating increasing travel demand with fewer and fewer resources. It carefully integrates transportation projects with land use planning and community design, which can enhance quality of life, mobility and economic vitality.

FIGURE 11. RECOMMENDED SUPPORTING TRANSPORTATION ELEMENTS



The mixed-used development also supports walking, biking and transit. It can be integrated with other transportation recommendations as shown in Figure 13. As a result, additional benefits of Mixed-Use Development would include:

- Make transit use more convenient and increase the number of potential riders within 5-minute walking distance of bus stops;
- Increase the number of residents within a 10-minute walk of the Connective Corridor and the major University Hill employers;
- Extend the average time a pedestrian will walk and grow the bicycle/pedestrian-commute mode share. Create block faces with excellent bicycle and pedestrian facilities;

- Reduce demand for parking, increase the viability and number of off-site public park and ride lots, and encourage institutions to jointly manage and share parking spaces and facilities;
- Reduce energy use, reduce CO_2 emissions and improve air quality; and
- Attract students seeking to live off-campus, thus relieving conflicts with residences in other nearby neighborhoods.

The concept and its benefits are more fully explained in the Land Use Concept Report (November 2006) prepared as part of this study.

FIGURE 12. OHIO STATE UNIVERSITY – SOUTH CAMPUS GATEWAY

Source: WRT

FIGURE 13. LAND USED FOR PARKING IN UNIVERSITY HILL

Source: WRT 2006

SECTION THREE – INTEGRATED PARKING STRATEGY

Convenient and inexpensive parking is often perceived as a prerequisite for successful development. It is not an unreasonable perception given our current practices and policies. In addition, employees like the convenience of quick access to their cars, and students often prefer driving to stores or nearby activities instead of walking or biking.

However, satisfying that demand for parking has caused some important trade-offs in the quality of the University Hill area. For example, multi-story parking structures with non-pedestrian-friendly facades dominate much of the core area of University Hill. Surface parking leaves many aesthetic holes in the streetscape, making it undesirable to walk between activities. Institutions must use limited funds to provide parking facilities instead of spending those funds on more functional buildings.

In addition to the 1,500 additional spaces recently constructed in new garages, the institutions are planning an additional 3,900 spaces on University Hill. This could seriously impact the appearance and mode share of University Hill. In order to improve accessibility, flexibility, economic viability and sustainability in the area, the study makes four major parking recommendations including:

- Shared parking;
- Wrapped parking;
- Parking pricing and management; and
- Remote parking

Each is explained below.

3A. Shared Parking

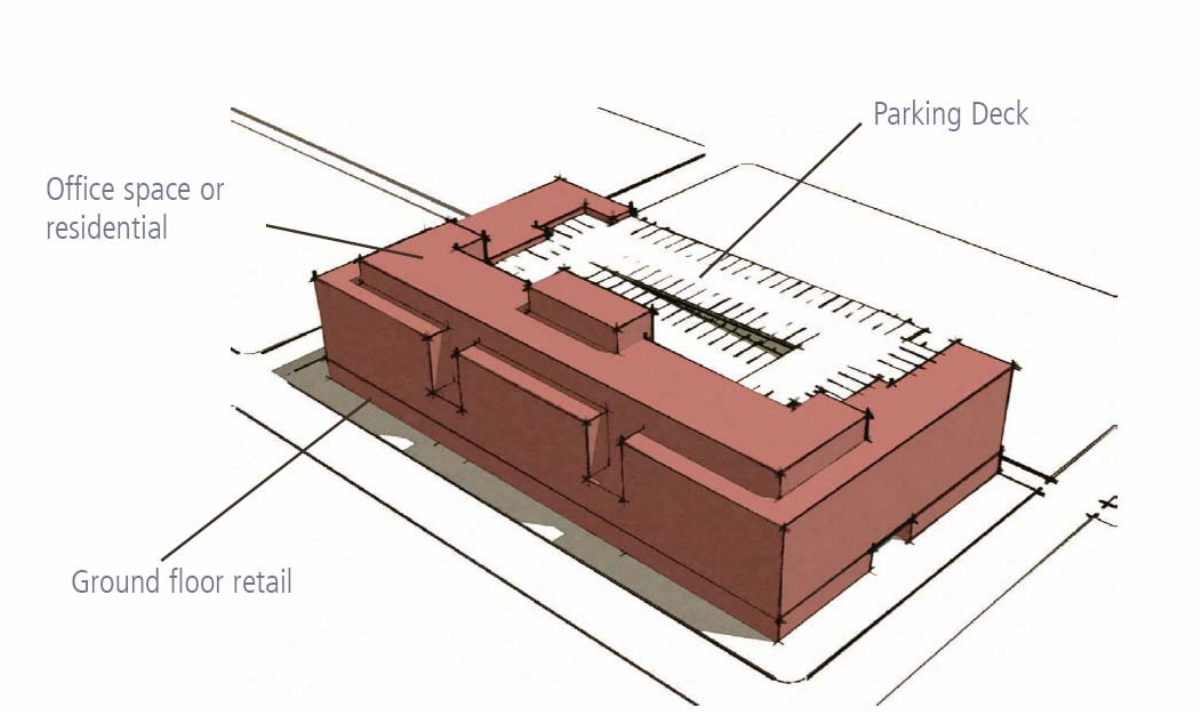
The recommended mixed Land Use Concept incorporates the use of shared parking facilities to reduce overall demand. Parking would be provided in several large above and below ground garages. It is recommended that parking be shared among the different uses. For example, spaces used by daytime employees can be used at night by residents who work elsewhere during the day. Similarly, daytime parking could be used by attendees of the cinema.

The Land Use Concept provides approximately 3,800 spaces. Because the concept places buildings on some existing surface parking lots, these spaces are replaced within this concept. As a result, the net reduction in additional supply is much higher than it appears.

The overall parking demand was calculated using the Urban Land Institute's Shared Parking Model. The approach is based on the principal that parking can be shared since

peak periods for different land uses do not always overlap. The result is the model predicts a need for approximately 3100 additional spaces which is a reduction of 700 spaces. Additional detail regarding the shared parking allocations and modeling is provided in the "Land Use Concept – Institutional Focus Group Memorandum No. 2" (November 2006).

FIGURE 14. WRAPPED PARKING CONCEPT



3B. Wrapped Parking

Parking garages and surface parking lots can have a negative impact on the attractiveness and walkability of University Hill. Parking represents "dead space" in the public realm, because it does not generate activity. In some cases, parking facilities create hostile pedestrian environments that discourage walking or create unsafe conditions.

The impacts of parking can be mitigated through the requirement of wrapped parking. Wrapped parking lines the facades of garages and surface lots with liner buildings that generate activity and put "eyes on the street." Even the most elegantly designed facades of parking garages are sterile walking environments. The liner buildings can include retail activity on the ground and offices or residences on upper floors. This increased activity improves safety at the entrances and exits to parking and allows the building to improve the aesthetic character of University Hill.

FIGURE 15. WRAPPED PARKING WITH GROUND FLOOR RETAIL, BOULDER, CO

Source: WRT

In addition, entrances and exits to parking structures should be located on side streets and not along major pedestrian corridors such as Adams Street, Harrison Street, or University Avenue. Where feasible on Crouse Avenue and Irving Street, special consideration should be given to the "hole in the façade" created by the garage access points. Mid-block service roads should be used as an alternative if feasible. This practice will improve safety and visual interest for walkers and bikers while minimizing conflicts with transit operations.

3C. Parking Pricing and Management

The completion of a parking pricing and management study is recommended to improve parking conditions on University Hill. The aim of the study would be to determine the feasibility of creating a centralized parking authority to manage all institutional parking facilities on University Hill. This would relieve the individual institutions of the responsibility and allow them to focus on their core missions.

Alternative institutional arrangements should be evaluated, and as part of the analysis, the feasibility of enabling the University Hill Corporation to take on this role should be examined. The University Hill Corporation also should be considered as the potential manager of institutional transit as well. Currently, there are three independent employee transit shuttle operations in the study area. Centralized coordination of the shuttles could help to mitigate employee perceptions about the new parking pricing and policies. Legislation to amend the Corporation's charter may be required.

