South Lake Union Transportation Study

Final Report

July 2004

The South Lake Union Transportation Study was led by the City of Seattle Department of Transportation (SDOT) in cooperation with the Washington State Department of Transportation (WSDOT). To conduct this project, SDOT and WSDOT contracted with:

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CHAPTER 1: BACKGROUND

The South Lake Union (SLU) area has experienced dramatic changes over the last twenty-five years. In the past, this area supported more traditional processing-related and marine-based industries with workers living in the Cascade Neighborhood. Today, the area is home to commercial and retail establishments and, more recently, a significant number of biotechnology (bio-tech) and high-technology (high-tech) companies. The changes are expected to continue into the future with additional growth in jobs and housing. The City of Seattle estimates that by the year 2020, growth in the SLU area will result in over 20,000 new jobs and 10,000 new housing units. In addition, substantial growth is anticipated in other neighborhoods in the area, including the Denny Triangle. To ensure that the necessary infrastructure and programs are in place to support this growth, the City of Seattle is conducting the South Lake Union Transportation Study to identify needed transportation improvements and strategies.

Goals

The main objective of the South Lake Union Transportation Study is to form a set of transportation strategies to address existing problems and to support and shape the development of the South Lake Union Urban Village. More specifically, the City has developed the following five goals to guide the development of transportation strategies:

1) Improve mobility and access for all modes of transportation;
2) Improve regional access to and through South Lake Union;
3) Promote economic vitality, neighborhood livability, sustainable development, and quality of life;
4) Improve safety for all transportation modes; and
5) Work toward implementing City of Seattle Comprehensive Plan goals and other city policies and plans.

History and Context

The South Lake Union area has the unique distinction of bordering downtown Seattle on the south end and an urban lake (Lake Union) on the north end (see Figure 1.1 for a vicinity map). Historically, the area has been used for industrial (heavy and light), wood processing, and maritime activities, as shown by the many warehouses and railroad track remnants remaining in the area. The construction and expansion of I-5 and SR-99 in the 1950s and 1960s created barriers that isolated South Lake Union from the surrounding neighborhoods of Queen Anne and Capitol Hill.

In the 1960's the City purchased right-of-way in the vicinity of Mercer and Valley Streets for an elevated roadway, the Bay Freeway, to connect I-5 to Seattle Center, and eventually the waterfront. This project was successfully challenged in court and then rejected in a subsequent attempt for voter approval. In the following years, the City and others conducted approximately 50 studies of transportation, land use, and/or open space for South Lake Union, and considered about 30 different alternatives for the Mercer Corridor. In 1999, the South Lake Union neighborhood plan recommended against any further consideration of the "expressway" solutions that many of the past plans had sought, and instead suggested

incremental improvements, primarily within the existing street system. As a result, the City finally sold the Bay Freeway properties, freeing them for development.

The face of South Lake Union began to change when the Fred Hutchinson Cancer Research Center (FHCRC) opened its first facility in the area. The FHCRC has expanded its own campus and drawn other bio-tech companies to the area over the past ten years. The recent arrival of a number of bio-tech and related research firms, along with the opening of a University of Washington research campus in the fall of 2004, has set the stage for continued job growth into the future.

Although the South Lake Union area has received increased attention from the recent development of bio-tech companies, this area is truly a mixture of uses, from residential to manufacturing and its future promises to continue as such. Residential uses have historically been located in the Cascade Neighborhood, between Fairview and Eastlake Avenues, but new housing is expected in other parts of the neighborhood as well. The City of Seattle expects growth in jobs and housing to be significant in the study area over the next thirty years, with much of it happening over the next twenty.

Figure 1.1: Vicinity Map

While the transportation network has been generally supportive of automobiles vs. other modes, this type of transportation system will not adequately support or facilitate the expected growth in housing and jobs in a way that supports the City of Seattle's transportation goals and policies. Furthermore, the primary emphasis for major arterials in this area has been to move through-traffic, with less consideration for SLU as a destination.

Concurrent projects have been undertaken that have potential direct impacts on the South Lake Union (SLU) neighborhood. These include the Alaskan Way Viaduct and Seawall Replacement Project (AWVSRP), which is looking at various treatments of Aurora Avenue N. (SR 99), which could enhance east-west connections between South Lake Union and Queen Anne, including Seattle Center. Another significant project underway is the development of a regional park, South Lake Union Park, on Lake Union north of Valley Street. The study team coordinated with these and other projects in the area to ensure recommendations are consistent with and supportive of each other.

The overall planning area for the South Lake Union Transportation Study is defined by the following boundaries: Denny Way to the south, Fifth Avenue N. to the west, I-5 to the east, and Ward Street to the north. The primary focus of this study is from Fairview Avenue (east) to Fifth Avenue N. (west) and Denny Way (south) to Valley (north). Figure 1.2 displays the boundaries of the study area.

Policies and Plans

The development of the South Lake Union Transportation Study included a review of relevant policies and plans, including the following:

City of Seattle Comprehensive Plan: This study supports a number of the City's policies outlined in the 1994 Comprehensive Plan (to be amended in 2004), including:

- Land use and transportation that work together to accommodate growth and change
- Providing choices to encourage changes in travel behavior
- Setting priorities for a street system that improves access and mobility
- Providing for and managing parking
- Improving non-motorized travel, transit, and public transportation
- Preserving and improving commercial transportation mobility

The City of Seattle's Department of Planning and Development is preparing the ten-year update to the Comprehensive Plan for adoption in the fall of 2004.

The South Lake Union Neighborhood Plan: This plan was published in 1998. The planning committee identified two plan goals specific to transportation:

- A neighborhood with an efficient east/west transportation corridor that serves neighborhood and sub-regional needs.
- A neighborhood with adequate parking available to support neighborhood businesses and activities now and in the future.

- To help reach these goals, the plan includes the following policies:
- Encourage Mercer/Valley improvements that support development of South Lake Union Park, city-owned parcels and other adjacent properties.
- Favor a set of improvements that are reasonably fundable and that do not require excessive new right-of-way.
- Explore transportation improvements that would link South Lake Union and Lower Queen Anne.

The Neighborhood Plan included a number of specific recommendations. All were considered and evaluated in this study.

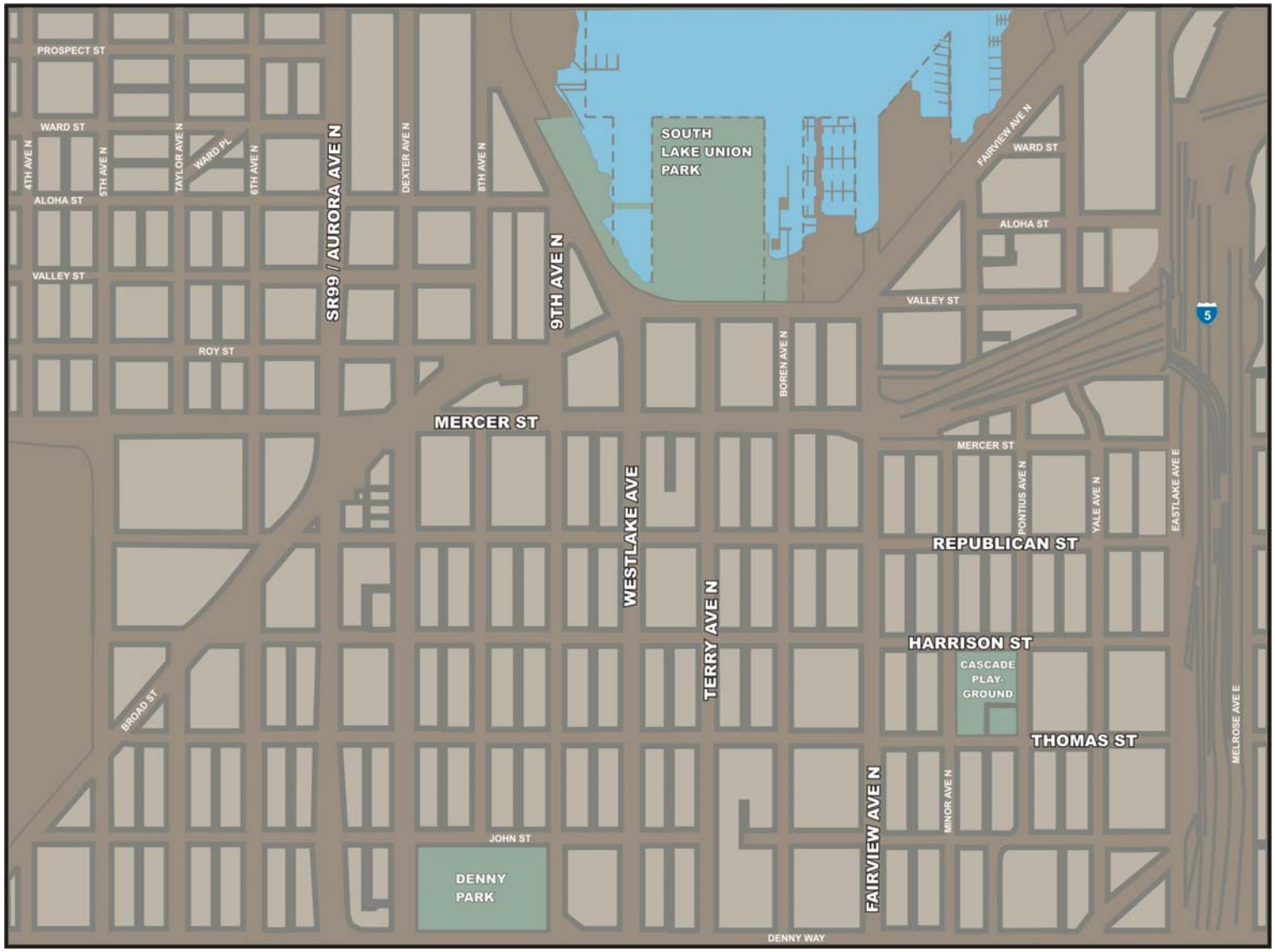


Figure 1.2: Study Area Map

City Council Resolution: In June 2003, the City Council adopted Resolution 30610 to support high-tech and bio-tech in the South Lake Union area: "The City Council hereby reaffirms its commitment to the redevelopment of the South Lake Union area to become the region's most competitive location for bio-tech, clean energy and high-tech research and manufacturing."

