

## Needs Assessment November 2006

Syracuse Metropolitan Transportation Council

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

## TABLE OF CONTENTS

1.OVERVIEW	2
a. Introduction	2
b. Report Organization	3
2. LAND USE AND TRANSPORTATION DEMAND	4
a. Existing Land Uses	5
b. Proposed Land Use Changes – the Current Planned Vision (CPV)	11
c. Anticipated Impacts on Travel Demands	14
3. NEEDS BY TRAVEL MODE	17
a. Interstate Access	18
b. Transit	32
c. Institutional Parking	42
d. Bicycle and Pedestrian Facilities	49
4. SCENARIO PLANNING	56
a. Move Cars Scenario	56
b. Move People Scenario	58
c. Conclusion	65
5. NEXT STEPS	66

This page has been intentionally left blank

## TABLES AND FIGURES

Figure 1. Cycle of Land Use and Transportation Demand	4
Figure 2. Institutional Use on University Hil	6
Figure 3. Existing Land Uses	8
Figure 4. Land Used For Parking	10
Figure 5. Projected 2025 AM Roadway Capacity Hotspots	21
Figure 6. Projected 2025 PM Roadway Capacity Hotspots	23
Figure 7. I-81 Average Daily Volume (2006)	25
Figure 8. I-81 Average Daily Volume and Through Traffic*	26
Figure 9. Existing Transit Routes in University Hill	35
Figure 10. Potential Downtown-SU Transit Prioritization Corridor	37
Figure 11. Transit Priority Concept for San Diego	38
Figure 12. Connective Corridor	38
Figure 13. Examples of Way-finding Signage	43
Figure 14. Surface Parking Lot Clusters in University Hill	48
Figure 15. Alternative Strategies	57
Figure 16. 1947 USGS Topographic Map	66
Table 1. Proposed Development Totals	13
Table 2. Measured Impacts of the CPV	15
Table 3. Accessibility Objectives and Measures	68
Table 4. Flexibility Objectives and Measures	69
Table 5. Economic Viability Objectives and Measures	70
Table 6. Sustainability Objectives and Measures	71
Case Study 1. Removing the Embarcadero Freeway	29
Case Study 2. Burnside Bridge	30
Case Study 3. Issues Raised by Urban Boulevards	31
Case Study 4. Transit Center	40
Case Study 5. University Students' Perspectives on Connective Corridor	41
Case Study 6. Centralized Parking	45
Case Study 7. Shared Parking	46
Case Study 8. Indianapolis Cultural Trail	52
Case Study 9. The Erie Canalway Trail	53
Case Study 10. Congestion Counterpoints	59
Case Study 11. A Sample Drive Alone Commute	61
Case Study 12. Jan Gehl and Copenhagen	62

This page has been intentionally left blank

## 1.OVERVIEW a. Introduction

University Hill is a thriving educational and institutional center in Upstate New York. 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.

University Hill is poised for continued development. Each institution has plans for growth that will allow them to support their mission. Growth within University Hill is positive for the region as it increases the proportion of employment and housing in urban areas. This assists in achieving the Syracuse/Onondaga County Planning Agency's (SOCPA) Onondaga County Settlement Plan policy of centeredness. One of The Settlement Plan goals is to focus development in urban areas where infrastructure already exists.

However, the collective planned growth and corresponding increase in people and vehicular traffic in University Hill could limit success in achieving these plans. The intent of the University Hill Transportation Study (the Study) is to keep the institutions and businesses viable on University Hill while reducing growth in auto use and parking in the area. The focus of the Study is on interstate access, institutional parking, transit and bicycle and pedestrian use. In short, the Study will result in a plan that supports existing and future land uses while guiding transportation investment decisions for these four focus areas.

This report summarizes the transportation and mobility needs and issues of University Hill related to the four focus areas. A need is a situation or condition in which something is desired or required. For purposes of this study, four basic needs are proposed including: accessibility, flexibility, economic viability and sustainability. There are also a number of issues that relate to each need for each focus area.

The basic needs and the related issues are described in Section 3 of this report. The needs and issues were derived from existing reports and data, field observations, modeling of existing and future conditions and discussions with both the Working Group and Institutional Focus group. As a next step of the Study, input from stakeholders will be obtained to refine these needs and issues.

It is important to note that this report does not identify recommendations or solutions. While in some instances possible solutions may be briefly discussed, specific recommendations and solutions to address the needs described herein will be identified as subsequent tasks in the overall study.

### b. Report Organization

This report is organized into five sections. Section 1 provides an introduction and describes how the report is organized.

Section 2 describes existing land uses, anticipated land use changes and their impacts on travel demands based on the Current Planned Vision (CPV). The CPV describes the combined planned growth (anticipated future growth) of each institution on University Hill in terms of total square footage of development, location of development and additional parking spaces. This growth is what will generate many of the future transportation needs. Due to the sensitive nature of this information, however, specific data on location of future growth will remain confidential.

Section 3 describes the transportation and mobility needs of the study area. It also explores possible objectives for these needs by travel mode including interstate access (vehicular), transit service, bicycle and pedestrian facilities and institutional parking (vehicular). The CPV will result in impacts on each of the current needs and issues facing University Hill. It may also result in new issues that have not yet been anticipated. These impacts, including travel demand modeling results, are summarized in this section.

Section 4 compares the needs and issues generated by the CPV with those possibly generated by emerging trends. This is intended to encourage participants to avoid thinking about the future needs only in terms of today's conditions. It challenges the participants to think about what factors might be in place 20 years from now and what needs these factors will create for University Hill. This type of scenario planning encourages participants to adjust their priorities when balancing competing needs.

Section 5 identifies a set of potential benchmarks or thresholds for each of the needs and objectives. It also outlines and describes the next steps in the Study process.

In addition, there are a number of case studies highlighted throughout the report. Some of the case studies illustrate innovative approaches in other communities to address similar needs and issues. Others discuss alternative approaches to the traditional thinking about certain issues. These are not recommendations but are simply presented to help set priorities for the future of University Hill.

## 2. LAND USE AND TRANSPORTATION DEMAND

The starting point for thinking about transportation systems is the way we develop land. Decisions about land uses directly affect the demand for different modes of travel. Obviously, as the amount of development increases, the demand for transportation facilities grows accordingly. Typically, the response has been to provide more capacity in different modes to meet that growing demand. However, in recent years, we have learned that this additional capacity actually induces unanticipated growth. This growth can erode the capacity such that roads and transit services can become congested or overcrowded. An example of how such a cycle might function on University Hill is provided in Figure 1 below.



## Figure 1. Cycle of Land Use and Transportation Demand

In order to examine the potential impacts of future growth in University Hill and to avoid similar cycles, the current and future land uses for the study area were examined. The key attributes of the existing land uses and the CPV are summarized below. The analysis of the CPV focuses on the amount of anticipated development, including parking. This is important when planning whether to accommodate an increased number of cars.

In order to identify the impacts of the CPV, the SMTC's Regional Travel Demand Model was refined to provide more detail for the study area. The CPV forecast growth was then tested in the model to examine impacts on auto travel and transit.

The form and density of development are also critical for fostering transit use and bicycling and walking. These elements cannot be modeled in the same way as the amount of development. However, the ways in which land uses can support non-automotive travel are explained in Section 3b where transit sustainability is discussed in terms of transit-oriented development.

## a. Existing Land Uses

Institutional land uses are comprised primarily of:

- Syracuse University
- SUNY College of Environmental Science and Forestry
- Crouse Hospital
- Upstate Medical University
- Hutchings Psychiatric Center
- Veteran's Administration Medical Center

University Hill includes a core area made up primarily of institutional uses. The institutional buildings are generally larger than those in the Marshall Street and Genesee Street business districts and adjacent residential areas. Figure 2 shows the locations of the institutional buildings on University Hill, and Figure 3 illustrates the current existing land uses.

The intense land use creates substantial parking demand. As a result, a significant portion (25%) of University Hill is used for surface and structured parking. This can be seen in Figure 4. The majority of parking spaces are concentrated south of Harrison Street and west of Crouse Avenue. These concentrations of parking facilities in these areas create vehicle congestion and impact the pedestrian environment on adjacent streets.

Irving Avenue, Waverly Avenue, Comstock Avenue and Oakwood Cemetery generally bound the core of Syracuse University. In addition to the core campus there are some University buildings interspersed with the residential and commercial uses on streets such as Comstock and University Place. The West Campus is primarily devoted to parking for students and special events held at the Carrier Dome. The remote location of these parking areas may be a factor in the level of use by students.

Figure 2. Institutional Use on University Hill



Source: WRT November 2006

## Figure 3. Existing Land Uses



Source: WRT November 2006

Syracuse Metropolitan Transportation Council I Edwards and Kelcey

## Figure 4. Land Used For Parking



Source: WRT November 2006

Syracuse Metropolitan Transportation Council I Edwards and Kelcey

The Marshall Street Business District, located adjacent to the institutional area, is comprised of specialty retail and small restaurants, which cater in large part to Syracuse University students, hospital employees and visitors.

The Genesee Street Corridor is evolving from a residential area with large turn-of-thecentury homes to a cultural and professional office district. Land uses include theaters (e.g. Syracuse Stage), restaurants, large-scale professional offices and hotels.

Open space located adjacent to University Hill includes Thornden Park, Oakwood Cemetery and the Morningside Cemetery. These uses provide open space in contrast with the developed University Hill area and buffer nearby residential neighborhoods.

Land uses to the east and south of University Hill are primarily residential with large homes. A large percentage of the homes located directly east of the institutional core have been converted to apartments for students. This concentration of student housing has created conflicts with those residing in the surrounding single-family residential neighborhoods. Parking and traffic congestion associated with student housing on occasion overwhelm quiet residential streets. This issue and related residential concerns are being addressed by the City of Syracuse in a separate study.

The Erie Boulevard corridor to the north consists mostly of vacant industrial buildings and scattered businesses in close proximity to the interstates. There is no clear vision yet identified for this area, but this area could be considered for expansion of the institutional uses on University Hill. However, issues of direct access between University Hill and the interstates will need to be resolved.

## b. Proposed Land Use Changes – the Current Planned Vision (CPV)

In an effort to better understand the anticipated land use changes in University Hill and ultimately the impacts on the transportation system in the future, the CPV was identified through a series of confidential interviews. The specific location and other details about the projected development will remain confidential to avoid real estate speculation.

Information gathered through confidential interviews included square footage of development, number of additional beds where appropriate, number of residential units and number of parking spaces. When the number of parking spaces was not available, an estimate of two spaces per 1,000 square feet of development was used. Site specific data is not presented so as to maintain confidentiality. This is important to avoid land speculation, which may negatively affect an institution's plans.

A significant number of properties in University Hill are ready for change. Approximately 2.1 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 additional parking spaces.

It is important to note, however, that while square footage is being added, it does not always translate into additional people. In some instances the additional square footage translates into a shift of current employees or students with no net gain. This was accounted for when forecasting impacts with the Travel Demand Model.