In addition, the effect of parking pricing and its impact on auto travel demand and transit use should be examined. Currently, parking is often free or relatively inexpensive for employees of the institutions. By increasing parking prices to their true cost to the institutions (including construction, financing and operational costs), two benefits could accrue. The most obvious is the financial benefits to the institutions.

The less obvious is the potential increase in transit use. Essentially, high parking prices at destinations on University Hill are required if increased transit use is desired. This can be mitigated through the use of the recommended prioritized transit system and the use of remote park-and-ride facilities, such as the proposed West Street Mobility Hub. The effect of this strategy will be few auto trips traveling to University Hill, less institutional financing of parking and similar accessibility for employees than will exist under congested conditions. Additionally, by making it less expensive to use transit, ridership will be higher thereby making the transit investment more efficient.

3D. Remote Parking

In addition to the parking incorporated into the West Street Mobility Hub, other locations to remotely provide low cost parking should be explored. This is paramount to reducing the need for 3,900 additional parking spaces on University Hill. The siting of the facilities should be done in coordination with planning for meeting the demands for parking and accessibility to Downtown Syracuse, which is being considered by the Metropolitan Development Authority.

The locations should be able to incorporate Mobility Hubs and provide a typical commute time that is shorter from "door-to-door" for commuters. The most obvious locations would have convenient, immediate access to I-81 and I-690. The facilities should be designed as "wrapped" parking facilities so that they provide an aesthetically pleasing and dignified portion of the commuting trip.

SECTION FOUR – PRIORITIZED TRANSIT NETWORK

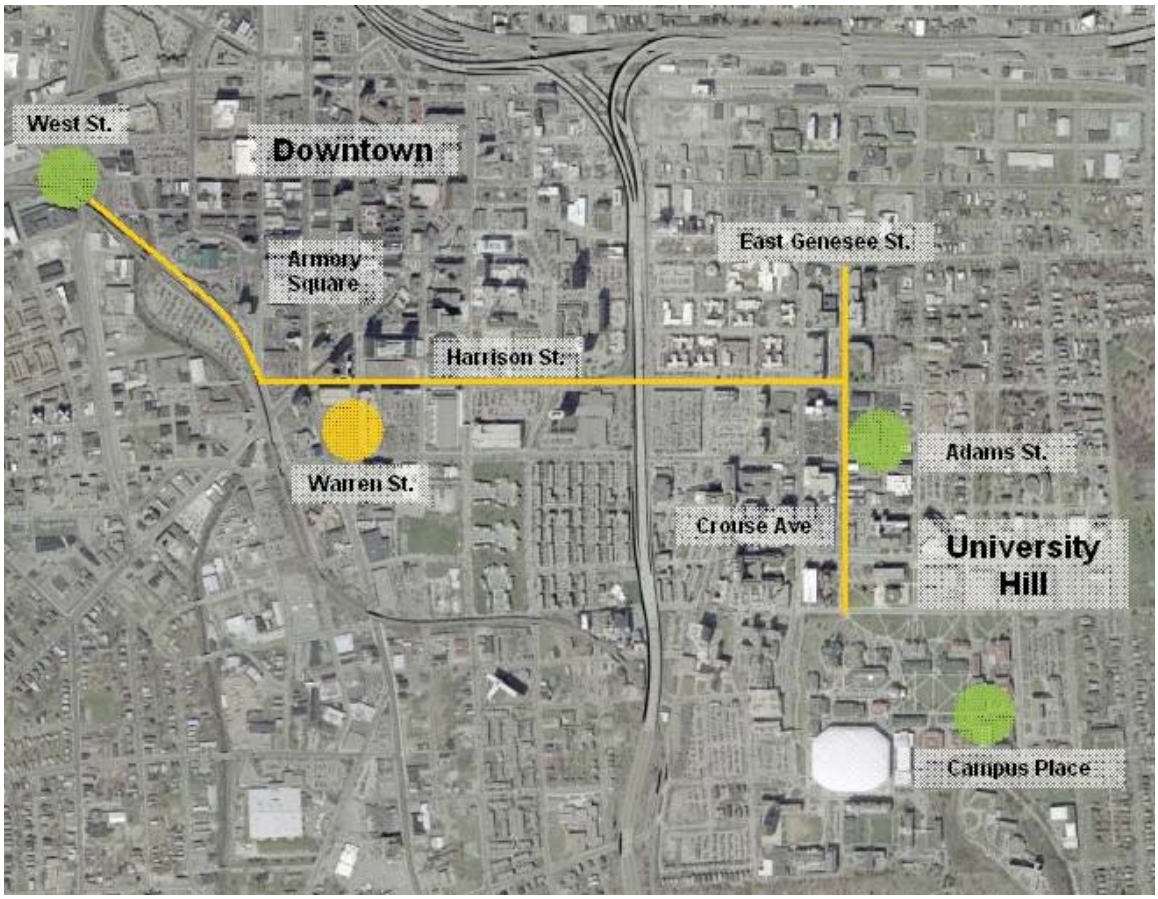
In addition to the creation of the transit- and pedestrian-oriented mixed-use development discussed in Section Two, three other major transit improvements are recommended to form a Prioritized Transit Network. These include:

- Streetcar service along the same route and continuing through Armory Square to West Street;
- Bus Rapid Transit (BRT) along Harrison and Irving/Crouse Streets between Syracuse University and CENTRO's Syracuse Commons; and
- A Mobility Hub Network.

FIGURE 16. PORTLAND STATE UNIVERSITY – COLLEGE OF URBAN STUDIES AND TRANSIT SERVICE, PORTLAND, OR

Source: WRT

FIGURE 17. TRANSIT SPINE AND MOBILITY HUB LOCATIONS



The combined streetcar and BRT would create a transit spine to serve both Downtown and University Hill. By establishing a priority system for transit, the system would be designed to make travel by bus as rapid and convenient as by car. In addition, potential riders would be able to easily recognize the transit facilities. The net effect of frequent bus and streetcar service would be the equivalent of a "moving sidewalk" with recognizable and reliable service.

The prioritization could also benefit regional traffic by getting express buses to and from the interstate system more quickly than automobiles on University Hill and Downtown. Modeling forecasts conducted as part of the study showed that 500 potential drivers per day would switch to traveling by BRT alone. This is a 2 percent increase, which can be considered significant.

Prioritized transit could serve as an attractive, less costly option to the full cost of a car trip, which will reduce the demand for free parking and maximize the amount of developable space in University Hill. This could be enhanced by the use of a Mobility Hub (which includes a park and ride facility) at the terminus of the route along West Street. West Street connects to I-690 and I-81 for travel north and west of downtown.

The majority of employees traveling to and from University Hill live northwest of Downtown.

Prioritized transit could attract new, mixed-use, transit supportive land uses clustered around transit hubs and priority routes. In turn, this could help reduce roadway congestion, improve air quality, reduce auto dependence and enhance quality of life.

4A. Streetcar System

A potential streetcar alignment that would connect Armory Square to the Syracuse University Campus is recommended. The route would include Harrison Street and Crouse Avenue on University Hill, the alignment of one of the city's former streetcar lines. A more detailed study of potential ridership, conceptual design and costs should be completed in the near term to refine this recommendation.

Another potential streetcar alignment that would also connect downtown to the Syracuse University Campus would be along Genesee Street along Irving Avenue. This alignment would promote the Arts District and provide an essential connection between University Hill's different districts, in addition to downtown.