Mayor's Action Agenda for South Lake Union: In order to guide the current study, the Mayor developed an action agenda for South Lake Union that incorporates the goals and objectives of the above noted plans and policies for SLU. The Mayor's Action Agenda included five points:

- Attract bio-tech jobs
- Create a waterfront park
- Help create a great neighborhood
- Build Streetcar
- Improve the Mercer Corridor
- Upgrade essential utilities to provide for growth
- Promote sustainable development practices

Previous Study Phases

The South Lake Union Transportation Study is the third phase of a series of studies that have built upon each other. Phase I involved a brief summary of potential improvements to the Mercer Corridor itself. This phase examined Mercer Street from Fifth Avenue N. to the I-5 ramps at Fairview Avenue, Valley Street between Fairview Avenue and Westlake Avenue, and Broad Street from Westlake Avenue to Fifth Avenue N.

Phase II included a more detailed analysis of potential Mercer Corridor improvements and identification of a preliminary preferred solution. Traffic analysis tasks and cost estimates for this solution were developed, and a public open house was held in November 2002 to gather input from the community. The Phase II process and results are documented in the *Mercer Corridor/South Lake Union Transportation Study Phase II Report* (Parsons Brinckerhoff, April 2003, and revised June 2003).

Phase III of the study incorporates and updates results from the previous two phases and expands the analysis to encompass the entire SLU area. The process and results from Phase III of the study are documented in this report.

Other Study Area Projects

As mentioned previously, a number of other studies relevant to the SLU area have either recently been completed or are currently being undertaken. Table 1.1 lists other studies, related to the South Lake Union Transportation Study, and summarizes their relationship to this study.

Table 1.1: Coordination with Other Projects

Project/Study	Relationship to SLU Transportation Study
Mercer Corridor Project	The SLU Transportation Study analyzed and recommended potential solutions for the Mercer Corridor in the context of the overall SLU study area. The Mercer Corridor Project will further develop and analyze alternative solutions as part of the environmental review process.
Alaskan Way Viaduct/Seawall Replacement Project	The SLU Transportation Study has coordinated with the Alaskan Way Viaduct/Seawall Replacement Project (AWVSRP) and incorporated one of the EIS Alternatives under consideration for the north end; however, some details of this alternative have been modified to better meet the goals of the SLU Study. Coordination with the AWVSRP will continue.
Center City Access Study	The Center City Access Study is assessing ways to improve access to Center City neighborhoods, including during construction of the AWVSRP. This ongoing study is coordinating with the SLU Study and incorporating some SLU Study recommendations. As the study is refined, it may revise some aspects of the SLU Study recommendations.
Terry Avenue N. Street Design	Draft Terry Avenue N. Street Design Guidelines are incorporated into the SLU Transportation Study recommendations.
Seattle Streetcar Network and Feasibility Analysis	The Seattle Department of Transportation completed the Seattle Streetcar Network and Feasibility Analysis in June 2004. This report provided an assessment of the SLU Streetcar, as well as other potential streetcar routes in Seattle.
South Lake Union Park Design	The Seattle Department of Parks and Recreation will complete the design for SLU Park this summer. Compatibility with the park design and access to SLU Park was a factor in evaluating SLU Transportation Study recommendations.
Center City Circulation Report	The recently completed Center City Circulation Report made recommendations for transit and non-motorized circulation improvements in the Center City neighborhoods. Recommendations relevant to the SLU Transportation Study area have been incorporated into SLU Study recommendations.
North Downtown Park Plan	The North Downtown Park Plan (NDPP) is identifying park/open space needs and opportunities related to projected growth in SLU and Denny Triangle. Key elements of the SLU Transportation Study recommendations considered in the NDPP include pedestrian and bicycle access to existing facilities, green streets, and pedestrian-friendly design of streets near parks.
Cascade Playground Design	The SLU Transportation Study recommendations include pedestrian improvements along Thomas and Harrison Streets near the playground.
Seattle Center Theater District Plan	The SLU Transportation Study has been coordinating with the Seattle Center planning efforts.

CHAPTER 2: METHODOLOGY

Data Collection

The data collection effort for this project included compiling existing data and gathering new data in the field to support traffic analysis and planning efforts for the overall study.

Existing data and information compiled included the following:

- City of Seattle traffic counts
  (most current counts available; in most cases year 2001 data was used)
- City of Seattle signal timing data
- City of Seattle travel forecasting model output
- Puget Sound Regional Council demographic data for years 2000, 2020, and 2030
- City of Seattle Comprehensive Plan (1994, updated 2002)
- South Lake Union Neighborhood Plan (1998)
- King County Metro bus stop locations
- King County Metro transit routes
- AWVSRP traffic counts

New data collected in the field included the following:

- Field surveys of facilities related to all transportation modes in study area, including:
  - Bus stop locations
  - Bus shelter locations
  - Bus routes and headways
  - Bicycle routes
  - Location and condition of sidewalks
  - Roadway geometry
  - Location of on-street parking
- Specific origin and destination data for Valley Street traffic between Fairview and Westlake Avenues, which included a special emphasis on truck movements in the area.

Objectives/Measures of Effectiveness

In order to evaluate the proposed improvement packages (as will be described in Chapter 6) the study team developed objectives that corresponded to the SLU Transportation Study goals. The overall study goals and corresponding objectives are shown in Table 2.1.

Table 2.1: SLU Study Goals and Corresponding Evaluation Criteria

Goal	Objectives
Improve Mobility and Access for All Modes within and between SLU, Surrounding Neighborhoods, and Downtown Seattle	Provide improved connections across SR 99/Aurora Avenue
	Improve transit service possibilities within SLU, surrounding neighborhoods, and downtown Seattle
	Improve pedestrian and bicycle connection throughout SLU, across SR 99/Aurora and to Eastlake and Capitol Hill
	Improve non-motorized connections across Mercer & Valley Streets to SLU Park
	Encourage pedestrian, bicycle and transit use as a way to accommodate travel demand
	Improve transit speed and/or reliability through and within SLU
	Improve arterial connections between SLU and surrounding neighborhoods and downtown Seattle
	Improve or maintain vehicle travel times on key routes through SLU
	Improve or maintain average vehicle system delay throughout SLU
Improve Safety for All Transportation Modes	Improve roadway and intersection geometry (e.g., to reduce weaving movements, improve way finding, etc.)
	Provide appropriate separation between pedestrians, bicyclists and vehicles
	Provide safe pedestrian crossings
	Provide safe pedestrian access to transit
Improve Regional Access To and Through South Lake Union	Improve arterial street connections to and from I-5 and SR 99
	Improve connections between I-5 and SR 99
	Improve regional transit service to SLU
	Improve local transit connections to regional transit service/lines
	Improve bicycle connections to regional bicycle facilities and routes
	Improve or maintain regional freight routes
Promote Economic Vitality, Neighborhood Livability, Sustainable Development and Quality of Life	Improve streetscape design
	Accommodate local business access and circulation needs
	Encourage transit and/or pedestrian oriented development.
	Provide for a safe and active pedestrian environment within SLU
	Improve non-motorized access to SLU park
	Manage parking appropriately to reflect a sustainable balance between parking demand and supply, and study area mode split goals
	Minimize adverse environmental impacts
	Minimize residential and business displacements
Work Toward Implementing Comprehensive Plan Goals and Other City Policies and Plans	Support projected growth and planned land-use patterns
	Support SLU Neighborhood Plan Goals and Policies
	Support City Plans and Policies
	Support other infrastructure and development plans
	Support the Mercer Corridor Project recommendations
	Reflect feedback from SLU Stakeholders
Implementation Feasibility (not a formal goal)	Constructability (relative ease or difficulty in constructing the improvements)
	Financial limitations
	Public/Political Acceptability
	Cost effectiveness (qualitative)

The objectives were used as criteria to evaluate the overall effectiveness of alternative improvement scenarios in meeting the study goals. Implementation feasibility was added to the list of formal study goals. Even though this particular goal was not included in the original list, the ability to implement the recommended project was deemed critical to a successful planning effort.

Travel Demand Forecasts

The SLU Transportation Study Team developed year 2030 traffic forecasts by using growth rates obtained from the City of Seattle EMME/2 travel demand model and applying them to existing observed traffic counts. The travel demand model projects future traffic volumes by estimating the growth in trips due to projected growth in employment and housing throughout the four County region (King, Snohomish, Pierce, and Kitsap). The trips between areas within the region are assigned to modes (drive alone, carpool, and transit) and assigned to the future transportation network.

The year City of Seattle 2030 network for this study is consistent with the regional transportation plan, Destination 2030, with two exceptions: 1) the Destination 2030 network assumes one additional general purpose lane and one HOV lane per direction on the SR 520 bridge, while the City of Seattle model assumes only HOV lanes; 2) parking prices, which affect mode choice, are assumed to increase by 1.5 percent per year in the city model compared to 3 percent per year in the Destination 2030 model.