Table 1 provides proposed development totals. The development of the Syracuse University West Campus is identified as a long-term prospect with an unknown impact. Therefore, the development totals are shown without West Campus. The Center of Excellence in Environmental and Energy Systems and Kennedy Square are not shown because they are outside of the study area. However, it is understood that development at these locations may have a potential impact on the transportation system, and is therefore accounted for in the Travel Demand Model.

## Table 1. Proposed Development Totals

## **University Hill\***

	Parking Spaces	Residential Units	Retail SF	Commercial SF	Medical Related SF	Education Related SF	Total Additional SF
Recently Completed	1,475	-	-	-	-	85,000	85,000
Short-Term (0-5 years)	120	150	15,000	4,400	258,000	399,000	676,400
Mid-Term (5-10 years)	1,180	-	-	5,400	408,000	325,000	738,400
Long-Term (10-20 years)		80	19,000	58,000	135,000	385,000	597,000
Total	2,775	230	34,000	67,800	801,000	1,194,000	2,096,800

\*does not include SU West Campus, Kennedy Square, or the Center of Excellence

Syracuse Metropolitan Transportation Council I Edwards and Kelcey

## c. Anticipated Impacts on Travel Demands

Travel demand depends on the type and intensity of the various land uses as well as the design and types of the modes that make up the transportation system. In order to assess the impact of the CPV on travel demand in University Hill, the SMTC's regional transportation model was refined and used to forecast future conditions. The model contains roadways, bus routes and sections of the roadway network that accommodate bicycle/pedestrian travel. For purposes of this forecast, the conditions regarding these modes were not changed. In this manner, the needs created by the CPV could be identified.

The regional model's Transportation Analysis Zone (TAZ) structure on University Hill was refined such that each city block or individual institution (e.g., Crouse Hospital, Syracuse University, etc.) was a separate TAZ. The model uses as inputs the number of employees by specific classes (e.g. retail, restaurant/drinking establishment, service, manufacturing, etc.) and households within each TAZ. Square footage of non-residential uses was converted to travel demand using nationally-accepted trip generation rates<sup>1[1]</sup> which relate the amount of new square footage (or number of employees) to the number of new trips generated. The resulting performance measures of the CPV scenario compared to existing conditions are provided in Table 2.

One common measure of automobile travel is "vehicle-miles." Vehicle-miles are the sum of the distance traveled by all roadway traffic, in this case within University Hill. The model forecasts the development anticipated in the CPV would result in a net increase in automobile travel within the area bound by I-81, I-690, SUNY ESF and Ostrom Avenue of approximately 13% by the year 2025. Much of this growth in automobile traffic is expected on the interstate system, and on surface streets in the vicinity of the University Hill institutions (largely in the southern and western sections of the study area.) This is significant since these areas already experience congestion and have conflicts between different modes of travel.

Transit ridership in the University Hill study area is predicted to experience a modest decline of 7%. This is largely attributable to an assumption in the model that automobile ownership in the region will continue to increase in coming decades. If this trend continues with no significant improvements in transit service (both are assumptions carried through from the regional model's future year analyses), the decline in transit ridership will occur. A revision to the prediction of a trend of increased automobile ownership, improvements to transit level of service, or measures which discourage automobile travel would all have the potential to reverse the forecasted decrease in transit ridership, and potentially increase transit usage.

<sup>&</sup>lt;sup>1[1]</sup> *Trip Generation Manual*; Institute of Transportation Engineers; 7<sup>th</sup> Edition

## Table 2. Measured Impacts of the CPV

	Existing Conditions (Year 2003)	Current Planned Vision (Year 2025)
Vehicle-Miles of Travel (24-Hour Day) <sup>2</sup>	272,000	307,000
Vehicle-Hours of Travel (24-Hour Day)	8,300	8,700
Transit Ridership (24-Hour Day)	2,900	2,700
Bicycle/Pedestrian Trips (24-Hour Day)	29,000	33,700
Number of Congested Roadway Segments (AM) <sup>3</sup>	4	15
Number of Congested Roadway Segments (PM)	5	11
Number of Roadway Segments Approaching Capacity (AM) <sup>4</sup>	17	28
Number of Roadway Segments Approaching Capacity (PM)	19	22

 <sup>&</sup>lt;sup>2</sup> Within area bound by I-81, I-690, SUNY ESF, and Ostrom Avenue/Beech Street
 <sup>3</sup> 'Congested' defined as volume-to-capacity ratio in excess of 1.0
 <sup>4</sup> 'Approaching capacity' defined as v/c ratio from 0.75 to 1.0

An increase in bicycle and pedestrian travel of 16% is forecasted in University Hill. The transportation model calculates bicycle/pedestrian travel as a fixed percentage of travel based on data collected in the 2000 Census. Therefore, the increase in bicycle/pedestrian travel is related to two factors: 1) the locations of the individual developments that comprise the CPV and 2) the existing bicycle/pedestrian mode share. Taken together, the trend in increased bicycle/pedestrian travel is most pronounced in the vicinity of the educational institutions in the southern portions of the study area. Much of the increased walking and biking activity will occur in areas that were considered "poor" environment for such activities in the Current Planned Vision assessment performed by Wallace Roberts and Todd.

Meanwhile, the number of street segments categorized as 'congested' is projected to increase from single digits to the low-to-mid teens. While this increase is more than a doubling of the number of street segments so classified (from existing conditions), it would represent only approximately 2-3% of the University Hill roadway system. Roadway capacity 'hot spots' are forecasted to occur on the mainline interstates, connecting ramps, and in the vicinity of the parking areas to the southwest of the VA Hospital. There are also forecasted roadway capacity 'hot spots' to the east and northeast of Syracuse University. This appears related to the condition that all access from this direction is via local streets (Ostrom Avenue, Madison Street, Euclid Avenue, etc.) Nearly all of the surface streets in the central and northern sections of the study area are projected to operate well in the CPV scenario.

## 3. NEEDS BY TRAVEL MODE

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.

The needs of the University Hill Transportation System can be thought of in terms of four concepts including:

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

These needs 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 among needs and issues will be established by the Working Group. The mix of preferred solutions will depend on which of these needs are considered most important to the future of University Hill.

**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 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?

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?

The following section describes the transportation and mobility issues by travel mode within the context of the basic needs. These issues were identified through a review and analysis of existing conditions for each travel mode. In addition, key issues and needs based on existing conditions and future growth identified in the CPV are described. Outlining the needs is helpful in developing solutions and recommendations for University Hill to maintain its vitality and continue to grow, while improving mobility.

## a. Interstate Access

The location of interstate highways in proximity to the study area influences vehicle access to and from University Hill, as well as the movement of vehicles and traffic congestion within University Hill. Interstate 81 (I-81) is located along the west side of University Hill, Interstate 690 (I-690) is located just north of University Hill, and Interstate 481 (I-481) is located south of University Hill near the Syracuse University South

Campus. Access to the study area from the interstate has had significant impacts on land uses within University Hill.

The interstate system is the backbone of the U.S. transportation system. Its key function is to support the rapid movement of people and products to major destinations and densely populated areas. The interstate system sustains economic strength and enhances competitiveness in the global marketplace. The City of Syracuse is strategically located at a cross-section of several New York interstates, making it reliant on its functionality and ability to access businesses, institutions and housing within the City.

The primary concern with interstate access is congestion. The existence of congestion is evidence of social and economic vitality. As a growing economic, educational and employment center, more people will be attracted to University Hill. This new activity is important to University Hill, the City of Syracuse and the entire region. It is tolerable to accept a certain level of congestion if it means economic vitality. However, the severity of congestion in University Hill is based on perception and a number of needs and issues will arise.

The following are key issues concerning interstate access and congestion for University Hill. The issues are presented as potential objectives to be addressed by future solutions.

## Improve Capacity of Interstate System to Access University Hill (Accessibility).

Although three interstates bound University Hill, access from I-81, I-481, and I-690 to and from University Hill is very limited. This limited access directly affects perceptions about congestion in the study area.

There is only one direct access point from I-81 for University Hill, which is located at the Adams and Harrison Streets vicinity. This is also the primary location for access to the eastern portion of downtown from I-81. The "competition" for access to the ramps by drivers from both University Hill and Downtown creates congestion during peak hours in this area now and is expected to in the future as well.

Motorists entering University Hill from the southeast are forced to use local neighborhood and collector roads, such as Nottingham Road, Colvin Street and Comstock Avenue because there is no direct access point from I-481. There is also no direct link between I-690 and University Hill. Traffic traveling eastbound on I-690 enters University Hill primarily via Teall Avenue and Townsend Street.

Access between University Hill and the interstate system is critical to the study area's and City of Syracuse's economic vitality. The existence of only one primary interchange

serving the study area is already an issue under current circumstances and will continue to be an issue under the CPV. Additional links from the interstate system could improve access to University Hill by decreasing the number of vehicle miles and average minutes traveled, as well as improve air quality by reducing vehicle emissions and balancing the ratio of local to through traffic.

Figure 5 and Figure 6 illustrate the projected volume to capacity ratios for the year 2025. The figures show both AM and PM travel patterns and where congestion "hotspots" will be based on volume to capacity (V/C) ratios. When a V/C ration approaches or exceeds 1.0, a roadway will be perceived as congested. The ratios were developed by refining the Syracuse Metropolitan Transportation Council's Travel Demand Model for the study area.

The limited access from both I-481 and I-690 increases the number of miles and minutes a vehicle must travel to reach the core area of University Hill. Cars are forced to use roads that were not designed for high traffic volumes, increasing the potential for motor vehicle accidents and crashes with bicyclists and pedestrians and the need for road infrastructure repairs and replacement.

Figure 5. Projected 2025 AM Roadway Capacity Hotspots



Source: Edwards and Kelcey Transportation Demand Model, November 2006

Syracuse Metropolitan Transportation Council I Edwards and Kelcey

Figure 6. Projected 2025 PM Roadway Capacity Hotspots



Source: Edwards and Kelcey Transportation Demand Model, November 2006

Syracuse Metropolitan Transportation Council I Edwards and Kelcey

## Increase Number of Driving Route Choices for Accessing University Hill and Interstates (Flexibility).

The CPV forecasts show that local streets, such as Van Buren Street and Irving Avenue, will face growing congestion. This creates a need for more choices in how to access the interstate system from local streets.

University Hill has a system of one-way streets, which influences the internal circulation of vehicles in University Hill. This type of road network has shifted a larger share of traffic to fewer streets. Streets such as Almond Street, Adams Street and Harrison Street experience a great deal of congestion during peak hours.

Re-establishing a two-way street and grid system in the vicinity of I-81 may relieve congestion on local streets during peak hours. Additionally, circulation on surface streets linked to I-81 may improve, providing more possible routes to reach key activity centers and destination points.

# Use Interstate System to Serve Regional Traffic and Goods Movement (Economic Viability).

The interstate system's primary function as a transportation network is to support the rapid movement of people and products to key destination points and densely populated areas. It is the backbone of the nation's transportation system, supporting the majority of truck traffic carrying goods and interregional automobile traffic. In fact, the interstate system represents 1% of the nation's roadways but carries 24% of the traffic.<sup>5</sup>

The movement of goods depends on the capacity and ability of the interstate to access major cities and/or "trading centers." Essentially, the interstate system sustains economic activity and enhances competitiveness in the global marketplace by facilitating the movement of goods and regional passenger travel where they need to be and when.