TABLE 1. STREETCAR SYSTEM SUMMARY

Streetcar System Summary

Route Distance:	1.8 miles
Top Speed:	30 mph
Average Speed:	12 mph
One way trip time:	9 minutes
Roundtrip Time:	18 minutes
Recovery Time:	3 minutes
Headway:	6 minutes
Vehicles Required:	4 + 1 spare

FIGURE 18. STREETCAR, PORTLAND, OR

Source: WRT

A combination of a streetcar, limited parking and excellent pedestrian amenities can create a new urban living option in University Hill. Streetcar systems operate on electric rails embedded in street surfaces and often travel in lanes shared with other vehicles. Streetcars normally operate over short distance (under 5 miles) with short station spacing (every few blocks) and emphasize mobility and accessibility rather than speed. Because they travel at moderate speeds and don't require exclusive right-of-ways, streetcars can operate safely in high-pedestrian areas where roadway capacity and parking are scarce. This form of rail transportation offers passengers smooth, quiet rides, comfortable interiors and relatively easy boarding at operating costs equivalent to, or less than, those of a bus. The high quality of service provided by streetcars attracts a wide range of riders.

The general size and appearance of a streetcar makes them distinguishable from buses. They are also different and less costly than a light-rail service because they require few amenities for passengers and can be fully integrated with other forms of transport and pedestrian activity, making simultaneous use of the street.

In urban neighborhoods and university campuses, especially, where land-use and planning promote pedestrian activity, streetcars serve as "pedestrian accelerators,"

extending the distance of short trips that can be made on foot. As a result, transit users and pedestrians can travel more easily to a greater selection of destinations. Drivers are able to park their car once, and use the streetcar to access other locations without having to drive and find a new parking space for their car. In this way, people are encouraged to enjoy the variety of dining, shopping, entertainment or cultural opportunities available in their extended neighborhood.

Streetcars can also provide convenient connections to regional rail services and are effective at encouraging commuters and other drivers to park their vehicles at outlying stations and ride transit to their destination. This can result in the need for fewer downtown parking spaces, and downtown streets that are less congested with private vehicles.

The level of visibility and transparency typical of streetcar systems is an important catalyst for improved accessibility. Unlike bus or subway routes, streetcar tracks are clearly identifiable and within plain sight so that even infrequent visitors to neighborhoods served by streetcars can become familiar with the streetcar's route without consulting route maps or schedules. Unlike other rail systems, short stop spacings and the ability to view the outside environment allows riders to feel confident that they are traveling in their desired direction and that they will be able to arrive within close proximity to their desired destination. For these reasons, streetcars can attract riders who may normally be intimidated by mass transit, such as tourists and occasional visitors.

Streetcars would be an attractive transit option for a variety of users, increasing ridership and providing direct access to employment, education facilities and health care for residents with a mix of incomes and abilities. As a critical piece of the transit priority corridor, it could increase the mode share for transit and increase the number of transit options, which can reduce transit travel route times.

Streetcars are appealing to more people, while offering a less costly trip than the full cost of a car trip. It would preserve the much needed auto capacity in University Hill because it can be seamlessly integrated into the roadway.

Portland, Oregon opened the first modern streetcar system in North America in 2001. The Portland Office of Transportation and Portland Streetcar, Inc. worked together, as part of a unique public-private partnership to link investment in high-quality transit service with major new- and re-development. Since the Portland Streetcar opened, over $2.28 billion has been invested, 7,248 new housing units and 4.6 million square feet of office, institutional, retail and hotel construction have been constructed within two blocks of the streetcar alignment. The streetcar alignment has enabled developers to build new residential buildings with significantly lower parking ratios than anywhere else in the city.

Additional case studies from North America as well as additional information on funding are provided in Appendix B.

FIGURE 19. DEDICATED BUS RAPID TRANSIT LANE

4B. Bus Rapid Transit/Prioritization

In order for transit to succeed in any urban area, it must emulate the qualities that are associated with the automobile, including frequency, flexibility, reliability, speed, convenience and ease of use. Transit corridors equipped with enhancements like bus-only lanes, bus rapid transit, signal prioritization, queue-jumping lanes and other technologies significantly improve transit service by separating buses from the automobile environment so they can successfully compete with vehicles as a viable mode of transportation.

A potential alignment for a transit spine between West Street (Downtown) and University Hill is West Fayette Street, Clinton Street, Harrison Street, Irving Avenue and University Place (See Figure 19). This corridor could be equipped with signal prioritization and queue-jumping lanes to be a precursor for a full Bus Rapid Transit system. Crouse Avenue could serve as an alternative to Irving Avenue if Crouse Avenue were converted to a two-way street.

A transit corridor equipped with prioritization elements would provide employees, residents and visitors of University Hill with a reliable, convenient, speedy, frequent and easy-to-use transportation choice.

The increase in travel speed and convenience of transit could attract more riders, which would decrease automobile use demand. The transit line would be within a 5-minute walking distance of every major institution on University Hill, as well as adjacent to the Convention Center and CENTRO's proposed downtown bus transfer hub on Warren Street (between Adams and Harrison Streets).

4C. Mobility Hub Network

The study recommends the development of a mobility hub network to serve not only University Hill, but Downtown and the surrounding region. Initially the hub network is envisioned to include: a new hub on University Hill in the vicinity of the Adams Street and Crouse Avenue intersection; the Common Center in Downtown; and a new hub northwest of Armory Square along West Street. A programming and siting study should be performed to determine the size, mix of services and appropriate locations for the two new hubs. The Common Center is proposed for development along Warren Street immediately south of Harrison Street, which is proposed as the major transit spine.

The proposed hub network would stand out from ordinary transit stops since it would be equipped with better weather protection (i.e. heated shelters and rain canopies), bike storage facilities, improved transit service and user information, restrooms, site lighting and vehicle loading and layover bays (or curb extensions). The West Street Hub can also serve as a major park and ride facility allowing people to avoid congestion along the I-81 and Almond Street corridor. Properly implemented, it could be cheaper and quicker to access University Hill by parking on West Street and using the streetcar than it would be to drive to and park on University Hill.

The hubs can be attractive, community focal points that are designed to enhance the surrounding area and stimulate redevelopment efforts with economic activity. In this case, the hubs could also be a location for offering a shared car service such as Zip Car, within walking distance of the major institutions.

The hub can make transit more user-friendly by providing sufficient information to the rider while also making transit more appealing by providing amenities to transit users.

The hub can create a demand for more transit routes and/or frequency of buses, thereby reducing travel times and appealing as a convenient and reliable transportation option, not just for those that depend on it.

The hub can attract a wide variety of users, which will help to reduce the demand for free parking and therefore reduce the acreage of land used for parking and improve the environment.

High-density, mixed-use development can be integrated with the mobility hubs as long as land use policies are implemented to encourage this type of land use. Combined with the recommended reduction of free parking, investments in enhanced bicycle and pedestrian facilities between transit stops and key destinations and activity centers can decrease auto travel in the area.

CASE STUDY- MOBILITY HUB

TORONTO, CANADA

Urban transportation is evolving around the world to become more seamless and integrated. In Toronto, Canada, transportation professionals have created links between the city's transportation services that do just that. Toronto is building "Mobility Hubs" around the city that connect together various modes of sustainable transportation, including cycling, walking and transit. Residential, commercial and retail developments throughout the city are linked by a network of mobility hubs that provide easy access to buses, trains and streetcars; clean fuel taxis; car-share vehicles and bike-share bicycles; bike parking; a walkable environment; cafés and newsstands with wireless internet access; maps, trail guides and other tourism information; bike and rollerblade rentals and repair; real-time information on when trains, buses, and streetcars will arrive and depart; and payment and discounts integrated on one electronic smart card.

Toronto's New Mobility Hub network is a project of Moving the Economy (MTE), an organization whose mission is to spur the growth of sustainable transportation. The mobility hubs take a global approach to the challenges of getting around cities. It approaches matters of efficiency on par with matters of sustainable development, pollution and environmental impacts such as resource efficiency, energy conservation, public health and quality of life in communities. This agenda addresses the issues of sustainable transportation by emphasizing the supply side. It combines transportation demand management (TDM) strategies and measures for containing, challenging and limiting wasteful and encumbering private car traffic in cities, with coordinated support of a wide range of alternative transportation arrangements, like cycling, walking and transit.