A variety of screenlines were drawn throughout the study area to capture the projected north-south and east-west traffic demands from the forecasting model at different locations throughout the area to ensure that reasonable average growth rates could be developed across groups of parallel arterial facilities. The intent of this process was to understand overall future demands for the area prior to developing the more detailed arterial and turning movement volumes.

The study team then applied the screenline growth factors to existing intersection approach and turning movement counts in the study area, to arrive at raw projected volumes. The raw projected volumes were then reviewed in conjunction with the current or proposed roadway facilities and known or expected traffic patterns. This information was used to balance the volumes and develop the draft post-processed arterial volumes and turning movement estimates for selected streets in the SLU study area.

These volumes were then input into the Synchro/SimTraffic model to perform traffic simulations of future conditions. Based on initial SimTraffic model results the input volumes were further refined to develop final post-processed study area analysis volumes.

Simulation Model Development

The primary analysis tool used to evaluate study-area traffic conditions in terms of average vehicle delays, level of service, and point-to-point travel times was the Synchro/SimTraffic package (version 5.0). Synchro/SimTraffic is commonly used in transportation planning to simulate traffic flow and intersection operations based on

accepted macroscopic and microscopic simulation analysis techniques. The basic input program, Synchro, is a macroscopic analysis modeling tool intended to estimate vehicle delays, queuing, and traffic stream progression based on static analysis equations and calculations. Synchro provides a relatively quick and easy way to determine vehicle congestion through automated analysis calculations similar to those documented in the year 2000 *Highway Capacity Manual* (HCM). Typical intersection-level inputs and parameters used in Synchro follow.

- Turning Movement Traffic Volumes (in vehicles per hour)
- Heavy Vehicle Proportion (percentage of trucks)
- Non-Motorized Traffic (number of pedestrians/bicyclists)
- Lane Geometry (width, number, length of through/turn lanes)
- Signal Data (cycle lengths, green time allocation, phasing, etc.)
- Transit Movements (number of bus movements)
- Parking (number parking maneuvers)

The SimTraffic module takes the Synchro model analysis to the "next step" in an effort to simulate individual vehicle movements and their discrete interactions during a designated time period (typically a peak hour). This type of analysis is useful for determining in greater detail the effects of queue spill-back (traffic back-ups) from one intersection to an adjacent intersection. SimTraffic also provides a more accurate picture of how long vehicles are waiting at signals within the roadway system, by evaluating the performance of each vehicle individually and determining how other vehicles affect their specific paths of travel.

Basic input data for Synchro/SimTraffic was provided either by the City of Seattle (from previous studies conducted in the South Lake Union Area) or where needed, from field data collected during peak traffic periods. To evaluate existing AM and PM traffic conditions, the basic inputs were entered in their unprocessed state to emulate current traffic parameters and conditions accurately.

For the future 2030 analysis scenarios, roadway lane geometries in terms of number of lanes, directional configurations, and connections across Aurora Avenue N. were modified to reflect the specific options under consideration. Future-year peak-hour traffic volumes were developed based on output from the City of Seattle's EMME/2 travel demand model, which reflected the projected job and housing growth in the region, including SLU. Growth rates were derived from the travel demand model output and applied to existing volumes to arrive at future year volumes.

Other traffic-related inputs (e.g., transit and non-motorized traffic volume estimates) and signal data were also estimated and/or changed accordingly, to reflect anticipated conditions and, in the case of signal timings, to ensure that the overall system was optimized to accommodate the expected increases in congestion. Due to the anticipated congestion levels for existing conditions and the various 2030 future condition

scenarios (and associated intersection queuing), results for the simulation and analysis were reported from SimTraffic, rather than from the Synchro model output.

CHAPTER 3: PUBLIC INVOLVEMENT

Phase III of the South Lake Union Transportation Study sought broad public participation to provide information about the study and to seek input on the study's recommendations. Public input was sought at three distinct stages: issue identification; review of potential improvements; and development of draft recommendations. Outreach was targeted to both the general public and specific stakeholders, including residents, business owners, property owners, and interest groups affected by transportation in the South Lake Union area, as well as those in the surrounding area who travel through South Lake Union.

Public Involvement Events and Tools

The following is a description of public involvement activities and tools that were used to support development of recommendations for the South Lake Union Transportation Study.

Public Involvement Plan

During the initial stages of Phase III, a public involvement plan was developed to lay out the goals, objectives, and tools to be used to engage the community in the study. The plan proposed a schedule of activities to coincide with technical milestones in order to maximize public input as the process moved forward. A list of targeted stakeholders was also included in the plan, along with a description of tools to engage those stakeholders and to incorporate their feedback. The public involvement strategy helped inform technical work at all stages of the project and was modified to maximize community input at key decision points in the development of draft study recommendations.

Public Open Houses

The public was invited to two open houses during Phase III. The first open house, held in October 2003, sought feedback on the study's goals, objectives, issue areas, and potential solutions. The second open house, held in March 2004, gave the public an opportunity to review and comment on draft study recommendations. The second open house was held in conjunction with the Mercer Corridor Project EIS scoping meeting. At both open houses, members of the public reviewed display boards, asked questions of study team members, and submitted comments.

Two postcards, included in Appendix A, were used to announce the open houses. The postcards were mailed to approximately 1,750 people in the study area, and an announcement was posted on the study web site. E-mails announcing the open houses were sent to stakeholders and announcements were made at community group meetings.

The following summarizes general comments on the Phase III recommendations that were received at the March open house:

- Build the streetcar.
- Make Westlake and Ninth Avenues two-way.
- Increase and improve transit, including added connections to the regional transportation system.

- Narrow Valley Street and make Mercer Street two-way.
- Connect South Lake Union to surrounding neighborhoods and downtown Seattle.
- Make South Lake Union more pedestrian-friendly.

Stakeholder Work Sessions

Because the duration of Phase III of the study was relatively short, SDOT engaged the efforts of a stakeholder group to solicit detailed information on the study, exchange opinions and ideas from diverse perspectives, and to enlist community leaders to share study information with their organizations. At two, three-hour work sessions, stakeholders were asked to provide feedback on issues that should be studied, and then to comment on and rate potential improvement scenarios. Input from both work sessions was used to frame technical analysis, and to inform development of the study's recommendations.

The first stakeholder work session was held in November 2003, and the second in January 2004. Detailed summaries of the two stakeholder work sessions are included in Appendix A.

Stakeholder work session participants included representatives from:

- SLUFAN
- Cascade Neighborhood Council
- Uptown Alliance
- Seattle Center
- Queen Anne Community Council
- Eastlake Community Council
- Seattle Parks Foundation
- Vulcan, Inc.
- Ballard Interbay Northend Manufacturing and Industrial Center (BINMIC)
- Seattle Times
- Consolidated Works
- PEMCO
- Center for Wooden Boats
- Fred Hutchinson Cancer Research Center
- Trident Seafoods
- Kenmore Air
- Shurgard Storage

Community Group Involvement

The study team met with existing community and business groups to brief them on study progress and to solicit input at key milestones. Team members attended groups' regularly scheduled meetings to give a short presentation and answer questions.

The following community groups were briefed as part of the outreach conducted for the South Lake Union Transportation Study:

- SLUFAN
- Cascade Neighborhood Council
- Queen Anne Community Council Transportation Committee
- Queen Anne Chamber of Commerce
- Uptown Alliance
- Lake Union District Council
- SLUNET
- BINMIC
- North Seattle Industrial Association

At the outset of the public involvement process SLUFAN and the Cascade Neighborhood Council were recognized as playing important roles in the South Lake Union community. SLUFAN is the neighborhood plan stewardship group, and both groups represent a broad coalition of business, residential neighborhood, and property owner interests. A greater effort was made to involve these groups, and the study team presented to each group several times. The success of the South Lake Union Study will be greater due to the active role SLUFAN and the Cascade Neighborhood Council, and their individual members, played in developing Phase III study recommendations. SLUFAN will also be the primary contact with the project team as the study is finalized and published.

Individual Stakeholder Interviews

In order to gain a better understanding about the needs of South Lake Union businesses, the study team conducted targeted business interviews. Individual interviews were conducted throughout the study area with existing businesses, emphasizing those that might be affected by potential recommendations, such as Westlake and Ninth Avenues, and businesses planning to relocate to South Lake Union in the near future.

Business owners, or their representatives, were asked to provide information on the logistics of their business, identify potential issues or unique situations related to transportation, and offer suggestions for improvements. A complete summary of the interviews can be found in Appendix A. The following businesses were interviewed for the study.

- Athletic Supply
- Chefshop.com
- Duke's Chowderhouse
- Jones Soda
- Morningside Academy
- NBBJ
- Northwest Wholesale Florists
- REI
- Seattle Biomedical Research Institute
- Seattle Times
- Shurgard Storage
- Tommy Bahama
- Vulcan, Inc.

Freight Community Outreach

In an effort to acknowledge South Lake Union's mix of industrial and commercial businesses and the key freight route passing through it connecting I-5 to neighborhoods north and west, the study team sought participation from the freight community both in and around South Lake Union. Representatives from BINMIC (the Ballard Interbay Northend Manufacturing and Industrial Center), and other Interbay businesses were invited to participate in stakeholder work sessions, and a meeting with members of the freight community was held in January 2004. At the meeting, the study team discussed freight issues and possible solutions with representatives from Trident Seafoods and Charlie's Produce. A complete summary of the freight meeting is included in Appendix A.

Study Web Site

The City developed a web site to provide updated study information to the public. Information, such as the draft study recommendations, study goals and objectives, and open house announcements and materials were available on the Seattle Department of Transportation Web site throughout Phase III of the study.

The Web site URL is: http://www.cityofseattle.net/transportation/southlakeunion.htm.