Figure 7 and Figure 8 illustrate the average daily volume and through traffic for I-81 in 2006. As shown in Figure 8, the level of through traffic is approximately half of the overall total traffic on I-81 between I-481 and I-690. In reality though, through traffic declines to approximately one-third of the volume in the vicinity of the Adams and Harrison Street interchange. From a design perspective, Interstate 81 is being asked to serve both through and local traffic in the core of Syracuse, which are contradictory needs. From a needs perspective, a regional roadway system and a design for the I-81/Almond Street corridor that address both local and regional travel is required.

<sup>&</sup>lt;sup>5</sup> safety.fhwa.dot.gov/speed\_manage/docs/speeding\_counts.pdf



Figure 7. I-81 Average Daily Volume (2006)

Source: SMTC Regional Travel Demand Model

## Figure 8. I-81 Average Daily Volume and Through Traffic\*



Source: SMTC Regional Travel Demand Model

#### Strengthen Connection between Downtown and University Hill (Sustainability).

The I-81 Viaduct separates University Hill from adjacent neighborhoods including Downtown. The picture below illustrates that the viaduct is an unfriendly barrier that constricts pedestrian flow between the two neighborhoods separated by the I-81 Viaduct. It complicates automobile circulation along Almond Street and between Downtown and University Hill. Together, the viaduct and Almond Street are perceived as an unsafe and unfriendly barrier for pedestrians. The multi-lane Almond Street roadway is difficult for pedestrians to cross. This unique space presents an opportunity for University Hill to create a pedestrian-friendly and aesthetically pleasing link to downtown Syracuse through innovative design alternatives.



The I-81 Viaduct looking southwest at Harrison Street

The Study could consider altering the design of the viaduct and/or Almond Street. Removing the viaduct between Van Buren Street and Fayette Street and re-routing I-81 traffic around University Hill would provide a space to create a boulevard with multiple access points to the institutions and activity centers both on University Hill and in downtown Syracuse. Elevating the viaduct higher than its current height or redesigning its interchanges in the study area are other options.

Other communities with elevated barriers have created exceptional public spaces by finding innovative ways to use the space or by removing the structure and transforming the corridor into a more aesthetically pleasing and pedestrian-friendly boulevard. San Francisco's tale of capitalizing on the removal of the Embarcadero Freeway, an elevated expressway similar to the I-81 Viaduct, is told in Case Study 1. Details on ways Portland, Oregon found to adapt space under their Burnside Bridge are explained in Case Study 2.

If a limited access highway, such as Interstate 81, is transformed into a boulevard, there may be a number of benefits. These include more roadway links, which can increase connectivity between University Hill and Downtown. It also provides new route possibilities for transit, pedestrians and bicyclists. The right angle interface between the

boulevard and existing streets is pedestrian and bicycle-friendly. Right angles slow down traffic and provide opportunities for bus stops and dedicated transit lanes. Land currently used for streets may possibly be reclaimed and returned to the tax rolls. In addition, the boulevard may improve the aesthetics of the corridor and serve as a gateway to both Downtown and University Hill.

Converting expressways and elevated barriers can also raise issues in urban areas. A boulevard has a much lower carrying capacity than an expressway, and generally needs more lanes to produce a similar level of service. In addition, access for emergency vehicles must be considered. Case Study 3 offers one perspective regarding the problems that Toronto, Canada faces in overcoming their Lake Shore Boulevard and creating a pedestrian-friendly connection between their downtown and the waterfront.

## Case Study 1. Removing the Embarcadero Freeway

#### San Francisco, California

Like Syracuse, San Francisco suffered from an overhead expressway that fragmented its downtown. With much protest from residents, construction of the Embarcadero Freeway began in the mid-1950s, cutting through neighborhoods and demolishing houses. The city's bay views were replaced with a dark, elevated concrete viaduct. The design and plans for the freeway were disastrous. The freeway funneled traffic into bottlenecks instead of improving the movement of cars and it was not built to withstand a significant earthquake. When an earthquake hit the city in 1989, some San Franciscans celebrated because it helped remove the detested freeway. As a result of the freeway's removal, San Francisco acquired a strip of new land and sought to create great public spaces from it.

Some lessons from San Francisco on how to capitalize on removing an elevated freeway and making a good public space:

1. Pack the edges with housing. Land that was formerly made desolate and undesirable from the freeway was replaced with new neighborhoods of apartments.

2. Work to attract people to new open space. The PacBell Ballpark where the Giants play sits on the embarcadero and includes restaurants and bars on its ground floor, which open onto the sidewalk outside the park and operate all-year whether or not there's a game.

3. Open space could be paved or grassy as long as it serves and welcomes the public. Rincon Park was constructed and also became home to two restaurants.

4. As one of Rincon Park's sponsors put it, "Find the memory in the site." Because the land was once under water, the restaurants' themes are nautical.

5. Plant trees! Planting trees along the new strip of land called attention to the area, especially in a city with few trees. Natural elements and creative landscaping can bring specialness to place.

6. Create generators of activity. People will not come to an open space, green or paved, just because it's there. Permanent fixtures or even short-termed programmed activities create exciting public spaces.

7. Don't be afraid of commerce. Commerce is the lifeblood of cities. People like to go out to grab a cup of coffee or a beer, watch a movie, enjoy a meal at a restaurant, and go shopping.

8. Everything should be served by public transit. The better the public transit, the more successful the public space. San Francisco's Embarcadero is not only served by the iconic trolleys, but also by the Bay Area Rapid Transit (BART) subway line and a light-rail line, both nearby.

#### THE EMBACADERO FREEWAY



AFTER IT'S REMOVAL



#### Case Study 2. Burnside Bridge

#### Portland, Oregon

The Portland Saturday market (PSM) is the largest outdoor arts and crafts market in the United States. It transforms the historic old town district into a thriving arts and crafts open-air marketplace every weekend from March until December. Founded in 1974, PSM was modeled after Eugene, Oregon's Saturday market and was moved to under the Burnside Bridge in Portland in 1976. Its 400 members generate \$8 million in gross sales annually and attract over 750,000 visitors to the historic old town district of Portland each year.

PSM is accessible by foot and bike, Trimet's max light rail line stops right in the middle, bringing in people from all over the Portland metropolitan area. It is a win-win situation for the artists and city of Portland. PSM provides an economic outlet for the artists' work, customers gain better access to locally produced items, and the city has an attraction that draws customers into the downtown area. PSM has become a central economic engine for the historic old town/Chinatown neighborhood, attracting new business activity and visitors.

Also making its home under the Burnside Bridge is the Burnside Skatepark. In the early 1990s skateboarders discovered a vacant space under the bridge and began building banks up to the walls with cement, mud and water from an empty lot across the street. Eventually the word got out, and more skaters started visiting to ride the wall and gradually built more banks and ramps. The skaters got as far as hiring a backhoe and digging up the road beneath the bridge before they received civic citations.

The Skatepark eventually became accepted by the city and has risen to become world famous. Tony Hawk himself considers it among his five favorite Skateparks (USA today, May 5, 2003). Once a neglected, uninviting lair for junkies, Burnside has risen to become a space for recreation and diehard skaters throughout the city of Portland.







#### Case Study 3. Issues Raised by Urban Boulevards

#### Toronto, Canada

In the past couple of decades Toronto, Canada has made major efforts to revive its waterfront on Lake Ontario. The objective of the waterfront revival has been to create a better link to the central business district. Overall, these efforts have been successful and Lake Shore Boulevard has been nicely streetscaped and equipped with a new trolley line, running the length of the waterfront. There has been rapid development of condominiums and apartments, capitalizing on the views of Lake Ontario and proximity to downtown Toronto.

According to commentary by the Reason Foundation, one essential aspect of the waterfront revival that has not been successful is the walkability between downtown and the waterfront. The Gardiner Expressway and Lake Shore Boulevard both run through the city between downtown and the waterfront. The Expressway was once viewed as an ugly barrier to the waterfront, which architects and planners suggested be brought down and transformed into a Gardiner Boulevard. However, some argue that today the barrier and challenge of connecting the downtown to the waterfront is Lake Shore Boulevard.

The commentary explains that the boulevard's capacity is generally 60% lower than - and their fatality rates are double that of - an expressway. An expressway lane can carry up to 2,500 vehicles per lane, per hour, whereas a boulevard lane can accommodate 1,000 to 1,100 vehicles per lane, per hour. Boulevard speeds are lower, vehicles are required to stop at more signals and negotiating intersections is more difficult and time consuming compared to a grade-separated expressway. Lake Shore Boulevard is an eight lane roadway plus turning lanes. The lanes and wide intersections create a threat to pedestrians who are faced with long waits for traffic signals and the danger of conflicts with motorists turning on amber and early on red lights. The commentary also argues that if you want to avoid "paving over America" that an expressway uses less pavement.

Compared to 6.1 fatalities per billion vehicle miles traveled on an urban expressway, arterials experience 11.5 fatalities per billion vehicle miles traveled, increasing fatalities by 90% by converting expressways to boulevards. Cities generate traffic, which needs to flow in and out by some route, and the quickest and safest is by an expressway. Adding pedestrians into the traffic mix sacrifices safety and speed and usually makes no sense.

The commentary concludes that most urban expressways in America are heavily used and face increasing traffic. They cannot be replaced with boulevards. If the "elevateds" cause blight, then that needs to be dealt with by improving their surroundings, as they are doing with the Gardiner Expressway in Toronto.



Lake Shore Boulevard

Source: The Reason Foundation, 2006 www.reason.org/commentaries/samuel 20060107.shtml Gardiner Expressway
# b. Transit

There are currently three types of transit services available in University Hill: the Centro fixed route bus system, a number of shuttle routes funded by hospitals as parking/circulator shuttles and OnTrack. Transit currently accounts for approximately 5 percent of commuting trips in the University Hill area. Centro is the Central New York Regional Transportation Authority providing transportation and related services in Central New York. Centro is also contracted to provide transit service for individual hospitals and Syracuse University.

All Centro fixed route services operating to or through University Hill are open to the general public. Certain services, including routes 30, 40, 62, 72, 76, 172 and 340 are regular route bus lines that serve neighborhoods in and around University Hill, including Syracuse University (SU) upon which SU employees and students may ride fare-free within certain geographic boundaries upon presentation of a valid ID card. In addition, Centro provides service on a number of University Shuttle routes, operated at the behest of SU and subsidized by the University. These routes are also open to the general public and fare-free for employees and students. Weekday University Shuttle routes include Winding Ridge, Manley, Vincent, Slocum Heights, North Campus, Euclid/Westcott, Warehouse and the Quad Shuttle. The University Shuttle weekend routes include Winding Ridge, Manley, Vincent, Slocum Heights, North Campus, Warehouse and Euclid/Westcott. Figure 9 illustrates the routes that service University Hill.

The fixed route services operated by Centro to downtown Syracuse in the morning and evening on weekdays are very frequent, requiring no schedule coordination between bus lines. However, in off-peak hours on weekdays and on weekends, service is less frequent and a pulse system is operated in which the schedules of up to 18 bus lines are coordinated to meet at Common Center, a centralized hub in downtown Syracuse. Since most routes converge on downtown Syracuse, those passengers bound for downtown locations enjoy a one-seat ride, which is highly desirable from the rider's perspective. Service from one outlying area to another, however, requires a transfer, which makes transit less desirable.