The power of connectivity is driving the explosion of future transportation strategies and advancements. New technology, such as Integrated Mobility Systems (IMS) that use "Smart Card" technology, are enabling tools to access and link the range of urban and inter-city transportation options. The Internet brings the opportunity for web portals, which can provide transportation information and services, regionally and nationally, including door-to-door urban traveler information and the exchange of information by transportation professionals. The system saves time, money and frustration while connecting people to a variety of sustainable transportation choices.

Source: Moving the Economy (www.movingtheeconomy.ca)
SpacingWire (http://spacing.ca)

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SECTION FIVE – ALMOND STREET CORRIDOR IMPROVEMENTS

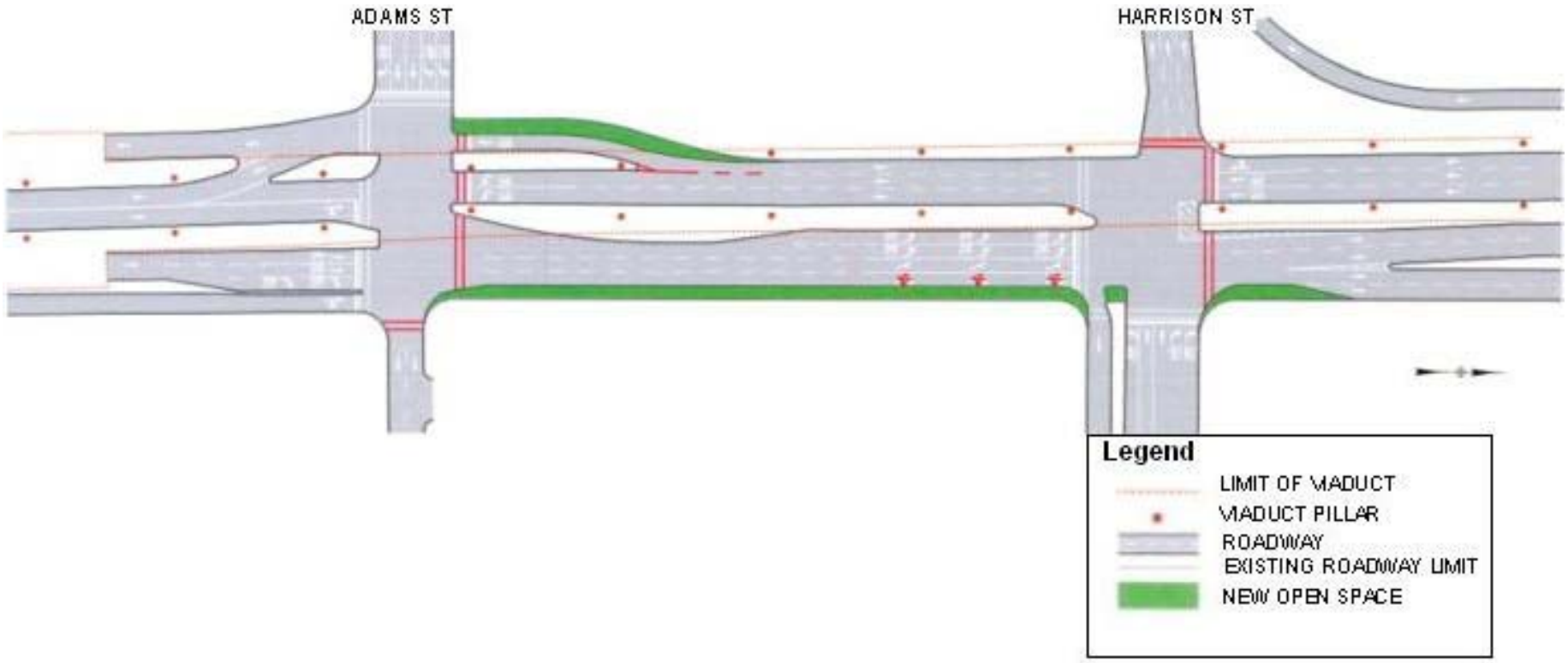
FIGURE 20. ALMOND STREET AT THE ADAMS STREET INTERSECTION

Almond Street is equal to ten lanes in width at the Adams Street intersection

A subject of improvements is recommended to improve pedestrian and bicyclist safety, help traffic operations and enhance the attractiveness of the Almond Street corridor. By improving its attractiveness, the desirability of walking in that vicinity, especially between Downtown and University Hill can be increased. The recommended improvements include:

- Narrowing of Almond Street between Adams Street and Harrison Street;
- Constructing modern roundabouts at the Adams Street and Harrison Street intersections; and
- Long-term study of the feasibility of creating an urban boulevard in lieu of the I-81 Viaduct.

FIGURE 21. ALMOND STREET NARROWING



5A. Almond Street Narrowing

Pedestrians seeking to cross the Almond Street/I-81 corridor would benefit from a narrowing of the corridor. There are no pedestrian facilities on the north legs of the Adams and Harrison Street intersections. The distance across the north leg of Adams Street is approximately 140 feet in width. Assuming facilities were installed on the north legs, the trip length is still discouraging. At an average walking pace of 4 feet per second, the trip would take 35 seconds if it were non-stop. However, because of signal operations associated with the three bays of travel in the corridor, the trip is more likely to exceed a minute and can exceed two minutes. This dramatically decreases the willingness to walk in this vicinity. The amount of time is even longer if a pedestrian follows the prescribed crosswalks across the three legs of the intersections as described in Viaduct/Corridor pedestrian treatment alternative.

As shown in the facing page, the alternative includes removal of one lane of travel at the far western and eastern edges of the corridor. The narrowing on the west side would only involve the slip lane between Adams and Harrison Streets. However, the narrowing on the eastern side could extend between Adams Street and Erie Boulevard if traffic operations permit. The lanes would be transformed into streetscape feature to make crossing the corridor more inviting. The eastern section of Almond Street could also be used to incorporate a bike boulevard. The alternative would likely be combined with the corridor treatment alternative discussed previously to overhaul the pedestrian experience in this vicinity. In addition, the narrowing of Almond Street could be an integral part of the Connective Corridor project.

The narrowing would improve accessibility for pedestrians creating more prominent pedestrian crossings and a more inviting environment. By providing a more direct route across Almond Street on the north leg of the intersections, pedestrians would have more options for crossing the corridor. It would also create an environment that attracts bicycle and pedestrian-friendly development and design, and increases the number of jobs within a 10-minute walk and the number of residences within a 10-minute walk of the major University Hill employers.

Economic viability would be enhanced by encouraging institutions to maintain facilities on both sides of the corridor without concern for accessibility by employees.

Increased walking would promote health and reduce air quality impacts of automobile travel. It would also improve community health by improving safety for pedestrians and bicyclists in University Hill, while providing a safe environment, which promotes walking and cycling, increases the percent of streets with landscaped street features, and creates an overall attractive community.

The narrowing should be combined with the creation of a more formal, landscaped gateway to University Hill. The gateway would create a welcoming entrance into the neighborhood and form a unique identity for the University Hill area, while creating an enhanced sense of arrival at somewhere special. The treatment also should be integrated into the Connective Corridor to reinforce the identity of the corridor and to improve its effectiveness.

The gateway treatment along Adam Street, Harrison Street and Almond Street also can help calm traffic. Traffic calming involves designing roadways in a manner that improves pedestrian and cyclist safety. Traffic calming techniques provide visual cues to motorists to slow down and be alert for pedestrians, bicyclists and other motorists. Typical traffic calming measures may include narrowing the street, strong vertical streetscape features, tight turn radii, bulb outs and curb extensions, on-street parking and textured or well-marked crosswalks. The addition of landscaping elements such as street trees also could be utilized.