Public Feedback

The technical team used comments and feedback heard throughout the public involvement process to help them develop a recommendation package for Phase III. Public meeting comments were combined with input heard from individual stakeholders and groups. Overall, stakeholders were supportive of the recommendations. Table 3.1 illustrates how public input was incorporated into the Study's recommended improvement package:

Table 3.1: Public Input to the Recommended Improvement Package

What We Heard	*What We're Recommending*
Increase connections between I-5 and Queen Anne	• Turn Mercer Street into two-way street, improving westbound route • Add Thomas or Harrison Street crossing of SR 99/Aurora Avenue
Improve access to South Lake Union Park	• Make Valley Street a narrower, two-lane street • Improve pedestrian crossings of Valley and Mercer Street
Connect South Lake Union and downtown Seattle	• Add streetcar between downtown and South Lake Union • Improve transit bus frequencies and travel times along Fairview Avenue • Add directional signs to downtown bicycle routes • Improve pedestrian crossings on Denny Way
Improve and maintain freight mobility in and through South Lake Union	• Remove weave and turns associated with Fairview and Valley for connection to Interbay and Fremont • Accommodate trucks in the design of a two-way Mercer Street
Enhance the pedestrian experience and improve connections	• Improve pedestrian crossings of Mercer, Valley, and Denny, and across SR 99/Aurora Avenue • Add a sidewalk to the north side of the Denny Way bridge crossing I-5 • Provide ample sidewalks along Mercer and Valley • Incorporate and construct the Lake-to-Bay multi-use trail into the roadway system
Increase transit options, reliability, and convenience	• Give transit priority on Fairview Avenue and increase service frequency • Provide new or improved east-west transit service with opportunities provided by 2-Way Mercer • Add regional transit service to South Lake Union • Add streetcar between downtown and South Lake Union
Maintain customer parking and existing on-street parking	• Manage on-street parking to facilitate short-term customer and visitor parking • Add on-street parking where appropriate
Implement programs to reduce auto trips	• Develop program with employers and developers to reduce auto trips to SLU

CHAPTER 4: EXISTING CONDITIONS

The SLU neighborhood comprises a mixture of both employment and residential land uses. The area includes a number of auto-oriented businesses and accommodates a significant number of non-destination trips between I-5 and Aurora Avenue (SR-99) to/from nearby neighborhoods and major attractions (i.e., Seattle Center, Waterfront, etc). Significant roadways in the study area are described below.

Roadway Network

The existing roadway network in the South Lake Union study area consists of a variety of local streets and arterial types. These roadways range from two-lane local streets to major primary arterials. Figure 4.1 shows the existing roadway network and the following section describes key roadways in the project area.

East-West Roadways

Mercer Street is a principal arterial with four eastbound lanes from Queen Anne Avenue to Fairview Avenue. Mercer Street serves as a primary connection to I-5 from the Queen Anne, Ballard, Magnolia, and downtown neighborhoods. Mercer Street operates as a couplet with Valley Street, between Westlake Avenue N. and Fairview Avenue N, and both are designated major truck streets in this segment. A short section of on-street parking is available on the north side of Mercer Street between Terry and Boren Avenues N.

Valley Street is a principal arterial with five lanes (two eastbound and three westbound) from Fairview Avenue N. to Westlake Avenue N., and serves as the westbound segment of the Mercer/Valley couplet. Vehicles exiting I-5 use Fairview Avenue N., Valley Street and Broad Street to access Seattle Center and surrounding neighborhoods such as Queen Anne, Ballard, Magnolia, the interbay manufacturing center and the north sections of downtown. Valley Street becomes a minor arterial west of Eighth Avenue N. A short half-block section of on-street parking is available on the south side of Valley Street, between Fairview Avenue N. and the alleyway just to the west.

Roy Street is classified as a minor arterial (between Dexter Avenue N. and Ninth Avenue N.) and a local street (between Dexter Avenue N. and Taylor Avenue N.). It is a one-way street between Ninth and Dexter Avenues for westbound traffic. Roy Street becomes a two-way street west of Dexter Avenue, and while it connects to SR-99 (Aurora Avenue N.), traffic cannot cross SR 99 on Roy Street.

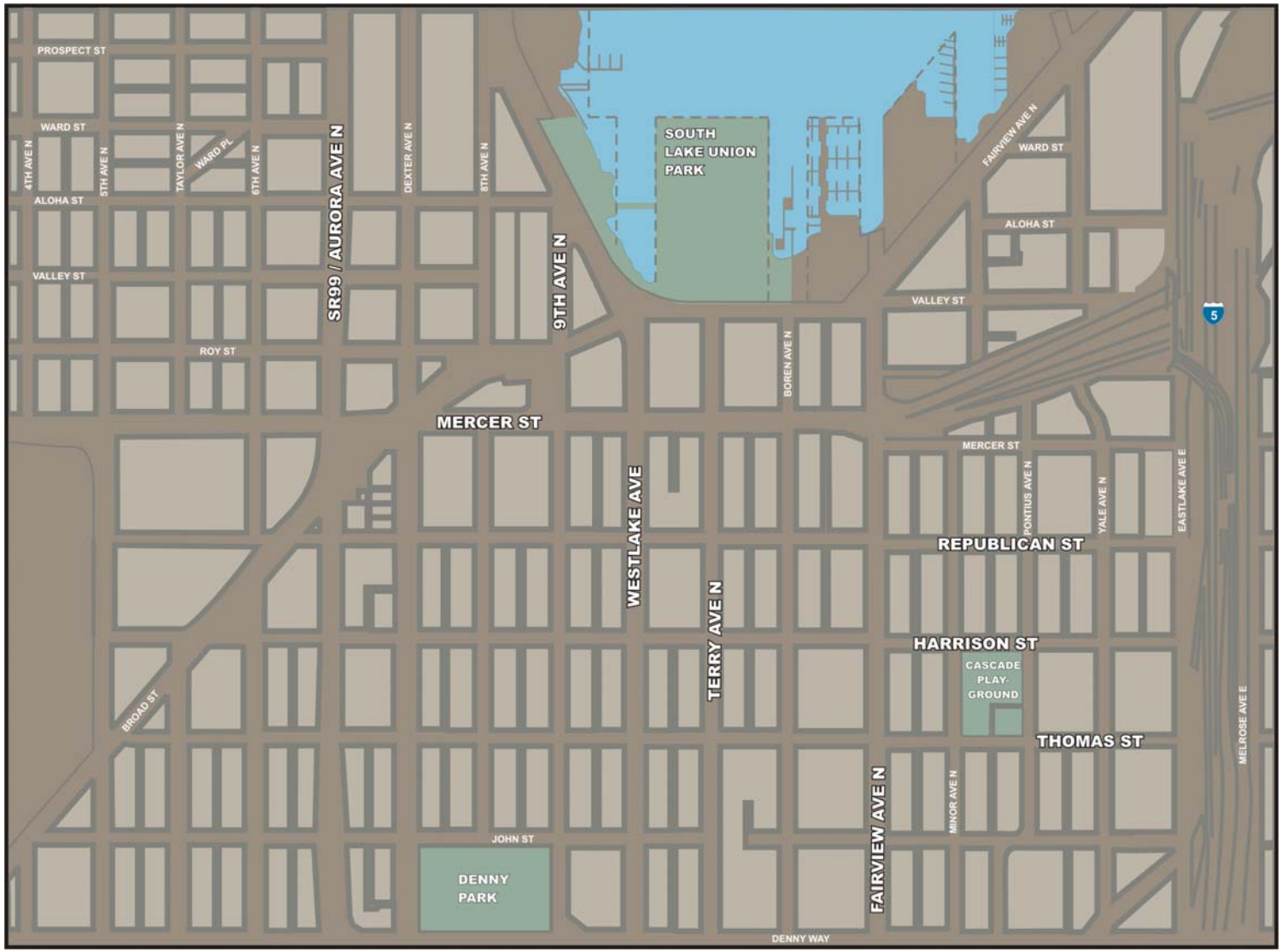


Figure 4.1: Study Area Map

Republican Street is a two-lane minor arterial with one lane in each direction. It is significant to the study area since it serves as an alternative route to Mercer Street as a connection to Eastlake Avenue N. and Capitol Hill, and also for local circulation within the study area. Traffic signals were recently installed at Ninth and Westlake Avenues, and this is an existing signal at Fairview Avenue N. On-street parking is available on both sides of the street within the study area. Republican Street currently does not provide access across SR 99/Aurora Avenue N.

Harrison Street is a two-lane local street with one lane in each direction. Similar to Republican Street, it also provides relief for Mercer Street by offering an alternative for local circulation in the SLU area. Signals exist along Harrison Street at Fairview Avenue N., Westlake Avenue N., Ninth Avenue N., and Dexter Avenue N. Parking exists on both sides of the street within the study area. Harrison Street also does not provide access across SR-99.

Thomas Street is a two-lane local street with one lane in each direction. It primarily serves local traffic and provides access to local businesses. With the exception of its intersection with Fairview Avenue N., no signals exist along Thomas Street within the study area. Parking is provided on both sides of the street from Dexter to Eastlake Avenues. The block of Thomas Street between Boren and Fairview Avenue N. is heavily used by trucks accessing the Seattle Times loading docks. Thomas Street does not provide access across Aurora Avenue N.

Denny Way, located at the southern edge of the study area, is a four-lane principal arterial with two lanes in each direction. It provides a key connection to/from the Capitol Hill neighborhood and the south side of the Seattle Center. To the east, this roadway also connects to southbound I-5 (via Yale Avenue) and the reversible express lane ramp. Signals exist at key cross streets such as Fairview Avenue, Westlake Avenue, Ninth Avenue, Dexter Avenue, Aurora Avenue N., Sixth Avenue N. and Fifth Avenue N.