Since University Hill generates a relatively large demand for transit service, Centro attempts to through-route as many bus trips as possible from outlying areas to downtown and on to Hill locations. In fact, Centro has been experimenting with one route from a suburban corridor directly to the Hill, without serving downtown first (#88X). This route has been in operation for several years and has been only marginally successful to date. Despite its best efforts, provision of direct, one-seat service in a decentralizing, suburbanized environment such as Central New York has been and will continue to be a challenge for Centro, the mass transportation provider in the region.

The University shuttle bus system is a well-developed system providing service to the large transit-dependent student population. The greatest density of service connects the North and South Campuses via the Comstock Avenue corridor and along Irving Avenue. Other routes provide access from residential areas east of the campus to the College Place transit hub as well as internal circulator access.

Overall, the University Shuttle system provides a solid system of campus access. The University Shuttle is oriented around the College Place Hub on the Main Campus. The College Place hub has become a readily recognized center for students to be able to gain access to most key locations within the study area and throughout the Syracuse community. Centro also operates an additional express route to Carousel Center during weekend periods to facilitate the shopping and entertainment needs of students.

Other transit services operating on University Hill are the Crouse Hospital shuttle and the Veterans Hospital shuttle systems, which are similar to the Syracuse University Shuttle in that they are operated as regular route services by Centro under contract, are open to the general public, and subsidized by the hospitals. The SUNY Upstate Medical Center shuttle also is a contract service, operated by a private bus company. All of these shuttles circulate through areas of off-site parking locations in Syracuse, bringing employees to their work sites.

# Make Transit Easy to Grasp, Easy to Go Places and to Save Time and Money (Accessibility).

People enjoy choice and freedom, therefore it's important that people be able to drive, access transit, or walk safely and conveniently whether to run errands, get to work and/or school, or go shopping. For people to use transit, the system must be easy to grasp, easy to get to places, easy to save time, and easy to manage. There is a need to enhance the ease of transit use on University Hill. At the same time, it must be recognized that transit service cannot be all things to all people. Transit service cannot function as a taxi system, meeting all origin and destination demands. Nevertheless, while the existing fixed route and shuttle routes would provide service for most of the development identified in the CPV, additional transit service would be desirable in some areas.

Transit services must also respond to emerging socio-economic trends. Census figures show that the population of 65 years and older increased by twelve percent (12%) between 1990 and 2000 in the City of Syracuse. This population is expected to continue to increase as the baby boomers age. An aging population and an increase of the immigrant population means there are more people who may not be able to drive and who are increasingly dependent on transit. Also, global economic issues such as rising fuel costs are influencing drivers to opt for transit instead of driving their car.

Syracuse Metropolitan Transportation Council I Edwards and Kelcey





Syracuse Metropolitan Transportation Council I Edwards and Kelcey

**Easier to Save Time and Money** - There are limited incentives that improve the perception of using transit and encourage transit use. In order to discourage single occupancy vehicle travel, there must first be a combination of incentives and disincentives to encourage transit use. Some examples of incentives are expansion of the free transit program (expand the free zone, include all service for Syracuse University students and employees, etc.). Disincentives could include increases in parking fees, and limits on the amount of parking that is provided. Overall, employees perceive the hospital shuttle systems as undesirable. This perception relates to a variety of issues, such as the distance of park and ride lots from the interstate, the frequency of shuttle service, and the overall experience of using the shuttle.

**Easier to Go Places** – Centro shuttle services lack connectivity with OnTrack's University Station because of the intermittent nature of OnTrack's non-event service and also because there is no bus connection at the Raynor Avenue station because buses cannot get up the incline on the hill. A transit corridor could be developed between University Hill and downtown to provide a focal point for improved transit services. Based on field observations and discussions with Centro staff, one potential alignment for a transit corridor would be Salina Street, Harrison Street, Irving Avenue, and University Avenue (see Figure 10). To maximize benefit, the corridor could be redeveloped to include BRT elements such as bus lanes, queue jump lanes, and stations (see Figure 11), and could be a precursor to full BRT or LRT services. A variety of services could be provided in a Downtown-University Hill Transit corridor, including:

- Reconfigured existing local routes;
- A Downtown-University Hill Shuttle;
- Local and express routes extended from downtown to University Hill; and
- New express routes.

Syracuse University's Connective Corridor, which is intended to better link Syracuse's cultural resources, is another area where transit services could be enhanced and further developed. One of the proposed elements is a shuttle bus route that will link key facilities (see Figure 12) and provide one-seat service between Connective Corridor facilities and other locations in and around downtown. Connective Corridor services could be developed as currently envisioned. Alternatively, multiple routes would be implemented in order to provide more direct service.

At present, Centro and area hospitals operate a number of specialized services. These include Centro's Syracuse University routes and individual hospital shuttle routes. By better integrating these services, it may be possible to provide more frequent service at a lower cost. An example of this issue is Centro operates a Crouse Hospital shuttle between a remote parking lot on Syracuse University's South Campus and Crouse Hospital, which is adjacent to Syracuse University's North Campus. It also operates

separate Syracuse University shuttles between the South and North Campuses. The combination of these shuttles into a single service could increase the amount of service available to all riders, while also helping to simplify it. Similarly, the different shuttles that serve parking lots on University Hill could be consolidated into simpler and more frequent joint services by a coordination of institutions.



# Figure 10. Potential Downtown-SU Transit Prioritization Corridor



Figure 11. Transit Priority Concept for San Diego

Source: "Transit First: Setting A Vision For Transit's Future, San Diego Association of Governments, November 2004.

# Figure 12. Connective Corridor



Source: www.connectivecorridor.syr.edu/

# Serve a Wide Variety of Users (Accessibility).

The use of the College Place hub is well organized and located generally within the geographic center of Syracuse University. However, it is relatively removed from other activity centers such as the core area around the Crouse-Marshall business area, and more so from the hospital corridor along Irving Avenue and Adams Street. While both areas contain several bus stop locations, they lack easily identifiable centers for transit access, as well as any enhanced level of passenger amenities. Other communities have created attractive and amenity-loaded transit hubs to better serve the needs of their transit users. Case Study 4 shows how Maplewood, Minnesota has benefited from their Maplewood Mall transit hub.

# Improve Ease of Management (Economic Viability).

Currently, there is no coordinated transportation management in University Hill, such as a Transportation Management Association or similar entity. Transportation Management Associations, or TMAs, are private, non profit, member-controlled organizations that provide transportation services in a particular area, such as University Hill. As a general rule, TMA efforts are directed toward reducing single occupant vehicle travel by promoting alternatives. In addition, many efforts are also directed toward reducing parking requirements. Typical programs include:

- Rideshare matching and vanpool coordination;
- Commuter incentives, such as free or discounted transit passes, and preferential parking for carpoolers;
- Parking management and brokerage;
- Guaranteed ride home services;
- Shared parking coordination;
- The operation of shuttle services;
- Special event transportation management; and
- Marketing and promotion of available options and programs.

TMAs represent the interests of member organizations, which can include local employers and major institutions, business organizations, and local governments. They are also typically funded by those same organizations. Benefits for member organizations are that they provide a mechanism for multiple organizations to coordinate efforts to reduce automobile trip volumes. This produces a more attractive and appealing environment, reduces the amount of parking that must be provided, and allows for a more efficient use of space. In areas such as University Hill, the consolidation of individual shuttle services can reduce the cost of those services.

# **Case Study 4. Transit Center**

#### Maplewood, Minnesota

Maplewood is a city in Minnesota located just ten minutes from downtown St. Paul. The city is known for its great charm, strong residential neighborhoods and thriving commercial development that make it an ideal place to live and work. The city is also the home to the corporate headquarters and campus of the 3M Corporation.

The Maplewood Mall was identified as a key connection and transfer point in the city and region. Its transformation into a transit hub was needed to accommodate increased transit service, introduction of pulse transfer, increased



layover requirements, and driver services. Its function is similar to an airport, serving as a transportation center, where bus and other public transit routes begin and people are connected to places.



Maplewood Mall's transit hub consists of an island with excellent amenities, such as heated shelters, rain canopies, restrooms, site lighting, plantings and vehicle loading/layover bays. The transit hub was designed to match the mall's design and color, complimenting the character and architecture of the city instead of taking away from it.

As in Maplewood, transit hubs can be attractive, community focal points that are designed to enhance surrounding neighborhoods. Potentially, transit hubs could stimulate

neighborhood redevelopment efforts, revitalize communities and add new economic activity.

# Create transit oriented destinations and ridership (Sustainability).

Adjusting local land use policies can be a step towards proactive land planning, and more importantly, increased transit use. Higher density, mixed-use development could provide more support for a route connecting activity centers through an increase in potential riders. Such a system might also be coordinated with the Connective Corridor efforts. The Connective Corridor is an effort led by Syracuse University and the City of Syracuse to improve connections between the University and activity clusters within the City. Instead of improving roadway level of service, land planning could reduce autodependence by mixing land uses and providing direct and convenient paths for people to walk, bicycle and use transit between land uses. Strategic land planning could also create the "connection" between downtown and University Hill by encouraging land uses which attract employees, students and visitors from University Hill to downtown (See Case Study 5). Today's higher infrastructure and natural resource costs make this approach more flexible and sustainable.

# Case Study 5. University Students' Perspectives on Connective Corridor

#### Syracuse, New York

Syracuse University hosted the "Syracuse Welcomes Connective Corridor" in August 2006 to welcome new freshman and transfer students. Tour guides rode busses with the 2,300 new students to tell them about the Connective Corridor and the history of Clinton Square.

The event was designed to introduce new students to the diversity that downtown Syracuse has to offer and encourage them to get to know the Syracuse community. The building of the Connective Corridor is expected to bridge the gap between the University and downtown, and provide an easy, reliable and safe way for students to visit the downtown between classes and on weekends.

University administrators were happy with the event's turnout and sensed that it "went off without a hitch." Students also said they enjoyed the event but that they wouldn't go downtown if they didn't have to. New students felt there was nothing to do for people their age. Others said they felt "trapped" downtown, with only one route from the University campus to downtown and nothing to do in between. Without transit supportive land uses, such as those the University students are looking for (i.e. retail, entertainment, housing opportunities, etc.), the Connective Corridor may not be viable and transit use may be discouraged.



Source: The Daily Orange, 2006

# c. Institutional Parking

The availability of parking can impact land uses and the quality of life for travelers to University Hill. Currently, about 25% of land in the University Hill area is used for offstreet parking. According to an analysis completed in 2002 by Clough Harbour and Associates (CHA), there are approximately 950 on-street parking and 10,300 off-street parking spaces available. The number of different vehicles that will use a parking space in a Central Business District averages per day.

In 2002, it was estimated by CHA that a total of 11,250 parking spaces accommodate approximately 13,000 employees and 4,000 visitors to the hospitals and universities alone in University Hill. Under existing conditions, a turnover ratio of 1.5 is estimated to accommodate approximately 15,000 vehicle trips per day. Actively managing parking can increase turn-over ratio and accommodate more vehicle trips and people.