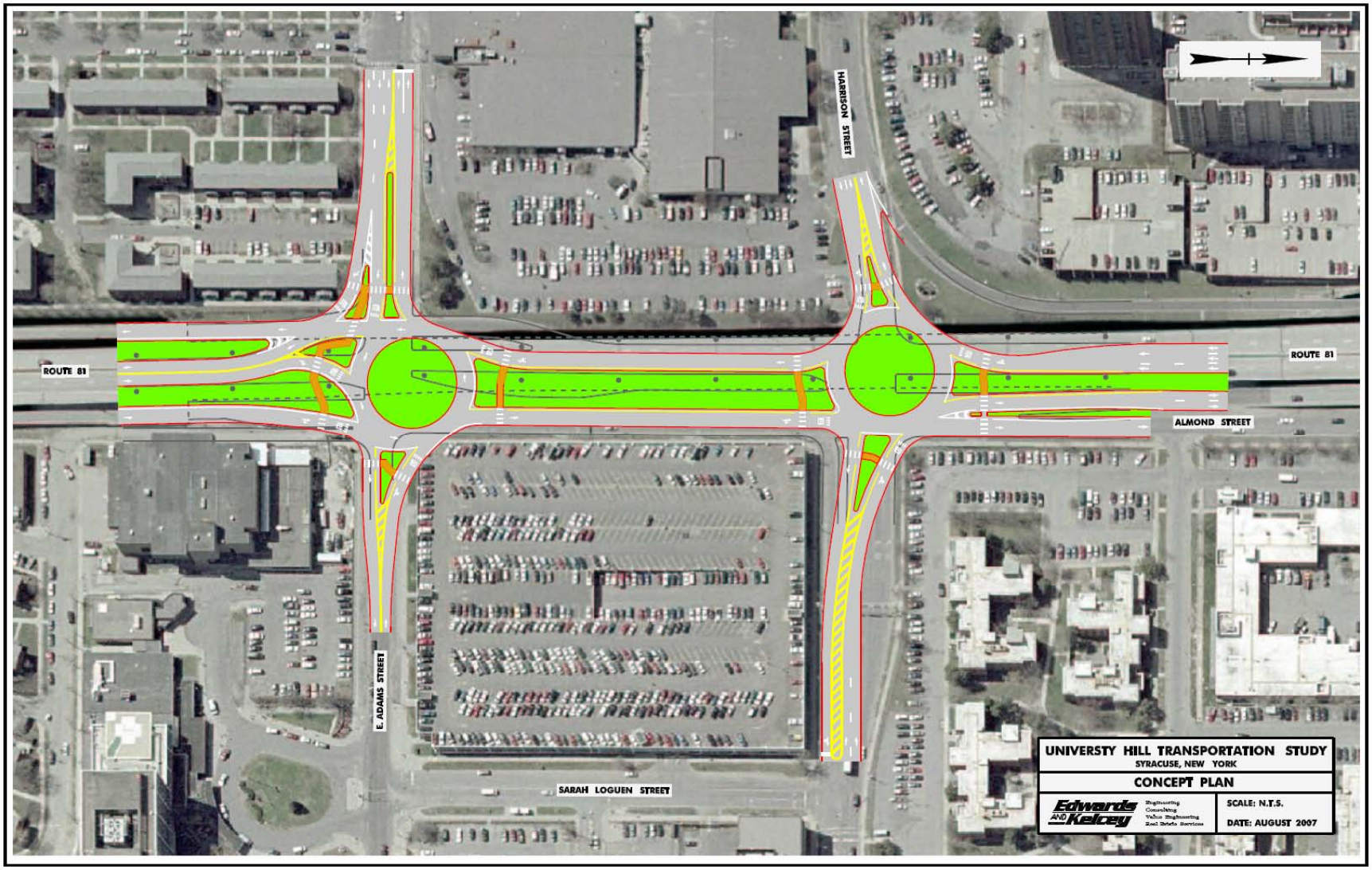
5B. Modern Roundabouts

The alternative includes the installation of two traffic roundabouts under the viaduct at the intersections of Almond Street with Adams and Harrison Streets. A modern roundabout is an unsignalized circular intersection designed to maximize safety and minimize traffic delay. Although the public is often skeptical of their utility and safety, roundabouts have been accepted enthusiastically once built.

FIGURE 22. MODERN ROUNDABOUT

Asheville, NC – Before and After Construction of Modern Roundabout in Urban Setting

FIGURE 23. DOUBLE ROUNDABOUT CONCEPT PLAN



The NYSDOT reports, “Roundabouts have proven to be particularly effective at places with moderate to high entering volumes and at the ends of freeway on and off ramps. In addition, they offer special advantages at intersections with more than four legs,” (NYSDOT, *A Citizen's Guide to Roundabouts*, March 2004). All of these characteristics apply along Almond Street at the Harrison Street and Adams Street intersections.

Safety is enhanced because the number of conflict points, as well as stop and go conditions, are reduced. In addition, the merging lanes that created confusion in old-fashioned traffic circles are eliminated. Since the roundabouts are relatively small, travel speeds are slower, creating more opportunities to enter circulating traffic and giving pedestrians safe crossing opportunities. The roundabouts use a combination of deflection in the travel lane approaching the roundabout to slow traffic, and a yield to traffic in the roundabout to create continuous, safer traffic flows. Pedestrian safety and mobility are also enhanced since pedestrians cross one or two lanes at a time, using the splitter islands as refuges before crossing the next lane(s).

FIGURE 24. A ROUNDABOUT USED TO ENHANCE THE AESTHETICS OF AN INTERSECTION

As shown in this illustration by Urban Advantage, modern roundabouts can be used to enhance aesthetics of an intersection. This is important, given concerns about the visual quality of the I-81 viaduct.

The design of the roundabouts could improve pedestrian access at these intersections. By reducing congestion, air quality could be improved. Public health and safety would also be enhanced by an increase in pedestrian activity. The roundabouts could help reduce travel time between I-81 and University Hill as well as between I-81 and Downtown Syracuse. As discussed in Appendix C, the roundabouts also can slightly improve air quality compared to no improvements in the study area.

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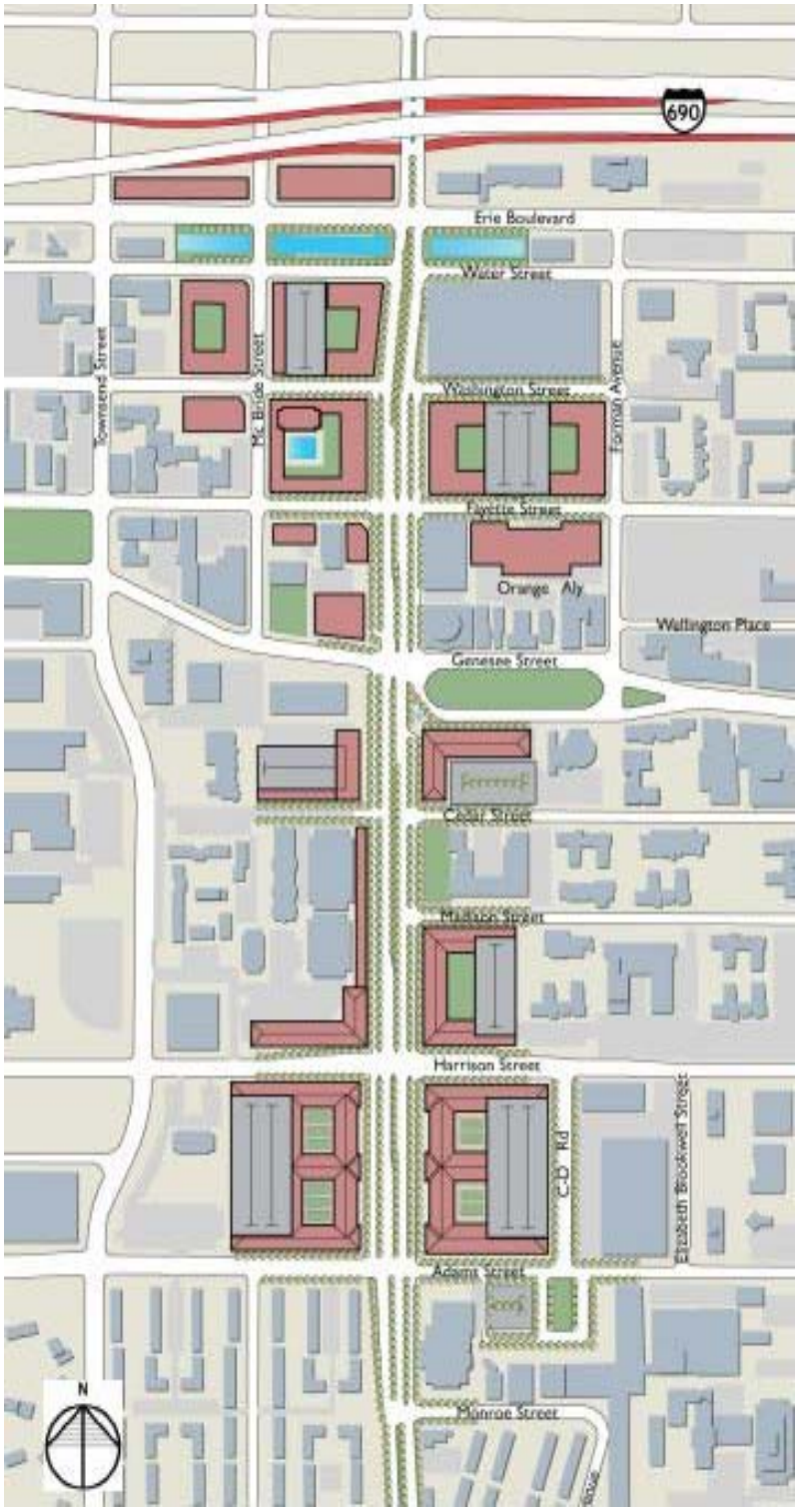
FIGURE 25. ALMOND STREET URBAN BOULEVARD