North-South Roadways

Dexter Avenue N. is a four-lane minor arterial that provides connections for bicyclists (bike lanes), transit and autos from Fremont, Queen Anne and other adjacent neighborhoods to the north and downtown. Parking is provided on both sides of the street north of Denny Way and signals exist at its intersections with Denny Way, Harrison Street, Mercer Street and Roy Street. Dexter Avenue N. is a key north-south bus route.

Ninth Avenue N. is a principal arterial that forms one half of the one-way couplet with Westlake Avenue from Broad Street to Denny Way. It provides a southbound route to downtown and serves as one of the few major carriers of southbound traffic from the Westlake and Fremont neighborhoods (via Westlake Avenue). Parking is provided on one or both sides of the street along much of Ninth Avenue N.

Westlake Avenue N. is a principal arterial with four lanes of traffic heading northbound from Denny Avenue to Valley Street. It provides a directional connection from downtown to South Lake Union and north to the Westlake and Fremont areas, and forms the other half of the one-way couplet with Ninth Avenue. Westlake and Ninth Avenues are major truck streets north of Mercer. Parking exists on both sides of the street and signals are provided at key intersections. South of Denny Way and north of Ninth Avenue, Westlake Avenue operates as a two-way roadway.

Terry Avenue N. is a local access street from Denny Way to Mercer Street. Currently, Terry serves as a lower-volume access road for a variety of businesses and light-industrial uses. However, the Terry Avenue Street Design Guidelines, recently developed by SDOT, will help shape Terry Avenue in the near future to create a primary north-south pedestrian corridor and limited-volume local access street. In general, on-street parking is available on Terry Avenue between Valley Street and Denny Way.

Fairview Avenue N. is a principal arterial with two-lanes in each direction and left-turn lanes at most intersections. It serves as a major connector to/from the Eastlake and University District neighborhoods and SLU/downtown Seattle, and also serves key transit routes such as the King County Metro 70-series buses. At Mercer Street, Fairview Avenue provides access to/from the I-5 ramps and thus serves as a critical gateway for the north downtown areas. Off-peak, directional on-street parking is available along Fairview Avenue between Denny Way and Republican Street.

Eastlake Avenue is a principal arterial with two lanes in each direction and is the easterly boundary of the SLU Transportation Study. Eastlake primarily provides a connection between downtown and the Eastlake and University District neighborhoods, but also provides a peripheral connection to South Lake Union. Parking exists on the west side of the street within the SLU study area and signals exist at key intersections such as Mercer Street, Lakeview Boulevard, and Stewart Street.

Aurora Avenue N. (SR 99) is a limited access state highway dividing South Lake Union from Queen Anne and Seattle Center. It has three lanes in each direction and access to Aurora is provided by right turns only from east-west streets.

Broad Street is a principal arterial that is aligned at a 45 degree angle to the existing street grid between the intersections of Westlake and Valley to the Elliott Bay waterfront. Broad Street crosses under Mercer, Dexter, and Aurora Avenues creating an interruption to local circulation at it's portals on both sides of Aurora Avenue. Broad is also a major truck street connecting to the Mercer/Valley couplet.

Traffic Volumes

Peak-hour intersection turning movement volumes for existing conditions were taken from the City of Seattle traffic count database and/or by collecting traffic volume data in the field. The majority of traffic volumes for the core South Lake Union area between Valley Street and Harrison Street and between Dexter Avenue and Fairview Avenue were obtained from City of Seattle data. Volumes for several intersections near the Seattle Center were obtained from manual field counts. Key intersections targeted for the analysis are listed in Table 4.1.

Table 4.1: Key Study Intersections

Mercer Street & Westlake Avenue	Mercer Street & Dexter Avenue
Broad Street & Westlake Avenue	Harrison Street & Dexter Avenue
Mercer Street & Fairview Avenue	Mercer Street & 5th Avenue
Valley Street & Fairview Avenue	Roy Street & 5th Avenue
Fairview Avenue & I-5 Off-Ramp	Harrison Street & 5th Avenue
Harrison Street & Fairview Avenue	Harrison Street & Broad Street
5th Avenue & Broad Street	Mercer Street & Eastlake Avenue
Roy Street & 9th Avenue	Denny Way & Broad Street
Mercer Street & 9th Avenue	Republican Street & Fairview Avenue

With the exception of the manual field counts, most intersection volumes reflected year 2001 information for the AM peak period (7 to 9 AM) and PM peak period (4 to 6 PM). Based on 15-minute traffic count data, the single-highest volume peak hour for the AM peak period was estimated to occur from 7:15 AM to 8:15 AM, while 5 PM to 6 PM defined the PM peak hour. Included in the existing count data are heavy vehicle volumes at the targeted intersections as well as pedestrian volumes by movement. For some intersection locations, volume refinements were performed to ensure reasonable balancing between adjacent intersections, especially for closely spaced intersections. Figures 4.2 and 4.3 graphically show the existing turning movement volumes.

Mode Share Data

Mode split data for existing conditions is taken from year 2000 U.S. Census Bureau Journey-to-Work data (TAZ 107). Based on the census data, the current single-occupancy vehicle (SOV) share for work trips to the SLU area is approximately 71 percent. Transit trips represent about 11 percent of the mode share, carpools/vanpools represent about 13 percent, and walking/bicycling, or other modes represents about six percent of the work trips to the SLU area.

Table 4.2: Existing Mode Share in the South Lake Union Area for Work Trips

	Mode Share
SOVs	71%
Transit	11%
Carpool/Vanpool	13%
Walk/Bike	4%
Other	2%

Based on Year 2000 Census Data for Work Destinations(TAZ 107)

Traffic Operations

Operational analysis of existing AM and PM peak-hour conditions was performed for selected signalized intersections using the Synchro/SimTraffic analysis package, which uses the analysis methods given in the 2000 Highway Capacity Manual (HCM). The key measures used to describe current operational characteristics for the SLU area included

intersection delays or level-of-service (LOS), and travel time. Key assumptions used for the overall analysis are described in Table 4.3.

Capacity analysis, as it is commonly referred to, is used to determine level-of-service (LOS) for various transportation facilities such as intersections, freeways, and arterials, etc. Table 4.4 shows standardized LOS criteria and thresholds for signalized intersections.

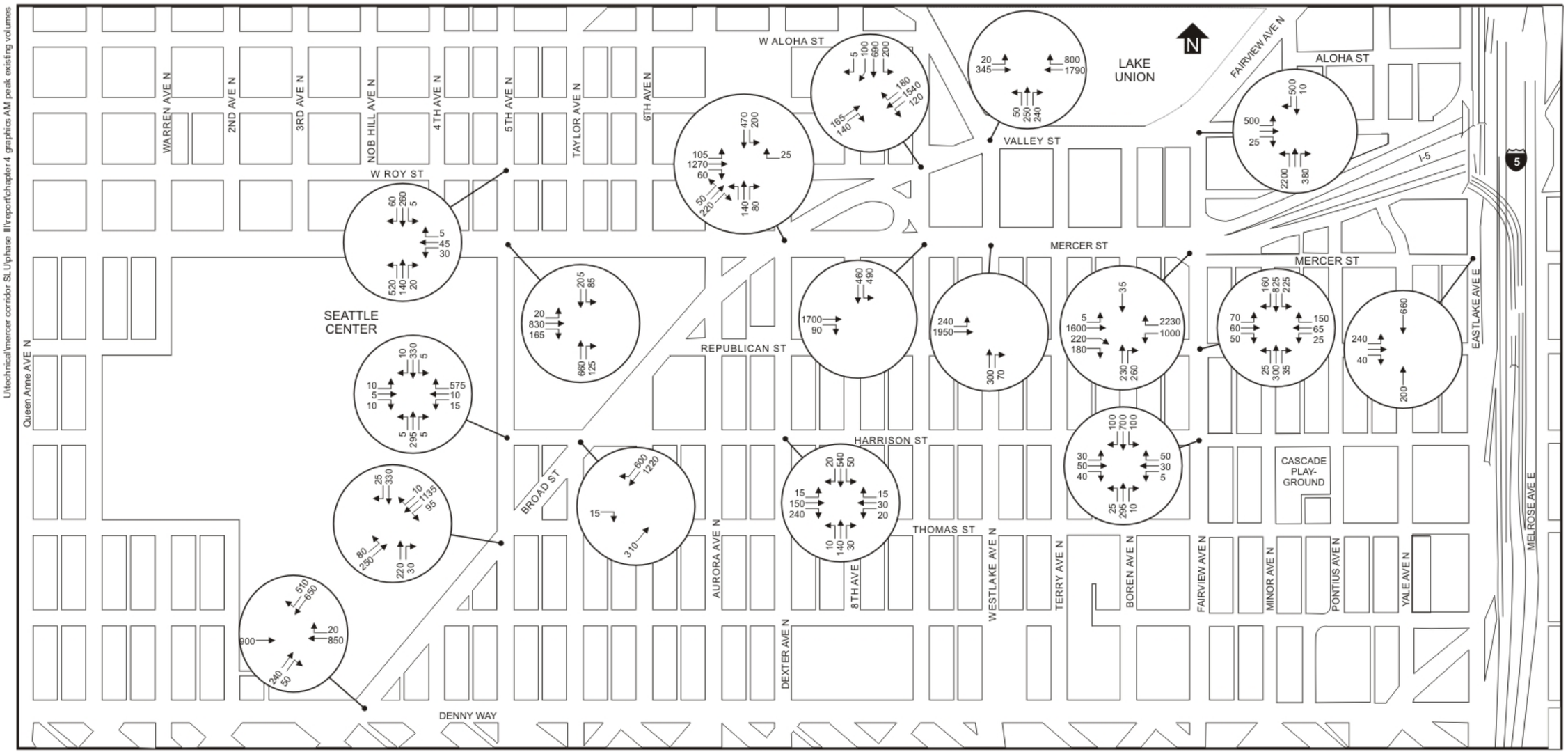


Figure 4.2: South Lake Union – Existing Conditions AM Peak Hour Intersection Volumes