The availability of parking in University Hill is perceived as extremely important to the institutions' ability to grow and expand, as well as the area's economic vitality. According to the CPV, a need for approximately 4,000 new parking spaces could occur as a result of growth in University Hill within the next five to twenty years. Given the constraints of the current parking supply, it may not be feasible for the institutions to expand. In turn, this may influence them to look outside of University Hill for a more suitable and accessible location to grow.

The following are current parking objectives and issues that are directly related to the forecast growth of parking demand.

# Satisfy Parking Demands of Employees (Accessibility).

Institutions are faced with a challenge of meeting the parking requirements of employees, while also providing parking for other types of visitors (i.e. students, patients, etc.) One of the benefits of automobile ownership is the flexibility it offers. Maintaining flexibility often means parking within walking distance of our places of employment. From a driver's perspective, it is even better when the parking is free or very low cost and in a convenient location. Given this perspective, institutions find they must provide convenient and inexpensive parking in order to attract and retain employees. Parking within walking distance of the hospitals is also a high priority for hospital patients and visitors.

Thus, convenient and low-cost parking is considered an important need for accessibility. This has resulted in the construction of a number of multi-level parking structures in the study area and more are planned in the CPV.

Peripheral parking in close proximity to the interstate could benefit University Hill. There are at least 3 park and ride lots serving the institutions on University Hill. However, each is located on local streets off of the interstate system. The addition of park and ride lots at more commonly used access points and outside the study area as part of an overall travel demand management strategy could reduce the need for vehicle travel within University Hill, limiting the number of cars on the street and improving mobility to, from and throughout University Hill. Park and ride lots should be close to transit and/or close enough to activity centers where people can choose to walk or bike if convenient.

# Improve Availability of User Information (Flexibility).

Improving user information increases mobility by directing vehicles, pedestrians, bicyclists and transit to their destinations in an efficient manner. Previous studies indicate that 1,000 hours of extraneous travel on urban streets can waste up to 470 gallons of fuel and produces about 7 tons of carbon dioxide.<sup>6</sup> Enhancing way finding will limit the number of vehicle-miles and vehicle-minutes driven in University Hill, which will minimize congestion and improve air quality. Way-finding signage can benefit a community's transportation system while also contributing to its sense of place.

The current design and location of parking lots and garages make it difficult for motorists to differentiate which parking lot belongs to which institution. Information such as parking fees, time limits and availability should be made clearly visible to motorists so they may find a space, which is ideal for their needs and in close proximity to their destination. Proper signage can also contribute to an attractive streetscape. With a unique design, or brand, signage can help create a sense of place in University Hill. Examples of attractive way-finding signage are shown in Figure 13.

# <image>

# Figure 13. Examples of Way-finding Signage

Syracuse Metropolitan Transportation Council I Edwards and Kelcey Wallace Roberts and Todd I Alta Planning and Design

# Provide Incentives and Disincentives to Reduce Parking Demand on University Hill (Economic Viability).

Providing incentives and/or disincentives to park could greatly reduce the number of vehicles entering University Hill and, in turn, reduce the number of parking spaces needed. By reducing demand on University Hill, institutions could avoid costly parking structure construction and maintenance expenses. The expenses saved could be used to invest in other institutional capital investments and to preserve borrowing capacity. It is important, however, to engage a balanced approach that does not discourage economic investment in University Hill. This balanced approach must also consider the view of employees that free, close parking is a priority.

A comprehensive Transportation Demand Management program could be established for the study area to reduce parking demand through a mix of incentives and disincentives. Incentives for limiting the number of cars entering University Hill include preferential parking for car and vanpools, and free or discounted parking for car and vanpools. Disincentives could include increases in parking fees and limits on the amount of parking that is provided.

Priced parking typically reduces parking demand by ten (10%) to thirty (30%) percent compared to unpriced parking. Parking is often overlooked as a major expense for most cities, averaging a national value of approximately \$1,000 per parking space, and much greater in denser areas like University Hill.<sup>7</sup> In addition to the cost of each parking space, property tax revenue for real estate is lost at the expense of parking. Increased revenues earned from priced parking can go into city beautification such as streetscape improvements, attractive bus shelters and improved bicycle/pedestrian facilities.

Major employers could cooperate in the management of parking in University Hill by providing incentive programs for employees, encouraging them to use transit, walk, bike or carpool instead of driving alone to work. Encouraging commuters to reach their destination by foot, bike or other form of non-motorized transportation can improve air quality, enhance fitness and health and, most importantly, is sustainable because it decreases demand for parking and roadway capacity.

Providing incentives for employees of University Hill to use alternative modes of transportation to get to work each day may limit the number of cars in the Hill's institutional core where there is significant congestion. Encouraging employees to park on the periphery and walk, bike, or take transit to reach their destination reduces congestion, limits air pollution and allows for underutilized surface parking lots to be

<sup>&</sup>lt;sup>7</sup> Victoria Transport Policy Institute, "Parking Management: Strategies, Evaluation and Planning," 2006

developed and create economic development. A free privately operated shuttle or subsidized Centro bus could provide employees with transit service from periphery parking areas to their place of employment. Chattanooga, TN implemented a similar plan to reduce congestion while encouraging economic development in its downtown (see Case Study 6). Limiting the availability of parking in the core makes alternative modes of transportation more convenient than driving alone.

# Improve ease of parking management (Economic Viability).

Institutions located in University Hill could benefit from a coordinated parking management plan instead of multiple plans, which aim to resolve each individual institution's parking problems in isolation. It is not unusual for adjacent institutions to plan for the same piece of land. Without coordination, an institution's plans may fail and more land will be devoted to parking and transportation. A lack of coordination can cause economic development to suffer and create an unfriendly environment for bicyclists and pedestrians.

# **Case Study 6. Centralized Parking**





To encourage urban development in downtown Chattanooga while limiting congestion and air pollution, the Chattanooga Area Regional Transit Authority (CARTA) developed a strategy to provide peripheral parking and a free shuttle service. The system is designed for the city's linear central business district and allows workers and visitors to drive to the city, park in one of the two peripheral garages, and use the shuttles to travel up and down the 15-block business corridor. By constructing parking at either end of the business district, CARTA intercepts commuters and visitors before they drive into and through the city center, reducing traffic congestion.

The two parking garages, Shuttle Park South (550 spaces) and Shuttle Park North (650 spaces), are owned by CARTA and operated privately. The free shuttle buses are financed through the garages' parking revenues. They depart from each garage every five minutes all day, every day, and pass within walking distance of most downtown destinations.

The electric-powered shuttles transport approximately one million riders each year, making shuttle-served property attractive to businesses. Since 1992, when the shuttle service began, over \$400 million has been spent on development in Chattanooga, including the successful aquarium, over 100 retail shops and over 60 restaurants. CARTA's initiatives won commendation from EPA, receiving a "Way to Go" award in 1996 for innovative transportation solutions that support urban development.

Source: EPA, 2006

Institutions could share parking facilities to limit the amount of additional parking spaces needed and create enhanced parking options for patients, employees and visitors. Instead of providing parking according to building square footage, consideration could be given to the type of use (i.e. deliveries, handicapped, users without cars such as low income families and students, etc.). Such a plan will allow institutions to grow and remain in University Hill instead of looking outside of the urban core for locations to expand, which would take employment and activity away from the area. Other cities have managed parking issues in a similar fashion, as explained in Case Study 7.

A centralized parking agency or organization can facilitate the concepts suggested above. The parking agency could also foster the trading of land and coordinating of development in University Hill to help accommodate parking where it is needed. Developers could be offered incentives for mixed-use, transit-oriented developments, which make walking, biking or using transit more accessible and convenient while discouraging automobiles.

# **Case Study 7. Shared Parking**

#### Circle Centre: Indianapolis, Indiana

Opened in September 1995, Circle Centre in Indianapolis' central business district offers retail and entertainment destinations. This development contains 630,600 sf of retail space and 100,000 sf of restaurant, specialty, and entertainment space, as well as a 2,700- seat cinema. One of the factors that led to the financial success of this \$300 million project was a shared parking arrangement that saved money and allowed a pedestrian-friendly design.

Under generic minimum parking requirements, Circle Centre would have needed about 6,000 parking spaces. By using shared parking, the project was built with just 2,815 spaces. Shared parking for Circle Centre is used for both customers and employees. The mixeduse nature of the development project allows customers to use a single parking space for multiple destinations within the complex. Employees can use nearby off-site parking, particularly in evenings and on weekends when



more than 12,000 nearby off-site spaces that normally serve downtown office workers become available. Taking these two shared parking components into account decreases the estimated need for on-site parking by more than 50 percent.

This reduction in parking demand translates into considerable cost savings. At parking costs of about \$10,000 per space for above ground structured parking, development costs were reduced by about \$30 million. In addition, operating costs were reduced by approximately \$1 million per year.

Source: EPA 2006

# Decrease Amount of Land Used for Parking (Sustainability).

Currently, 25% of land in the University Hill area is used for off-street parking. As shown in Figure 14 there are two significant clusters of surface parking. The larger cluster is in the northwest portion of the study area and a smaller cluster is located at the SU West Campus and VA Hospital. Both areas are adjacent to major institutions that can potentially grow and expand or have expressed plans to do so in the CPV. Each surface parking lot in these areas takes away potential land for development.

In comparison, the City of Saratoga Springs, New York has about 3,500 surface parking spaces, which makes up 15% of the downtown's land uses. Limiting the number of offstreet surface parking lots and providing parking structures, which fit the City's character and scale, have enabled downtown Saratoga Springs to be a vibrant and pedestrian friendly area. Although University Hill and downtown Saratoga Springs do not have the same institutional land uses, Saratoga Springs can serve as an example for reducing the amount of land dedicated to surface parking and capitalizing on high value properties for economic development and a pedestrian-friendly environment.





# d. Bicycle and Pedestrian Facilities

Walking is the oldest and most basic form of transportation. Most people become a pedestrian everyday at some point in every trip.

Even with challenges to bicycle and pedestrian travel, many people do walk and bike in the University Hill area. To determine existing pedestrian and bicycle trips within University Hill, mode share information for the 2000 Census was examined. In 2000, the mode share for bicyclists and pedestrians was over 36% in the City of Syracuse. Some neighborhoods within the study area experience as much as a 75% mode share for bicyclists and pedestrians. This is a very high percent mode share in comparison to other portions of the City of Syracuse. The estimated daily pedestrian commutes and/or school trips is about 24,000. The estimated daily bicycle commutes and/or school trips are about 3,500. A more detailed analysis of the bicycle and pedestrian facilities is located in the appendix.

Significant pedestrian activity can be found in areas along Irving Avenue near the medical centers, the University Place area, (which is an auto-limited zone pictured on the next page) and the business district on Waverly Avenue. Observations revealed that a larger number of cyclists are present than might be expected. Approximately 30 cyclists per hour were counted at the intersection of Comstock and Euclid near the campus entrance at 12:00 noon. New facilities, such as the new bike lanes on Comstock and East Colvin Street, are a positive step towards improving conditions for cyclists on University Hill and may be influencing the number of cyclists at the observed intersection.