Source: WRT

SECTION SIX – ALMOND STREET – URBAN BOULEVARD

FIGURE 26. ELEVATED VIADUCT AND ALMOND STREET

The combination of the elevated I-81 Viaduct and the substantial width of Almond Street diminish the connection between Downtown and University Hill for all modes of travel (Image Source: WRT).

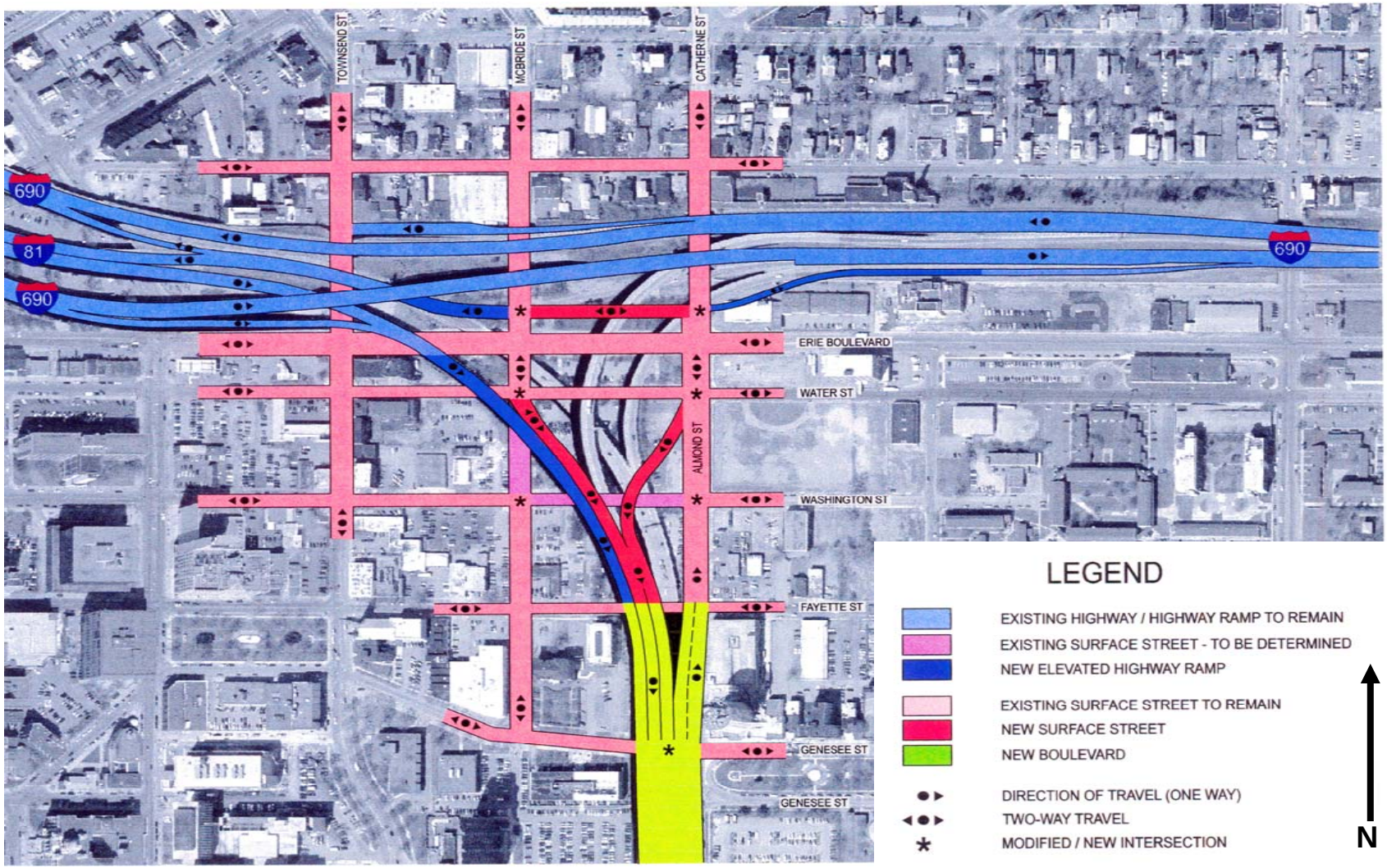
The Urban Boulevard concept involves creating a surface-level boulevard and removing a portion or the entire I-81 viaduct. Boulevards are roadways that typically include medians with landscaping, on-street parking, bicycle and pedestrian facilities and locations for transit stops. Boulevards are often designed to be multi-functional and accommodate multiple users.

The extent of the boulevard could vary significantly. A small-scale boulevard might extend between Burt and Harrison Street, coming back up onto the interstate system at the existing interchange of I-81 and I-690. A mid-scale boulevard could extend further south to West Castle Street. While this would have the advantage of connecting directly to the West Campus and the Dome, it would involve crossing the OnTrack line, which is also an active freight line.

A larger-scale boulevard concept would involve the reconfiguration of the I-81 and I-690 interchange. This would create additional real estate for mixed-use development while reducing the amount of elevated freeway, as illustrated in Figure 29. It could also reduce the costs associated with elevated roads, which are typically more expensive than surface roads.

The creation of an urban boulevard would require relocation of the I-81 route to I-481. For trips that have origins and designations south and north of the I-481, this may not significantly affect the trip length or travel time. However, the combined effect of the

FIGURE 27. URBAN BOULEVARD POTENTIAL INTERCHANGE CONFIGURATION



rerouting would be to significantly increase the total vehicle miles traveled in the region. It would also increase traffic volumes on Downtown streets.