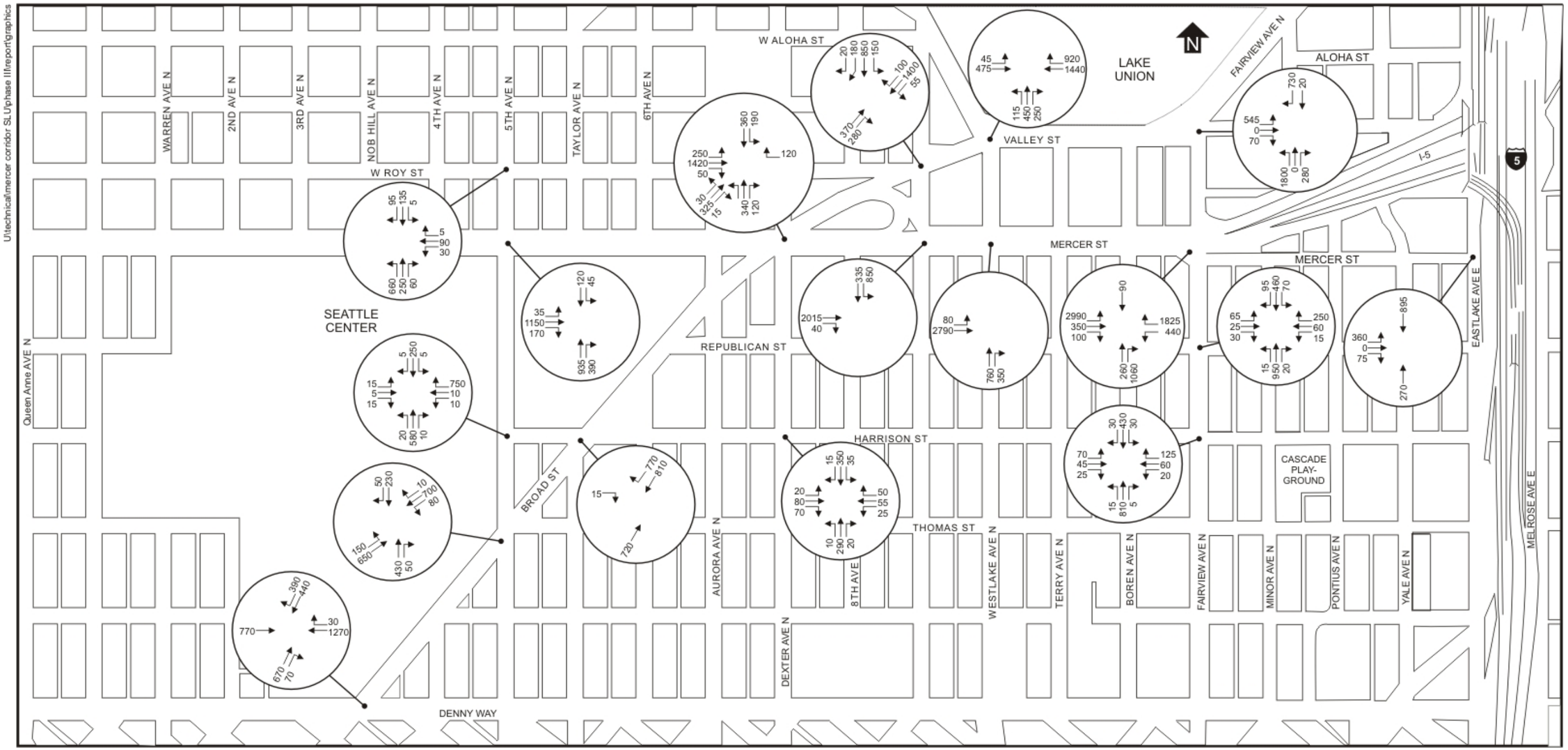


Figure 4.3: South Lake Union – Existing Conditions PM Peak Hour Intersection Volumes

Table 4.3: Analysis Assumptions

Assumption	Description
Lane Geometry	Existing lane geometry was used based on paint line sketches and field observations, including digital photos.
Traffic Data	Traffic volumes were taken from the City of Seattle count database and manual field counts where necessary (intersections near Seattle Center).
Driver Behavior	Driver behavior parameters used in the micro-simulation were similar to those used in previous SLU traffic evaluations which assume slightly more aggressive driver characteristics than a typical suburban environment.
Signal Timing Data	Signal input data for each intersection was taken from the City of Seattle signal timing database.
Transit Routes	Transit routes and service levels were coded in the simulation model based on current King County Metro schedules and route maps.
Pedestrians and Bicyclists	Non-motorized volumes used in the analysis were collected in the field for selected locations near the Seattle Center, and Mercer and Valley Streets between Fairview Avenue N. and Westlake Avenue N. Where this information was not available, program default values for crossing movements were assumed.

Table 4.4: Level of Service Criteria for Signalized Intersections

LOS	Average Intersection Signalized Delay (seconds/vehicle)	Traffic Flow Characteristics
A	≤ 10	Low delays, virtually free flow, unimpeded
B	> 10 and ≤ 20	Stable flow with minor delays, less freedom to maneuver through the intersection
C	> 20 and ≤ 35	Stable flow with some delays, less freedom to maneuver through the intersection
D	> 35 and ≤ 55	Long delays and high density but stable flow and operations
E	> 55 and ≤ 80	Operating conditions at or near capacity
F	> 80	Forced operation, breakdown conditions

Source: 2000 Highway Capacity Manual (Chapter 16)

Existing LOS analysis results for AM and PM peak hours are presented in Table 4.5. During the AM peak, the intersection of Mercer Street and Dexter Avenue N. operates at LOS D and Mercer Street and Fairview Avenue N. operates at LOS E. Four of the key selected intersections currently operate at LOS D while one (Mercer Street and Dexter Avenue N.) operates at LOS E during the PM peak. As one would expect, the most congested locations in the study network are mainly along Mercer Street due to the significant amount of traffic it carries during the critical peak periods. Mercer Street serves as the primary "feeder" to the I-5 corridor from the SLU study area, with access to the I-5 ramps occurring at the Mercer Street/Fairview Avenue N. intersection. Results for the remaining intersections indicate modest to moderate delays in the LOS A to LOS C range during both the AM and PM peak.

Table 4.5: AM and PM Peak Hour Delay and LOS Summary (Existing Conditions at Selected Intersections)

			AM		PM	
ID	**Cross Street 1**	**Cross Street 2**	**Delay**	**LOS**	**Delay**	**LOS**
9	Mercer Street	Westlake Avenue	29.8	C	37.3	D
10	Broad Street	Westlake Avenue	12.0	B	13.7	B
14	Mercer Street	Fairview Avenue	56.6	E	48.3	D
17	Valley Street	Fairview Avenue	21.4	C	21.5	C
18	Fairview Avenue	I-5 Off-Ramp	4.9	A	9.5	A
27	Harrison Street	Fairview Avenue	9.1	A	10.1	B
28	5th Avenue	Broad Street	22.1	C	26.8	C
31	Roy Street	9th Avenue	28.3	C	50.0	D
32	Mercer Street	9th Avenue	17.8	B	38.1	D
36	Mercer Street	Dexter Avenue	38.8	D	80.0	E
39	Harrison Street	Dexter Avenue	26.9	C	9.7	A
57	Mercer Street	5th Avenue	23.4	C	25.1	C
58	Roy Street	5th Avenue	33.9	C	14.8	B
62	Harrison Street	5th Avenue	8.6	A	10.8	B
63	Harrison Street	Broad Street	6.8	A	20.3	C
65	Mercer Street	Eastlake Avenue	9.8	A	19.0	B
66	Denny Way	Broad Street	14.2	B	20.3	C
203	Republican Street	Fairview Avenue	15.1	B	19.0	B
Total Network Average Delay (sec/veh)			226.3		223.2	

Note: Total Network Average Delay is a weighted average delay per vehicle for all intersections in the study area (beyond those listed in the table).

Another measure that was used to assess traffic operations was travel times for selected point-to-point routes within the study area. Travel times were calculated through a

combination of an assumed operating speed of 25 mph for vehicles between intersections and calculated approach delays at signalized intersections along the specific paths.

Table 4.6 summarizes the estimated AM and PM peak-hour travel times for several key east-west and north-south routes within the study area under current conditions. During the PM peak the highest travel times are experienced in the eastbound direction. During the AM peak, the travel times are moderate with the highest travel times along the east-west path between I-5 and the north side of the Seattle Center. Also shown in Table 4.6 is the estimated delay experienced by traffic on the off-ramps from I-5 as they approach Fairview Avenue N. Currently, the average delay for this approach is slightly higher in the AM peak hour as compared to the PM peak hour.

Figures 4.4 through 4.7 show the actual travel paths and their associated travel times for east/west and north/south routes, and AM and PM peak hours, respectively.