In general, while there are elements of the bicycle and pedestrian infrastructure that are positive, there are many others that are required to make biking and walking safe, accessible and user friendly in University Hill. Developing such infrastructure now will not only serve current users, but will also serve potential future users. It is important that any future development or infrastructure improvement not adversely affect the potential for bicycling and pedestrian activity.



Provide defined bicycle and pedestrian facilities on more streets in University Hill (Accessibility) and use physical treatments that extend the time and distance a person will be comfortable walking or biking (Flexibility).

A bicycle and pedestrian friendly environment can increase the percentage of trips that a traveler will make by biking or walking and extend the amount of time per trip a person will walk. There are only a few sections within the study area that present a bicycle and pedestrian-friendly environment. The lack of street trees, unclear and disorganized sidewalk, wide streets, large corner radii, overhead utilities and lack of pedestrian amenities makes some areas appear more suburban than urban in nature, creating an environment oriented more towards driving a car rather than walking or biking. Also, large surface parking lots fragment University Hill and make pedestrians feel uncomfortable and insecure because of the lack of street life and security. The general lack of a pedestrian-friendly environment throughout University Hill tends to create barriers, whether perceived or physical, between commercial areas and adjacent land uses.

"Complete streets" with elements such as street trees, wide sidewalks, lighting, and bicycle/pedestrian lanes make it less burdensome for people to park further away and walk to their destinations. Building design and attractive streetscapes foster pedestrian-friendly environments as well as encourage business development and decrease the number of miles and minutes vehicles must travel. Clearly marking, or providing the necessary facilities, specifically for pedestrians affirms that pedestrians are part of University Hill's transportation system. It must be made clear to motorists that pedestrians have priority when crossing roadways and motorists should be alert to pedestrians' presence.

Streetscape enhancements help to improve safety conditions for pedestrians and encourage more people to walk, which make a community more "livable." Reducing vehicle speeds on roads around institutions, installing pedestrian refuge islands, narrowing road widths, installing traffic signals with countdown timers or other innovative treatments, and reducing speed limits all contribute to enhancing safety and making pedestrians feel more welcomed and comfortable walking within University Hill.

The University campus and core urban areas largely accommodate safe bicycle access but arterial corridors generally do not. Well-defined bicycle facilities, such as marked bike lanes, exist only along Comstock Avenue and East Colvin Street. On all other roadways in University Hill, bicyclists must share lanes with motorists. Marked bike lanes create a safer environment for bicyclists and motorists. Also, there are facilities for bike storage and lock up on the Syracuse University and SUNY ESF campuses, and Centro has installed bike racks on the bus fleet, but there are few areas for bicycle lock up or storage near bus stops, and few locations where racks are protected from rain and snow. There is a general lack of a well-defined, organized system of bike routes, lanes and staging facilities.

Creating a safe and bicycle-friendly environment involves adding bike lanes to more roads in University Hill and providing bike storage facilities. Law enforcement is important to ensure that motorists, bicyclists and pedestrians will safely share the road – and several instances were observed of motorists and pedestrians not obeying the law. Maintenance is also an important issue, especially during the winter months when ice and snow are present.

Another element is missing from University Hill shared-use path facilities, or trails. Shared use paths, or trails, could serve a wider variety of non-motorized users such as in-line skaters, people in wheelchairs, joggers, dog walkers, bicyclists, and walkers. In urban areas it is important to provide opportunities for recreation, especially those that bring people in touch with their natural environment, which trails certainly do. An example of an urban trail network is explained in Case Study 8.

# Case Study 8. Indianapolis Cultural Trail

#### Indianapolis, Indiana

Beginning in 2007, Indianapolis will start construction of their world-class urban bike and pedestrian path. The path, "Indianapolis Cultural Trail" (ICT) will connect neighborhoods, cultural districts, and entertainment amenities that serve as a downtown hub for an entire greenway trail system. The creation of the ICT was lead by a public-private partnership consisting of several major not-for-profit organizations devoted to building a better city, the City of Indianapolis, and residents with a strong sense of ownership and pride in their city.

The ICT is expected to connect people to one another in new ways and be a place that is accessible for everyone to come and share their individuality, culture and community. It is an effort to get people out of their cars and truly enjoy the city by highlighting Indianapolis' profound history and the uniqueness of the downtown's five cultural districts. Six of the seven miles of the ICT will convert a lane of parking or traffic into dedicated pedestrian and bikepaths throughout the city's urban environment while serving as a playground for residents and visitors to walk, bike, skate, jog, picnic, romance and perform. It will be open to all residents to play in the safe, free and inspiring space.



Source: http://www.indyculturaltrail.info/

There are opportunities in University Hill to link key activity centers by off-road shareduse paths, or trails. Trails can reduce the number of motor-vehicle crashes and injuries and reduce the need for additional roads, travel lanes and parking. A shared-use path, or trail, is beneficial for business and can bring new economic vitality by attracting tourists and encouraging new trail-related business development. They also widen the options for non-motorized transportation, potentially serving in-line skaters, people in wheelchairs, equestrians, bicyclists, joggers, and even snowmobiles and cross-country skiers during the winter months. The extension of the Erie Canalway Trail through the City of Syracuse presents opportunities for University Hill to take advantage of a new connection, both locally and regionally. The Canalway Trail has successfully provided recreation opportunities across the state while also attracting trail-related business and economic development (see Case Study 9).

# Case Study 9. The Erie Canalway Trail

#### **New York State**

The Erie Canalway trail is currently 220 miles of open trail–some paved and some hard-pack cinder. The trail's goal is to someday reach 524 miles across New York State. The Canalway trail offers loads of history, working locks, and plenty of opportunities for family activities along its route (i.e. Camping, site-seeing, etc.).

Trails are catalysts for community revitalization, bringing new investment, increasing land values and luring tourists. The Erie Canalway trail has brought vitality to a number of communities along its route, attracting bed and breakfasts, ice cream shops and new bike-related businesses.

Currently, there is a proposed route passing through the city of Syracuse and anticipated to bring new economic activity with it. The proposed trail route will start at NYS Route 173 in the Town of Van Buren and pass through the Town of Geddes and Village of Amboy past the NYS fairgrounds and linking to the Onondaga Lake Loop Trail (West Shore Trail). The trail will continue to link to the Onondaga Creekwalk, which is being developed by the City of Syracuse, and extend to Armory Square, through Clinton and Hanover Square then continue through the northern area of University Hill between Erie Boulevard East and Interstate 690 (I-690) to the Town of Dewitt.



The trail will not only connect downtown with surrounding communities, but it will provide opportunities to pursue healthy physical activity, bring recreation close-to-home, stimulate economic development, improve the city's image and civic engagement, and be a safe place for residents to walk or bike to work, school, or local shops

# Improve the Connection for Walking and Biking between Downtown and University Hill (Accessibility).

The street layout in University Hill directly impacts the ability to walk or bike. A wellconnected street system, ADA compliant sidewalks, traffic control devices, and bicycle facilities provide better access for pedestrians, reduce walking distances, and provide more choices on travel while dispersing vehicle traffic. Improving pedestrian access makes it easier for commuters, students, seniors and the disabled to get around University Hill without cars.

The I-81 Viaduct/Almond Street corridor is perceived by many as an unsafe and unfriendly barrier between University Hill and downtown Syracuse. Areas along the interstate underpass are generally dark and uninviting for pedestrians and therefore impede pedestrian activity, as depicted in the photo on the next page. It is important to note that the viaduct alone does not create the problem. The multiple lanes of traffic and complex weave of traffic along Almond Street expose pedestrians and cyclists to many automobile turning movements. While the viaduct is the cause of this vehicle travel pattern, Almond Street's circulation may be as much, or more, of an issue for pedestrians than the viaduct itself.

Syracuse is not alone in facing this problem. Some cities, such as San Francisco (CA) and Milwaukee (WI), removed freeway viaducts and created urban boulevards. Other cities, such as Portland (OR) and Miami (FL). experienced similar obstacles in their downtowns and have taken steps to transform these unique areas into inviting public spaces. With either approach, the area could be transformed to a vibrant and attractive gateway to University Hill. There are a number of examples in



The I-81 Viaduct/Almond Street corridor

Appendix A of cities that have faced similar obstacles and have turned these unique spaces into outstanding public/civic spaces.

# Maximize Economic Benefits of Walkers and Cyclists (Economic Viability).

The economic benefits of walking and biking are often overlooked. These include avoided costs, such as health care that result from inactivity, fuel and car maintenance and infrastructure maintenance for automobiles, when people choose to walk or bike instead of drive. There are also benefits associated with the increased tourism spending associated with regional trail connections. Opportunities exist to link University Hill to both the statewide Erie Canal trail, which will be located along the Erie Boulevard/Water Street corridor to the north, and the Creekside Trail along Onondaga Creek to the west. A clear and well-protected connection for pedestrians and cyclists will help increase the number of visitors to University Hill that can spend dollars.

# Improve Pedestrian and Cyclist Safety and Community Health (Sustainability).

Complete streets possess key elements, such as:

- Continuous sidewalks
- Safe crossings at intersections and mid-block locations
- Street lighting
- Year-round maintenance
- Streetscape features

- ADA compliant curb ramps
- Well-designed signage and signals
- Way-finding information
- Law enforcement/safety and security

These elements are essential for encouraging walking and biking and creating an active, healthy community. These elements also provide a safe environment for all modes of travel.

Many intersections and mid-block crossings within University Hill do not have up-to-date signage, pedestrian signals and/or pavement markings, and speed limits throughout the Hill range from 15-30 mph. Parking lots of the large institution buildings and major employers in the University Hill area are on the opposite side of high volume streets such as Adams Street, Irving Avenue, Waverly Avenue and Comstock Avenue, which are difficult for pedestrians to cross. Also, a lack of well-defined pedestrian facilities influences pedestrians to cross the street at undesignated mid-block crossings.

Some areas, such as the Erie Boulevard/ I-690 area, have no sidewalks or crosswalks, making it virtually impossible for pedestrians to safely navigate through the neighborhood and difficult to encourage people to walk there. An absence of ADA compliant sidewalks and crosswalks is a liability for urban communities and can present danger to pedestrians. Intersections in close proximity to the medical institutions in University Hill should use longer walking intervals at signals to allow for disabled patients and visitors to safely enter and exit to their destinations.

Congestion and automobile dependence lessens community health, especially for seniors, parents and their children, and the disabled. The American standard for auto dependence is detrimental to the environment, roadways, sustainability, public health, and the global economy. A built environment oriented towards the automobile reduces the opportunity for non-motorized, active transportation such as walking, and increases the time spent in vehicles. Inactivity is a major risk factor associated with chronic heart disease in America. Additionally, congestion can be linked with asthma, hypertension and obesity.<sup>8</sup> Encouraging walking requires both education and awareness of its benefits as well as physical improvements to the streetscape and roadways.

<sup>&</sup>lt;sup>8</sup> Frank, L., Sallis, J.,Conway, T., Chapman, J. Saelens, B., and Bachman, W. "Many Pathways from Land Use to Health," *Journal of the American Planning Association*. Volume 72-Number 1. Winter 2006.