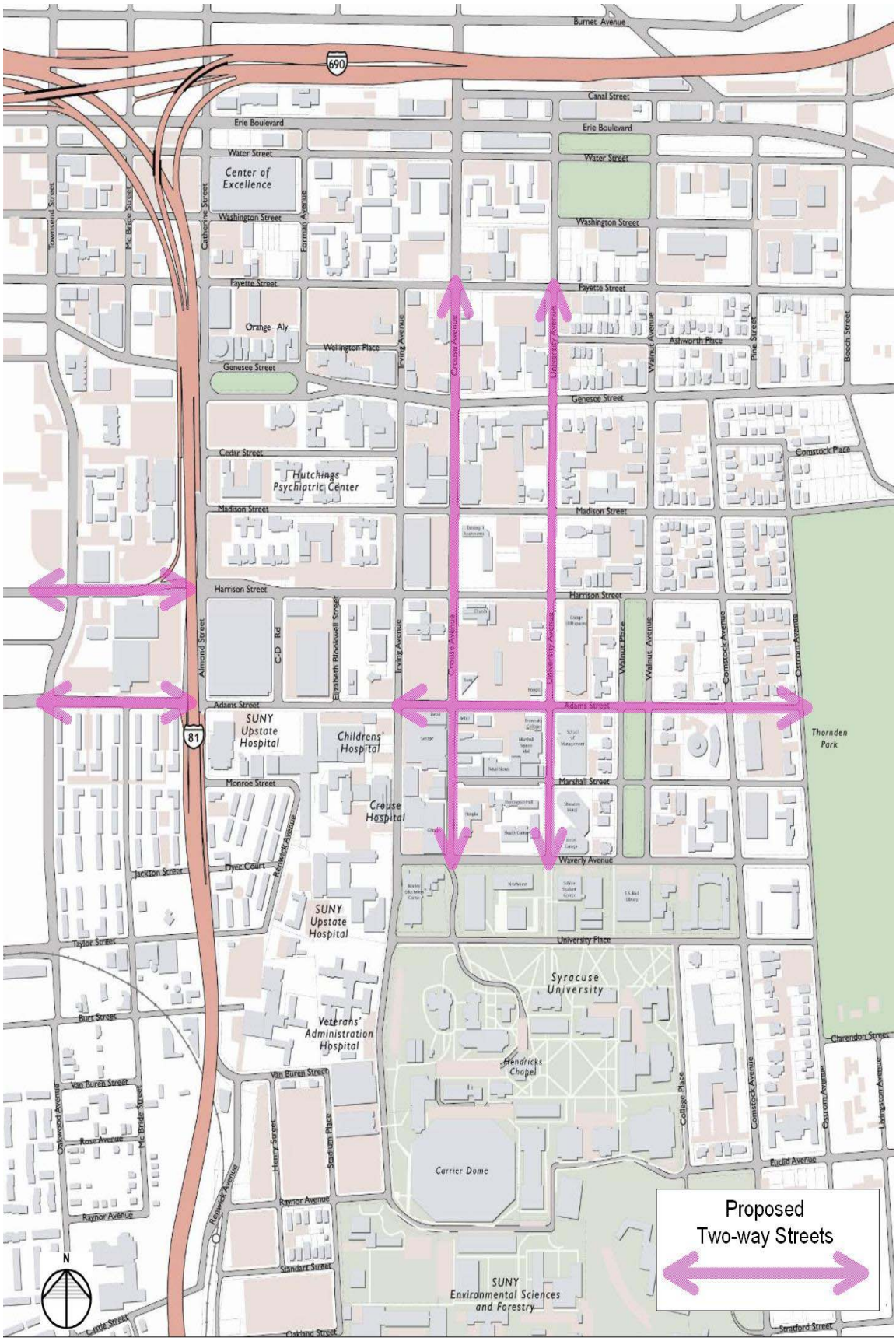
Improved accessibility for all modes could be generated. Travelers would have more choices of routes to select to their destinations. In addition, emergency vehicles would be provided more travel route options, which can be critical in cases of congestion or during special events on University Hill.

Better connections to downtown and the area immediately west of I-81 would result from a boulevard. In addition, this could create opportunities for increasing transit ridership with improved stops and pedestrian facilities.

A boulevard treatment could impact the percent of traffic that is local versus regional, thereby creating more opportunities for mixed-land uses and increased investment in a portion of University Hill that is not typically a focus for investment.

The creation of a boulevard would add landscaped features to the corridor that would serve as traffic calming measures as well as enhance the aesthetics of the area. By removing the regional through trips, air quality could be significantly improved in the Downtown and University Hill area (see Appendix C).

FIGURE 28. TWO-WAY STREETS



SECTION SEVEN – TWO-WAY STREETS

The conversion of one-way streets to two-way networks is a technique that is associated with downtown revitalization and improving pedestrian mobility. This concept would involve transforming existing one-way streets into two-way streets on three streets within University Hill and two streets in Downtown.

The existing conditions are summarized below.

- Adams Street – One-way eastbound between State Street and Ostrom Avenue. Two-way west of State Street.
- Harrison Street – One-way westbound between Salina Street and Almond Street. Two-way east of Almond Street.
- Crouse Avenue – One-way northbound between Waverly Street and Fayette Street.
- University Avenue – One-way southbound between Fayette Street and Waverly Street.

The following are the proposed changes to the street circulation system on University Hill and in Downtown:

- Adams Street – Two-way between Irving Street and Ostrom Avenue. The segment between Almond Street and Irving Street may be viable depending on emergency vehicle access concerns.
- Adams Street – Two-way between State Street and Almond Street.
- Harrison Street – Two-way between Salina Street and Almond Street.
- Crouse Avenue – Two-way between Waverly Street and Fayette Street.
- University Avenue – Two-way between Waverly Street and Fayette Street.

For years there has been a push to move as many cars as possible as quickly as possible without regard for the movement of other modes. While moving traffic is still important, two-way streets are more accommodating to pedestrians. Communities such as Berkeley, CA, Cincinnati, OH and Norfolk, VA are currently converting one-way streets to two-way.

One-way street systems often force motorists, especially visitors to the area, to follow out-of-the-way routes to reach their destination. This recirculation can cause an increase in turning movements, thus conflict points with pedestrians, and travel time. The creation of two-way streets could reduce the amount of travel time for pedestrians as well.

While those familiar with the University Hill area have likely found the most direct route to their destination, a series of one-way streets can often be confusing to visitors causing frustration and disorientation. Given that University Hill experiences many visitors to its several medical and educational institutions, providing flexibility through two-way streets can be beneficial.

In addition two-way streets can make transit easier by eliminating the confusion of where the stop for an opposite route is located. For example, a transit rider may be dropped off at a stop on a one-way street and may not realize the stop for the return trip is on another street. Currently, the SU-Thurber/Nob Hill and Drumlins buses travel north on Crouse Avenue and return south on Irving Avenue. The Warehouse bus travels north on University Avenue and returns south on Irving Avenue. The lines could be consolidated on a two-way Crouse venue, which would align with the entrance to University Place (the access to the Campus Place transit hub) at the SU Campus.

Recirculation of cars looking for parking spaces or building locations caused by one-way streets can lead to a degradation in air quality within the area that is already experiencing increased volumes. Transforming one-ways to two-way streets could have a positive impact on the reduction of air pollutants. In addition, the increase in walking and transit can improve community health while slightly reducing air quality impacts of additional vehicles (Appendix C).

In addition, the ability to turn left on Harrison Street from the I-81 southbound exit ramp or left from the I-81 northbound ramp onto Adams Street could possibly reduce the total vehicle miles traveled in the study area and downtown.