Table 4.6: Existing AM and PM Peak Hour Travel Times

Path ID	East-West Routes	AM Travel Time	PM Travel Time
1	WB – I-5 to North Side Seattle Center	7.0 min	6.4 min
2	EB – North Side Seattle Center to I-5	6.8 min	8.4 min
3	WB – I-5 to South Side Seattle Center	5.3 min	5.5 min
4	EB – South Side Seattle Center to I-5	6.1 min	10.4 min
5	WB – Eastlake to North Side Seattle Center	5.4 min	4.9 min
6	EB – North Side Seattle Center to Eastlake	4.7 min	6.0 min
7	WB – I-5 to Westlake/Aloha	3.3 min	3.2 min
8	EB – Westlake/Aloha to I-5	5.7 min	8.1 min
Path ID	**North-South Routes**	**AM Travel Time**	**PM Travel Time**
1	NB – Fairview Avenue	3.5 min	4.6 min
2	SB – Fairview Avenue	6.9 min	9.2 min
3	NB – Westlake Avenue	4.6 min	4.8 min
3a	SB – Westlake Avenue		
4	SB – 9th Avenue	5.7 min	8.0 min
4a	NB – 9th Avenue		
5	NB – Dexter Avenue	3.0 min	3.0 min
6	SB – Dexter Avenue	5.2 min	4.7 min
7	WB – Eastlake Ave to South Side Seattle Center	3.7 min	4.0 min
8	EB – South Side Seattle Center to Eastlake Avenue	3.4 min	5.6 min
Ramp Queue Delay at I-5 & Fairview (WB)		1.5 min	1.3 min

Accident History

The City of Seattle provided existing accident data for high collision intersections within the city limits. Figure 4.8 displays the year 2002 high accident intersections in the project area. As seen in the figure, there are nine unsignalized intersections and three signalized intersections in the

project area with a high number of collisions. Identifying these intersections supported the analysis of the existing "problem areas", which are discussed in the following sections.