# 4. SCENARIO PLANNING

When planning for future needs, it is all too easy 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 we might not have expected can be considered when participants examine emerging trends or other "what ifs."

This process is termed "scenario planning." The process can help frame the possible future needs for the University Hill Transportation Study. It can also help participants think about the future impacts of today's decisions. Scenario planning is not intended to precisely forecast future conditions. Instead, it compares the issues raised by alternative futures.

By examining emerging trends and alternative scenarios, the study participants can identify what kind of future they want in 20 years. The trends may also raise the question, "Should we modify the CPV to better fit the desired future"?

Two possible scenarios start to emerge for which we can discuss needs and issues. Both scenarios emphasize the need to keep all of the existing institutions located on University Hill or Downtown Syracuse. However, the scenarios differ in terms of which modes of transportation and types of land use practices are emphasized. Figure 15 illustrates the different scenarios and what needs and improvements they each present.

# a. Move Cars Scenario

The first scenario continues the current practice of focusing our investments on moving cars into, through and out of the University Hill area. This "Move Cars" Scenario will emphasize improvements to the interstate system, arterial roadways, and parking facilities in the study area. The transportation strategies associated with the "Move Cars" Scenario are illustrated on the right side of Figure 15. This approach focuses on providing more physical space and capacity for automobile movement. It seeks to improve features like our interchange capacity, design speed, highway capacity and the visibility and supply of parking.

This scenario is reflected by the balance of spending within the SMTC's 2005–2010 Transportation Improvement Plan. The majority of the regional and the City of Syracuse transportation spending program is committed to roads and bridges compared to transit and bicycle and pedestrian facilities.

# Figure 15. Alternative Strategies



Under this scenario, it is assumed that the current practice of each institution developing separate facilities will continue. The majority of these facilities will be employee- and student-oriented institutional uses (non-residential and non-commercial) as well as parking facilities to support the employees and students. This lane use trend is reflected in the CPV. Some of the current trends and factors, which support the development of this scenario, include:

- Patterns of dispersed and separated land uses are well established. As a result, we are reliant on cars to meet our transportation needs.
- Jobs and populations will continue to move to suburbs and beyond.
- The proportion of households without access to a vehicle will remain low.
- Our personal preference of commuting by car will continue.
- There will be continuing pressure of time on multi-worker households.
- Cars will remain relatively cheap to own and operate.
- Clean tech will keep cars viable despite climate and oil problems.
- Globalization will increase demands for trucking.

# b. Move People Scenario

The second scenario shifts the transportation emphasis to moving people by nonautomobile modes. This scenario looks to enhance transit, biking and walking capacity to provide a greater variety of transportation choices to commuters, visitors and residents. It also seeks to improve connectivity between modes, enhance security and mix land uses in an urban pattern. The strategies which are typically employed to achieve this focus are illustrated on the left side of Figure 15.

The scenario attempts to increase the flexibility of the transportation system. It applies the ecological maxim, "in diversity there is stability," to respond to possible dramatic shifts in our economy which may make driving less viable. Some of these potential forces include decline in oil production, policies implemented in response to climatic change and other socio-economic trends.

In essence, this scenario seeks to reduce the amount and impacts of the automobile trips and parking generated by the CPV. It replaces a portion of the automobile trips with services and features that may provide other benefits than can be achieved with the Move Cars Scenario. As shown in Case Studies 10 and 11, there are other emerging rationales for not focusing on relieving congestion for automobiles, but focusing on moving people instead. The efforts of Copenhagen, Denmark to achieve a more pedestrian-friendly environment are highlighted in Case Study 12.

# Case Study 10. Congestion Counterpoints

"In an era of just-in-time delivery and an increasingly global economy it is unacceptable that traffic congestion currently affects 33 percent of all travel on America's major roadways, leading to 3.6 billion hours of delay each year." Dennis Hastert

Congestion means lost time, squandered productivity, wasted gasoline, increased safety concerns and air pollution. But why can't we seem to eliminate it? Are we really failing? Long waits at restaurants are seen as a sign of success. Should transportation systems be viewed any differently? The following offers 9 counterpoints to challenge the conventional wisdom on congestion.

#### 1. Congestion is an inevitable result of successful cities.\*

Cities exist because they promote social interactions and economic transactions. Congestion occurs where lots of people pursue these actions within limited space. Empty streets are signs of failure. While congestion is an unfortunate consequence of prosperity, it is not a cause of economic decline and urban decay. A larger number and wider variety of activities can be accommodated in cities than suburbs or rural communities. Congestion may be worth the wait.

#### 2. Congestion isn't all it is cracked up to be. \*

When we speak of congestion on University Hill, we generally mean congestion refers to the trip between Interstate 81 and a parking space. However, thinking about this isolated portion of a drive alone commute is only a small part of the picture. As shown in the example in Case Study No. 11, the congested portion of the trip may constitute only a small percentage of the overall commute time. This is typical for the majority of travelers on I-81 in the study area; it may be misguided to spend money to relieve congestion.

Travel behavior research has shown that transfer and waiting times, such as walking from the car to the office, or waiting for a bus, comprise a large share of the trip times and are viewed by travelers as far more onerous that in-vehicle travel time. Most travelers would rather reduce transfer and waiting times by five minutes than in-vehicle travel on congested roadways by five minutes.

#### 3. Cars will remain central to our lives for the foreseeable future.\*

The love affair with cars is not an irrational addiction. It is a rational response both to the utility of cars and to public policies supporting their use. Our reliance on autos unquestionably has huge social costs, but cars also bring enormous public benefits. A few minutes of congestion can make us quickly forget how fast and flexible cars can be. Even in European cities where policies and planning explicitly favor modes other than the car, private vehicle use is rising. Thus, it may be acceptable to plan for adequate not over-sized capacity.

#### 4. Recongestion is unavoidable.

New capacity will attract more cars because of the reduced travel costs. When capacity is increased on a congested road, delay is reduced in the short term and traffic speeds increase. Increase speed reduces the time cost of a trip, making the route more attractive. Travelers who previously used other modes or routes due to the congestion, begin to use the route. As a result, the facility gradually becomes congested again. Absent some corresponding increase in the monetary price of a trip, any change that reduces delay and travel times is subject to this effect.

\*Adapted from "Rethinking Traffic Congestion" by Brian D. Taylor, University of California, Los Angeles

#### 5. Capacity expansion is valuable when it generates more "net" activity.

While capacity expansion in areas of dense activity may fail due to recongestion, it may still bring significant social and economic benefits if it fosters more activity and transactions within the city. If the gain in activity and transactions are lost due to out migration during the evening, it may not be worth the investment.

#### 6. Successful walking and transit environments require two forces.

There are two compelling reasons why walking, biking and transit is vibrant in cities and not in suburban or rural areas. First, the utility of driving is limited in cities. Parking is generally scarce and expensive. Driving speeds are slow on congested streets. When driving in cities gets easier or less costly, other modes suffer. For example, parking supply has a tremendous impact on transit use. Generally, each 1 percent rise in parking supply decreases transit ridership by 0.77 percent. Second, the convenience of these modes must be enhanced through urban design. Most new transit station areas emphasize design treatments to increase the ease of and interest in walking and transit far more than they seek to add to the cost, time or uncertainty of auto use.

#### 7. Fuel costs will not substantially affect congestion.

In addition to giving us personal freedom that no other form of transportation can achieve, the cost of fuel is relatively inexpensive and uses only a small portion of our discretionary expenditures. As a result, recent fuel price increases have had little effect on driving. We only have to look at how people in countries with high fuel taxes continue to drive. We enjoy our cars too much to give them up.

#### 8. If we are serious, road and parking pricing is required.

The most common aim of pricing is raising money to pay back the construction of a road or parking facility. This may be more important if the role of gas as a fuel for autos is reduced by hybrid vehicles or alternative fuel vehicles which consume little or no petrol and thus don't generate fuel tax revenue.

A second aim is demand management to reduce congestion. The impact of demand pricing is much stronger than the cost of fuel on driving. By varying charges by time of day, drivers can be discouraged from traveling during the peak times or encouraged to travel in the off-peak or via other modes. Similarly, by varying charges by location (like the London congestion charge), travelers can be dissuaded from driving to a specific place or via a specific route. Parking pricing can have the same effects as congestion charges, especially when combined with transit strategies.

Some form of road or parking pricing would be the best way to reduce congestion. But toll roads and parking fees are politically risky and unpopular to the general public. Thus political leaders are forced to mitigate traffic by other, less effective means. It is unlikely that these measures would garner support in University Hill. Perhaps, the public's rejection of congestion and parking pricing shows that congestion is less of a problem than they complain about.

#### 9. The future is not what it used to be.

We invest in transportation improvements to relieve congestion based on straight line extrapolations of current trends. We often assume that trends and behaviors will remain unchanged when making decisions for 20 years into the future. We only have to look back at the planning assumptions of the 50's and 60's which relied on male breadwinners as the only commuters, to realize the value of scenario planning. It would also be questionable to think that the number of cars will continue to grow rapidly. While we will have no better luck forecasting the future than others, it is useful to consider alternative scenarios to help us see unanticipated issues.

# Case Study 11. A Sample Drive Alone Commute

Consider the following example:

- A commuter walks from her front door to her car in her driveway on Fairway Circle in Village Green.
- She drives 0.4 miles on Fairway Circle (local street) to a Village Boulevard (collector street), then a half mile to State Fair Boulevard (arterial).
- She then travels on State Fair Boulevard for 2 miles to Interstate 690.
- Once on I-690, she drives east for 8 miles to the Almond Street exit.
- She then exits to access a congested Adams Street and drives 0.5 mile to a parking structure on Irving Avenue and Adams Street.
- She makes three loops up to the third level of the parking structure, where she parks.
- Then, she walks fifty yards and waits for an elevator, which takes her to the first floor.
- She then walks one block to a building and waits for another elevator to take her to the third floor for work.

In this example, the congested portion of the drive within University Hill accounts for only a small portion of the total trip. So even the elimination of congestion on University Hill would only reduce the total trip time by a small percent.

TRIP SEGMENT	DISTANCE (miles)	TIME (minutes)	SPEED (mph)	DISTANCE SHARE (%)	TIME SHARE (%)
Walk to Car	0.01	0.2	3	0%	1%
Drive on Fairway Circle	0.3	1.7	9	2%	5%
Drive on Village Blvd. South	0.4	1.0	24	3%	3%
Drive on State Fair Blvd.	2.5	4.2	36	21%	12%
Drive on I-690 and I-81	8.0	13.8	35	67%	41%
Drive on Almond/ Adams Streets	0.5	5.0	6	4%	15%
Drive in Parking Structure	0.3	1.9	8	2%	6%
Walk to Office	0.1	6.0	1	1%	18%
Total/Average	12.0	33.8	21	100%	100%

# Case Study 12. Jan Gehl and Copenhagen

#### Copenhagen, Denmark

"In a society becoming steadily more privatized with private homes, cars, computers, offices and shopping centers, the public component of our lives is disappearing. It is more and more important to make the cities inviting, so we can meet our fellow citizens face to face and experience directly through our senses. Public life in good quality public spaces is an important part of a democratic life and a full life." Jan Gehl

Jan Gehl is a Danish architect and urban designer whose career has focused on improving the quality of urban life for pedestrians. His ideas are useful for thinking about streets as more than thoroughfares for vehicles. Gehl's book *Public Spaces, Public Life* describes how gradual, incremental improvements transformed Copenhagen from a car-dominated city to a pedestrian-oriented city over 40 years. Copenhagen's Strøget carfree zone, the longest pedestrian shopping area in the world, is primarily the result of Gehl's work.