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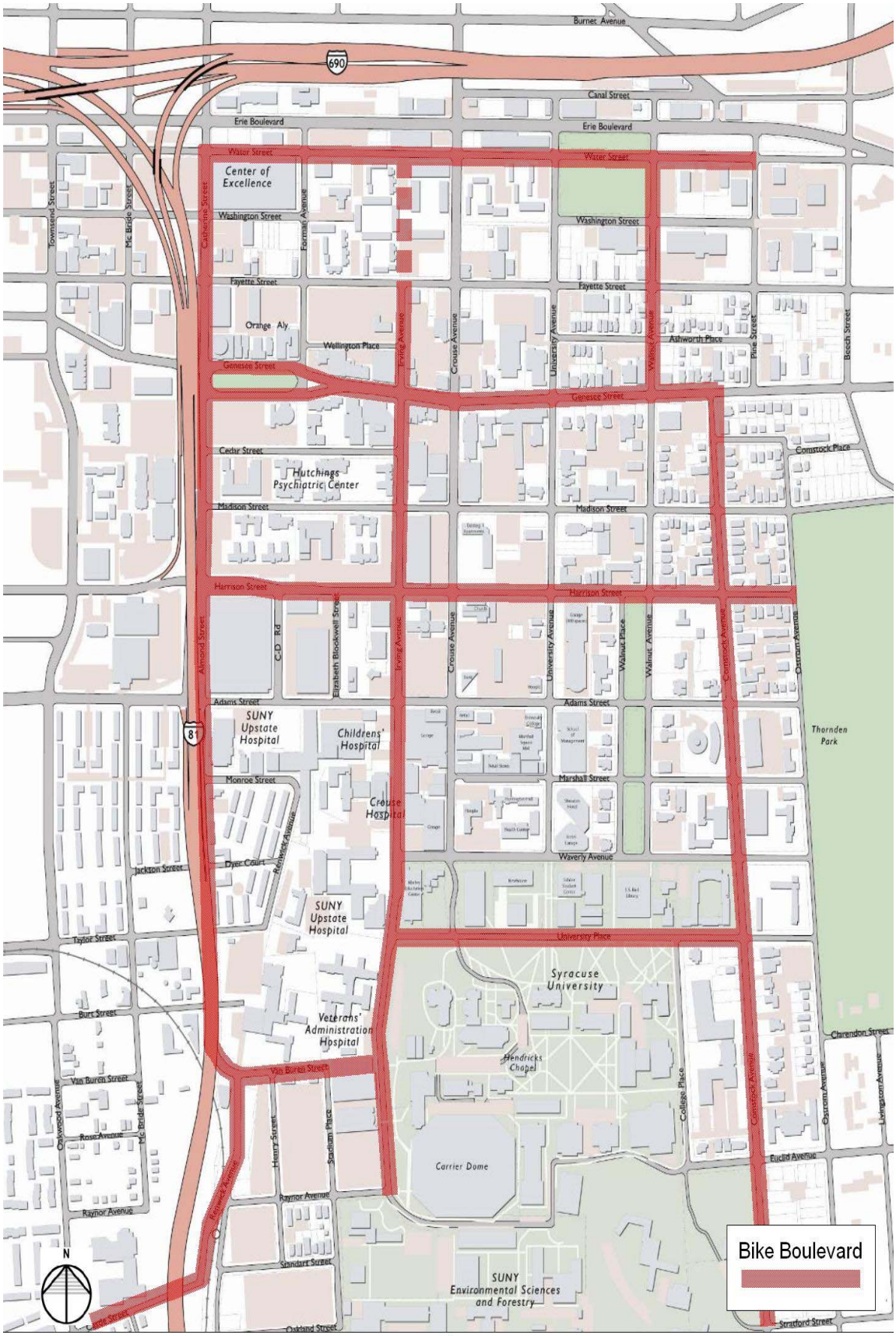
FIGURE 29. BIKE BOULEVARD



SECTION EIGHT – BIKE BOULEVARD NETWORK

FIGURE 30. EXAMPLE OF A TWO-WAY ON-STREET BIKEWAY, MONTREAL, QUE.

A bicycle boulevard network would increase the visibility of bikeways and acknowledge bicycling as an element of the transportation system. The proposed streets for inclusion in a bike boulevard network are shown in Figure 31. The boulevard is more than simply applying a striped lane and arrow to the pavement. It generally includes a segregated travel lane reserved for cyclists. The boulevard network also includes traffic calming and bike priority of traffic signals throughout the network.

It can also include a two-way (contra-flow) lane to accommodate two-way travel if cross-flow traffic by pedestrians is low. In such cases, on-street parking can be provided between the boulevard and the travel lane if street widths allow.

The benefits of bicycle boulevard networks include the following:

- The boulevard system could improve the safety and visibility of biking on a series of streets, create a network of complete streets, and increase the number of people with access to bicycle facilities;
- The boulevard system would increase the percentage of street miles designated to bike facilities. It would provide an environment safe and convenient for cycling that

would encourage cyclists of all ages and abilities to cycle more, and increase the cycling commute mode share;

- It would increase the number of residents within 10-minutes of the bicycle boulevard network, build connections to regional trails, such as the Erie Canalway Trail, and enhance neighborhood appearance and quality of life; and
- Healthy infrastructure provides opportunities for recreation, ensures safety for all users of the transportation system by providing traffic calming benefits and reducing conflicts, improves the overall environmental quality by lowering carbon emissions, and enhances community health by lowering obesity and asthma rates.

FIGURE 31. EXAMPLE OF A BIKE BOULEVARD

FIGURE 32. EXAMPLE OF A BIKE-BOULEVARD STREET MARKING

SECTION NINE – IMPLEMENTATION PLAN, ACTION PLAN, AND COSTS

9A. Implementation and Action Plan

The following is a summary of the short-, mid- and long-term implementation plans as well as a summary of costs for the major recommendations.

i. Short-Term Action Plan (2 years)

It is anticipated that short-term actions occur in the very near future. These actions represent items that can be achieved with minimal investment of resources or are already underway. These actions will also have recognizable results. Coordination between the Syracuse Metropolitan Transportation Council, the City of Syracuse, the NYS Department of Transportation, and CENTRO, as well as the institutions and businesses on University Hill, is essential to the successful implementation of these action items.

The following is a list of short-term actions:

- Mixed land use and shared parking implementation;
- Almond Street narrowing implementation (see discussion below);
- Mobility hub network siting study;
- Bike boulevard design and implementation;
- Centralized parking management and pricing analysis;
- Bus rapid transit conceptual design; and
- Streetcar assessment (see discussion below).

ii. Mid-Term Actions (3–5 years)

The mid-term actions represent items that may require more resources and/or study to implement. Again, these will require close coordination between the Syracuse Metropolitan Transportation Council, the City of Syracuse, the NYS Department of Transportation, and CENTRO, as well as the institutions and businesses on University Hill, is essential to the successful implementation of these action items.

The following is a list of mid-term actions:

- Operations analysis and design of roundabouts on Almond Street at Harrison and Adams Streets (see discussion below); and
- Operations analysis and design of conversion to two-way streets (see discussion below); and
- Introduction of bus rapid transit and streetcar; and
- Introduction of centralized parking management and pricing.

iii. Longer-Term Recommendations (5+ years)

The Almond Street Boulevard concept 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 due to its community "placemaking" contributions.

9B. Cost Estimations

i. Almond Street Narrowing Cost Estimation

The approximate cost of narrowing Almond Street is $500,000. The narrowing includes reconstructing the east side of Almond Street between the Harrison Street on-ramp (northbound) and Adams Street. It also includes reconstructing the southbound approach of Almond Street at the Adams Street to remove one lane. Landscaping and resetting the curb is proposed in both locations. See Appendix D for additional cost information.

ii. Streetcar System and Assessment Cost Estimation

Costs for constructing a streetcar system vary based on design, project length, utility requirements, the type and number of cars, the size and appearance of a maintenance facility, the number and design of streetcar stops, and the extent to which existing streets need to be rebuilt. Initial construction costs are because of the installation of support structures such as substations and a maintenance facility; however, extensions are generally lower once this infrastructure is in place. Typically, costs range in the $12 to $25 million-per-mile range for initial systems. This is about a third of a light rail system cost.

As shown in Appendix B, a combination of federal, state, local and private funding can be used for streetcar planning, design and construction; however, there is a significant amount of competition for these limited funds. Many projects are supported by public-private partnerships since the benefits of streetcars on development efforts include reduced parking requirements, an increased amenity and convenience for employees and visitors, and an increased market as transit riders are drawn to the line.

Depending on the level of complexity and type of system to be studied, costs for a feasibility study range widely. Generally, the studies cost between $225,000 and $500,000. Projects seeking "Small Starts" funding from the Federal Transit Administration (FTA) are required to enter a more complex process following the initial feasibility study, including a formal alternatives analysis and environmental review. However, there is FTA funding available for the alternatives analysis. The Small Starts

program allows cities and transit agencies to apply for federal funding of 50 percent of capital costs.

iii. Almond Street Double Roundabout Cost Estimation

The installation of two roundabouts on Almond Street is estimated to cost approximately $4.2 million. The cost includes landscaping restoration of the former street right of way created by the narrower street sections approaching the roundabouts. See Appendix D for additional cost information.

iv. Conversion

Converting Adams Street and Harrison Street from one-way to two-way streets is estimated to cost approximately $4.3 million. The costs pertain to conversions extending between Salina Street to University Hill. See Appendix D for additional cost information.