By 1996, Copenhagen had six times the amount of car-free space than it had when pedestrian initiatives began in 1962.

#### **Gradual Transformations**

Gehl emphasizes the importance of gradual transformation. This will make changes sustainable and give people time to adapt to physical changes, adjust their life styles, and experiment with the new ways of using the city. Gradual transformation allows for greater flexibility in the design process and facilitates attitude changes through public involvement and positive experiences.

#### Necessary, Optional and Social Activity

Gehl distinguishes between necessary, optional and social activities along streets and in public spaces. While necessary activities take place regardless of the quality of the physical environment, optional activities depend to a significant degree on what the street has to offer and how it makes people behave and feel about it. The better a street, the more optional activity occurs and the longer necessary activity lasts. Social activity is the fruit of the quality and length of the other types of activities, because it occurs spontaneously when people meet in a particular place or street. Social activities include children's play, greetings and conversations, communal activities of various kinds, and simply seeing and hearing other people. Streets become meaningful and attractive when all activities of all types occur in combination and feed off each other.

#### Life Between Buildings

The streets of University Hill are home to what Gehl refers to as "Life Between Buildings." Life between buildings is where social interaction and perception, urban recreation, and the sensory experience of city life take place. Life between buildings comprises the entire spectrum of human activities in public space—the necessary, the optional and the social types of behaviors. These are therefore vital areas, and planning processes must begin by understanding these spaces between buildings. "First life, then spaces, then buildings—the other way around never works."

#### Copenhagen's 10-Step Program

Copenhagen is one of the world's great pedestrian cities. The city has worked steadily to improve the quality of its street life. In the 40 years since Copenhagen's main street was turned into a pedestrian thoroughfare, city planners have taken numerous small steps to transform the city from a car-oriented place to a people-friendly one. By 1996, Copenhagen had six times the amount of car-free space than it had when pedestrian initiatives began in 1962.

#### 1. Convert streets into pedestrian thoroughfares.

The city turned its traditional main street, Strøget, into a pedestrian thoroughfare in 1962. In succeeding decades they gradually added more pedestrian-only streets, linking them to pedestrian-priority streets, where walkers and cyclists have right-of-way but cars are allowed at low speeds.

#### 2. Reduce traffic and parking gradually.

To keep traffic volume stable, the city reduced the number of cars in the city center by eliminating parking spaces at a rate of 2-3 percent per year. Between 1986 and 1996 the city eliminated about 600 spaces.

#### 3. Turn parking lots into public squares.

The act of creating pedestrian streets freed up parking lots, enabling the city to transform them into public squares.

#### 4. Keep scale dense and low.

Low-slung, densely spaced buildings allow breezes to pass over them, making the city center milder and less windy than the rest of Copenhagen.

#### 5. Honor the human scale.

The city's modest scale and street grid make walking a pleasant experience; its historic buildings, with their stoops, awnings, and doorways, provide people with impromptu places to stand and sit.

#### 6. Populate the core.

More than 6,800 residents now live in the city center. They've eliminated their dependence on cars, and at night their lighted windows give visiting pedestrians a feeling of safety.

### 7. Encourage student living.

Students who commute to school on bicycles don't add to traffic congestion; on the contrary, their active presence, day and night, animates the city.

#### 8. Adapt the cityscape to changing seasons.

Outdoor cafés, public squares, and street performers attract thousands in the summer; skating rinks, heated benches, and gas lit heaters on street corners make winters in the city center enjoyable.

#### 9. Promote cycling as a major mode of transportation.

The city established new bike lanes and extended existing ones. They placed bike crossings–using space freed up by the elimination of parking–near intersections. Currently 34 percent of Copenhageners who work in the city bicycle to their jobs.

#### 10. Make bicycles available.

People can borrow city bikes for about \$2.50; when finished, they simply leave them at any one of the 110 bike stands located around the city center and their money is refunded.



**Strøget** - In 1962 Copenhagen's old main street became its first car-free street. It's now the central artery of the city's pedestrian street system.

Source: Metropolis Magazine August/September 2002

In order to help maintain the economic viability of the institutions on University Hill, this scenario attempts to integrate the future developments of various institutions into joint or common developments. It also seeks to increase the amount of residential housing in the study area and in downtown. By shifting the jobs/housing ratio, more people can walk to work or are within walking distance of transit. Combined with infill projects, this can reduce the amount of land needed for parking facilities.

There are a number of visible signs of increased residential attractiveness in urban areas. For example, empty-nester, baby-boom parents with reduced space needs are coming back to the City. Household composition is changing and is impacting residential demand in urban area. The growth in childless couples, non-family households and single person households has created a demand for vibrant, urban places.

Strong levels of immigration have been a boom to cities. However, immigrants are among the most dependent segments of the population on non-automobile travel. This scenario will help to attain the cultural and labor benefits that can be attained from immigration.

Competition among regions and cities for skilled labor will be increasingly based on quality of life factors. Cities that have developed attractive amenities will have a stronger hand in the competitive labor market. The walking environment, including its level of social interaction, of a city is often one of the intangibles that rank highly among young professionals.

# c. Conclusion

For the last century, cities have chosen the traditional scenario of moving cars. This strategy inevitably has affected auto dependence and significant amounts of investments in the nation's infrastructure. The alternative strategy of moving people is forward-looking and innovative. It also provides the greatest benefits economically, socially and environmentally. However, the two scenarios need not be exclusive of each other. As part of this study, it is a matter of defining what we participants want to happen in the future and finding a balance of strategies to meet the corresponding needs. The discussion above highlights some of the needs that can be addressed with each scenario.

# 5. NEXT STEPS

The next steps in the study process include four important activities. The first is for the Working Group to review and refine needs and issues identified herein. The second is to establish a set of objectives to address those needs and issues. Developing a broad set of alternative solutions to meet those objectives is the third. This will include the efforts to develop University Hill specific prototypes to support joint development and transit and pedestrian supportive land uses. The fourth step will involve both identifying a set of performance measures to evaluate the alternatives and then comparing the alternatives against those measures to select the strategies that best fit with the Working Group's vision.

# Figure 16. 1947 USGS Topographic Map



This 1947 USGS topographic map illustrates the University Hill and Downtown roads and rail system prior to the completion of the interstate system.

To help prepare the Working Group for these steps, a draft set of objectives and performance measures is provided in Tables 5-8. The objectives and measures are organized by each of the four basic needs. The objectives move past the general goals of the study without being explicit recommendations. They form a bridge that articulates what the Working Group means when they say "improve interstate access, parking, transit and bicycling and pedestrian facilities."

An objective pertaining to one need may appear to conflict with an objective pertaining to another. The most obvious is the conflict between maximizing the utility and benefits of the automobile with objectives that support transit, bicycling and walking. This will require the Working Group to determine which blend of preferred objectives best fits its vision for University Hill. It may result that some objectives are emphasized more strongly in some portions of University Hill than in others.

The measures used to evaluate the alternative strategies should directly relate to the objectives. The measures should also be easy to obtain data or gauge the order of magnitude impact. It is desirable to use measures that can be revisited in the future to assess how well the recommended solutions are performing. A preliminary set of measures is presented in Table 3, Table 4, Table 5, and Table 6 to start the Working Group move forward in setting its measures.
## Table 3. Accessibility Objectives and Measures

Mode	Objective	Potential Measure
Interstate Access	Improve connection of interstate system to access University Hill and Downtown. Relieve congestion on streets linking University Hill and Interstate 81.	Percent of persons traveling to University Hill using the interstate. Households within a 30-minute travel of University Hill Vehicle hours of delay. Number of volume/capacity hot spots.
Transit Service	Make system easy for riders to grasp, to go places and to save time and money. Attract a wider variety of users.	Number of transit hubs Frequency of bus stops at activity centers. Transit ridership.
Parking	Satisfy parking demand of employees.	Amount of free parking within walking distance of institutions.
Bicycle and Pedestrian Facilities	Include defined bicycle and pedestrian facilities on more streets in University Hill. Improve access to the Connective Corridor between Downtown and University Hill.	Block faces with good/excellent bicycle and pedestrian facilities (i.e. complete streets). Number of residents within a 5-minute walk of the Connective Corridor.

## Table 4. Flexibility Objectives and Measures

Mode	Objective	Potential Measure
Interstate Access	Increase number of driving route choices for accessing interstates. Connect interstate with peripheral transit, bicycle, and pedestrian facilities.	Ratio of local to through traffic on Interstate 81 corridor.
Transit Service	Make routes easy for buses. Establish priority roadways for transit.	Mode share Route travel time.
Parking	Provide additional park and ride lots both on and off University Hill. Increase use of on-street parking.	Ratio of parking in study area and off-site park and ride facilities. Percent of block faces with on-street parking.
Bicycle and Pedestrian Facilities	Establish priority roadway for bicycle and pedestrian facilities. Improve walking and biking between Downtown and University Hill. Extend average time a pedestrian will walk per trip. Maintain or grow mode share.	Percent of street miles designated to bike facilities or total length of bike facilities. Mode share/Journey to Work percentage. Travel distance to air-line distance ratio.

## Table 5. Economic Viability Objectives and Measures

Mode	Objective	Potential Measure
Interstate Access	Use interstate system to serve regional traffic and goods movement.	Percent of traffic that is local vs. regional Ratio of University Hill employees residing inside city to employees residing outside city. Job growth in University Hill. Number of segments approaching or exceeding capacity.
Transit	Improve user-friendliness. Make a transit trip less costly than the full cost of a car trip.	Reduction in free parking.
Parking	Reduce costs to institutions to provide parking. Encourage institutions work together to manage parking.	Number of off-site public park and ride lot spaces. Number of jointly managed and shared use parking spaces.
Bicycle and Pedestrian Facilities	Maximize economic benefits of walkers and cyclist activity.	Number of jobs within a 10-minute walk. Number of residences accessible within a 10-minute walk of University Hill employers. Number of connections to regional trails.

## Table 6. Sustainability Objectives and Measures

Mode	Objective	Potential Measure
	Strengthen connection to University Hill via interstate.	Percentage of parking facilities with pricing.
	Use pricing to support use of automobiles.	Carbon dioxide emissions from vehicles.
Interstate	Meet air quality standards.	Energy use.
Access	Maintain safety of users.	Spacing of interchanges meeting FHWA criteria.
Transit	Develop transit supportive land uses and ridership.	Density and mix of development around transit hubs.
Parking	Decrease amount of land used for surface parking.	Acreage of land used for parking.
	Improve community health.	Obesity rates.
Bicycle and Pedestrian	Ensure safety of users.	Percent of street wall complete.
Facilities	Strengthen connection between Downtown and University Hill.	Percent of streets with street trees and square footage of landscaped street features.