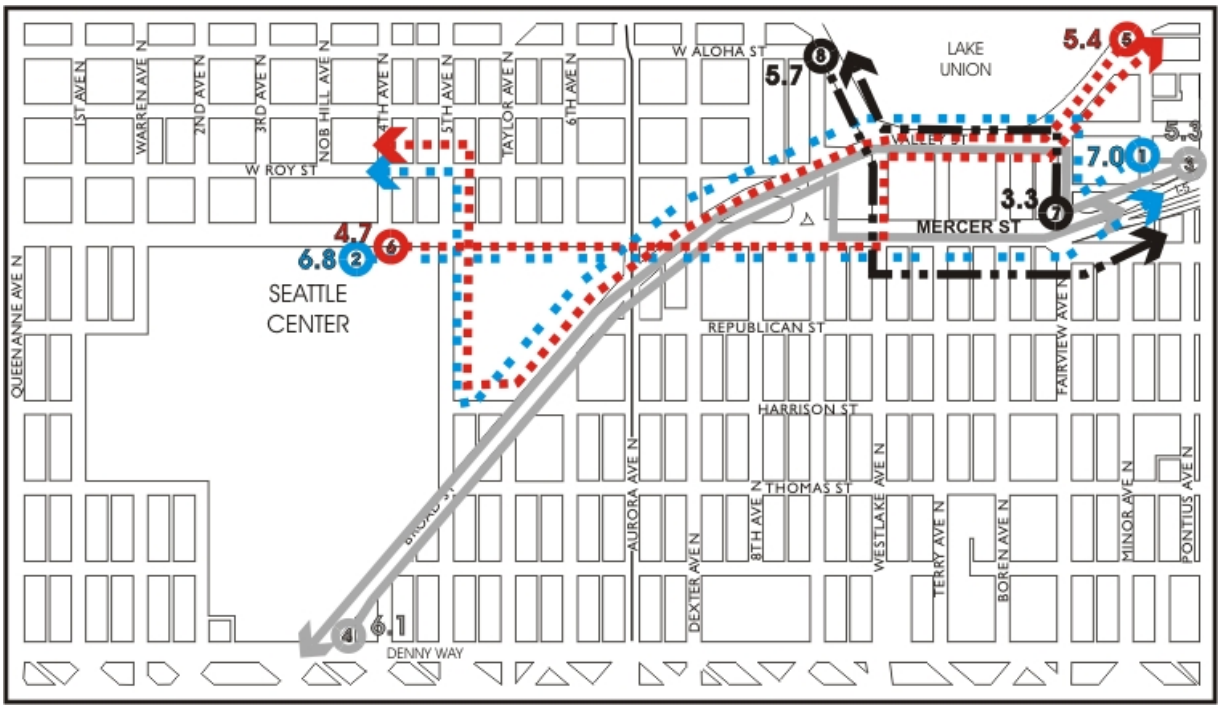


Figure 4.4: Existing East/West AM Peak Travel Time Path Summaries

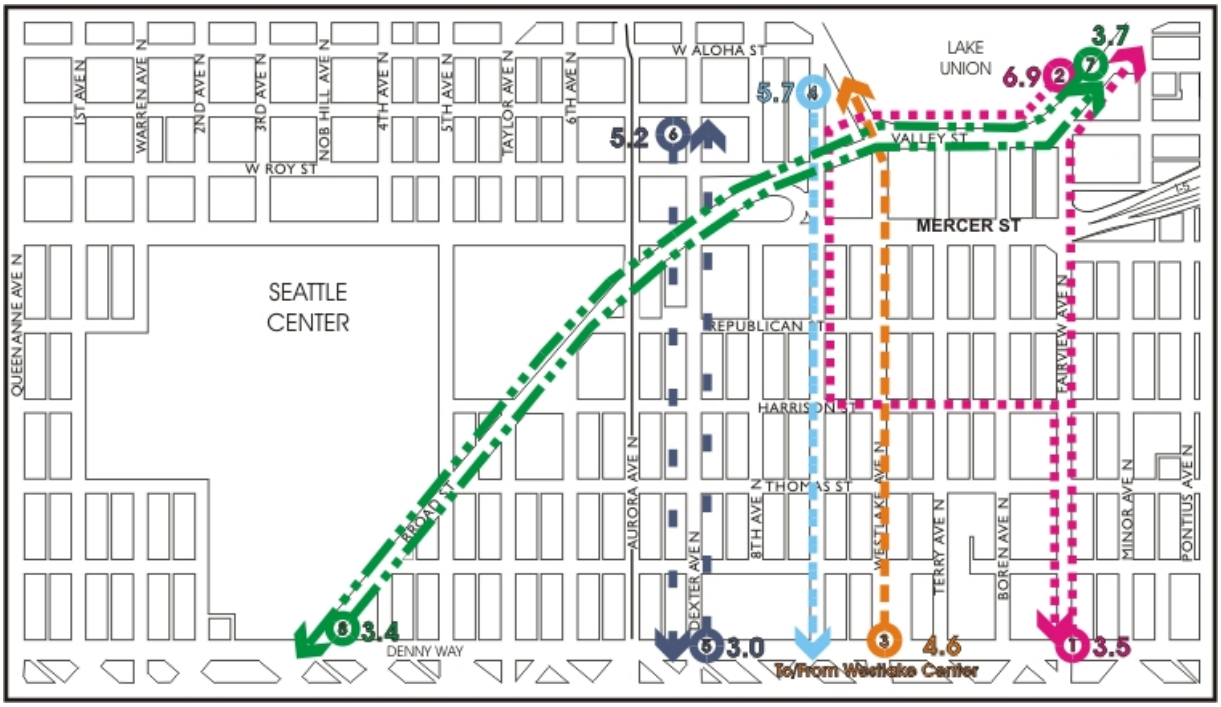


Figure 4.5: Existing North/South AM Peak Travel Time Path Summaries

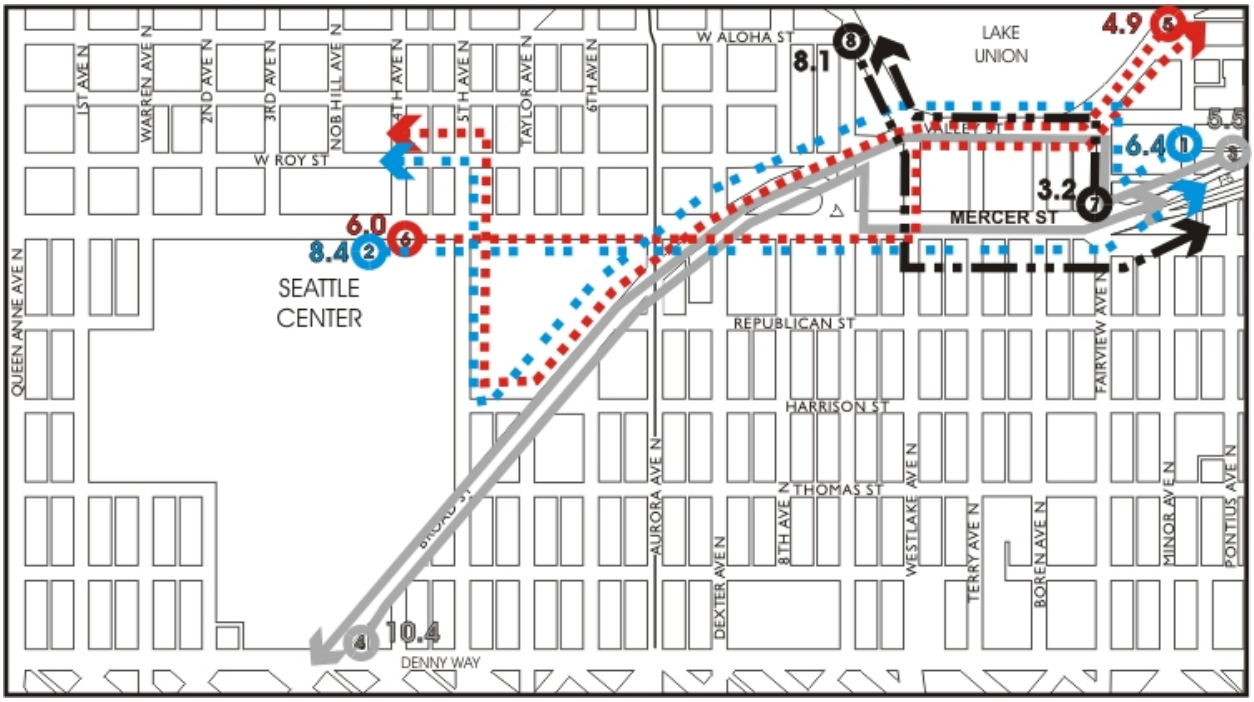


Figure 4.6: Existing East/West PM Peak Travel Time Path Summaries

Figure 4.7: Existing North/South PM Peak Travel Time Path Summaries

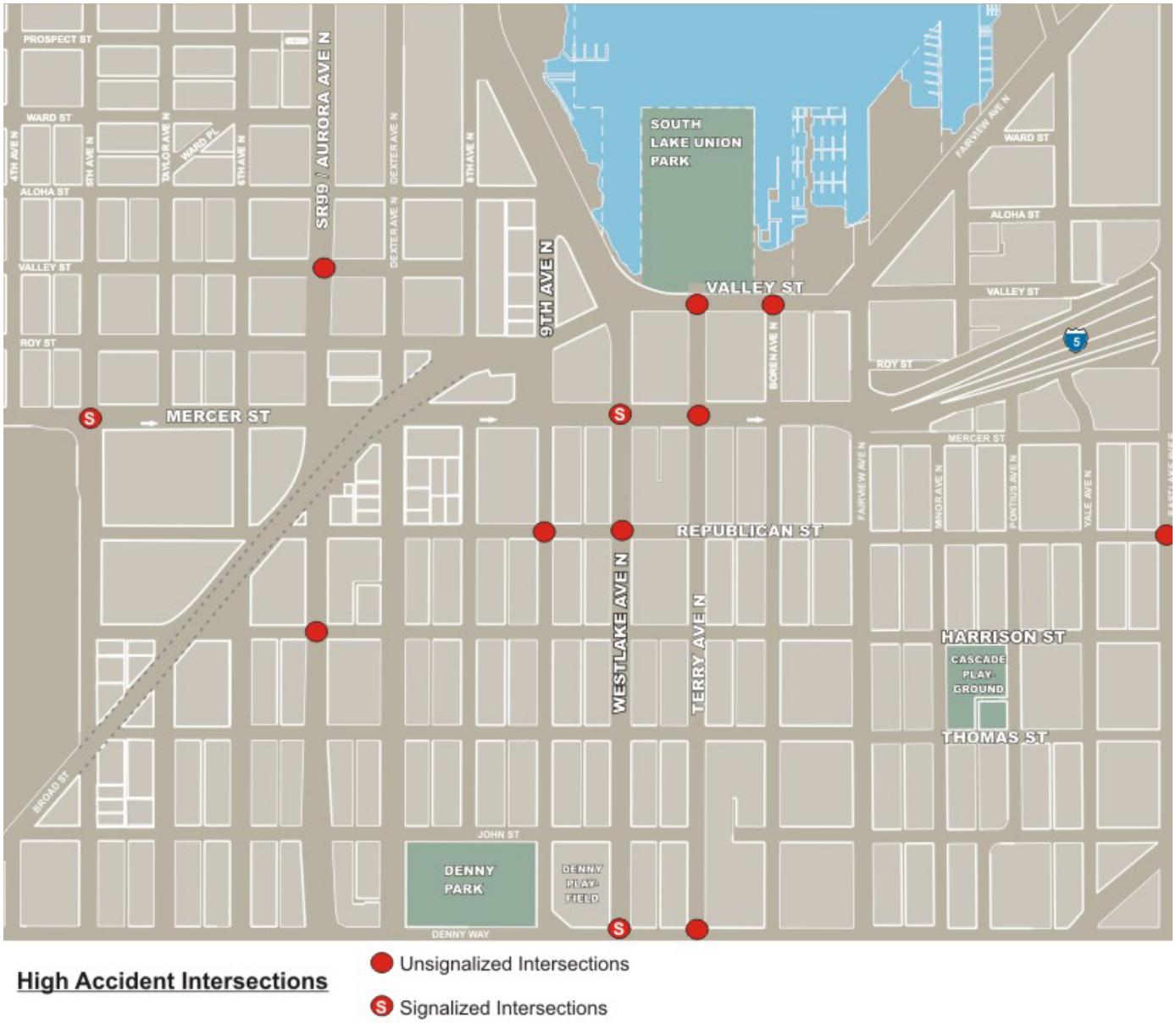


Figure 4.8: 2002 High Accident Locations

Valley Street Origin-Destination Survey

The South Lake Union Transportation Study included an origin and destination study that focused on users of Valley Street between Fairview Avenue N. and Westlake Avenue N. A traffic count/vehicle following study was conducted to better understand both general-purpose traffic and truck travel patterns through the Mercer Corridor area with special attention to the "around-the-lake" movement using Valley Street.

This analysis was undertaken to help the project team determine if narrowing Valley Street was a feasible option, provided the heavy westbound traffic volume from I-5 could be accommodated in other ways, such as by a widened, two-way Mercer Street configuration. The intent was to determine approximately how many vehicles (autos and trucks) currently use Valley Street to travel westbound and eastbound around the south end of Lake Union. The study team could then determine how many vehicles would continue to use Valley Street to make the around-the-lake movement and how many vehicles are actually using Valley Street to access Broad Street to continue traveling east or Mercer Street to travel eastbound and access the I-5 ramps and other locations.

The count team used the upper floor café of the Shurgard building to view westbound vehicle and truck traffic movements. They also made ground level observations at the Ninth Avenue N. /Valley Street intersection for eastbound movements. Traffic movements both from the Eastlake neighborhood (westbound around-the-lake movements) and from the Westlake area (eastbound around-the-lake movements) were quantified and documented. Data collection efforts for this effort were conducted on December 9th, 2003 and counts during the morning (7 to 9 am), mid-day (9:30 to 11:30 am), and evening (4 to 6 pm) were compiled.

General Purpose Traffic

Data indicates that total traffic making the westbound "around-the-lake" movement varied from between 21 to 26 percent of all southbound Fairview Avenue N. traffic approaching Valley Street. Approximately 500 vehicles during the PM peak hour currently arrive at the southbound intersection approach. Of these vehicles, approximately 480 are autos. Of the 480 autos, approximately 21 percent are using Valley Street to access northbound Westlake Avenue and complete a westbound "around-the-lake" movement. This represents a total of 100 vehicles making this movement in the morning peak period. During the evening peak period approximately 720 autos are in the southbound Fairview Avenue N. traffic stream that will turn right onto Valley Street (continuing south on Fairview Avenue N. past Valley Street is currently prohibited for all traffic except transit). Approximately 26 percent of this traffic is estimated to make the "around-the-lake" movement, representing a total of 190 vehicles during the evening peak.

In the eastbound direction, tracking each vehicle's movement after it left the intersection of Valley Street and Ninth Avenue was difficult. However, the study team observed that most traffic turning left at this intersection to access Valley Street would continue to travel eastbound and then northbound on Fairview Avenue N., making the "around-the-lake" movement. Based on observed traffic counts at the Valley Street and Fairview Avenue N.

intersection, the study team assumed a conservative estimate for auto traffic making the eastbound "around-the-lake" movement to be 90 percent of the total number turning left onto Valley Street from southbound Westlake Avenue N.

In the morning peak, approximately 185 autos (non-heavy vehicles) currently arrive at the southbound approach and turn left onto Broad/Valley Streets. Of the 185 vehicles, 90 percent (165) are expected to continue traveling eastbound to Fairview Avenue N. and make the "around-the-lake" movement. Results for the evening peak were similar, with 155 autos turning left, and 140 (90 percent) of those assumed to make the eastbound around-the-lake movement.

Figure 4.9 diagrams and quantifies the results of the Valley Street origin-destination study for both AM and PM peak hours, and for total traffic as well as trucks. The results indicate that the level of "around-the-lake" traffic currently using Valley Street ranges between 100 and 200 vehicles in each direction for both the AM and PM peak hours. Of these vehicles, fewer than ten in each direction are trucks. This information was used to assess the adequacy of proposed improvements to Mercer, Valley, and Boren Streets, which are discussed in Chapter 8.

Heavy-Vehicle Traffic

The survey found that the total number of truck movements was highest during the mid-day time period (9:30 AM to 11:30 AM), followed by the morning peak, and finally by the evening peak for either eastbound or westbound travel. Results of the survey also showed that the majority of truck traffic did not use Valley Street for eastbound movements, but rather used Mercer Street (presumably to access I-5 east of Fairview Avenue). This pattern was increasingly observed as the day progressed, with trucks using Valley Street eastbound decreasing from approximately nine trucks in the morning peak to five trucks during the mid-day peak, and further decreasing to three trucks during the evening peak.

Westbound truck traffic varied more noticeably. Based on the survey findings, approximately one-quarter of all truck traffic traveling westbound on Valley Street continues around the south end of Lake Union and then onto Westlake Avenue to points north during the morning and mid-day time periods. The number of westbound trucks traveling north onto Westlake Avenue decreases considerably during the evening peak period to approximately 6 percent of total truck traffic. In actual numbers, the total truck traffic heading westbound around the lake is estimated at approximately eight trucks during the morning peak and one truck in the evening peak.

Conclusion

Based on the findings of the Valley Street origin-destination survey for auto and truck traffic, it does not appear that on the proposed two-lane design for Valley Street will impede auto or truck traffic using Valley Street to make around-the-lake movements.

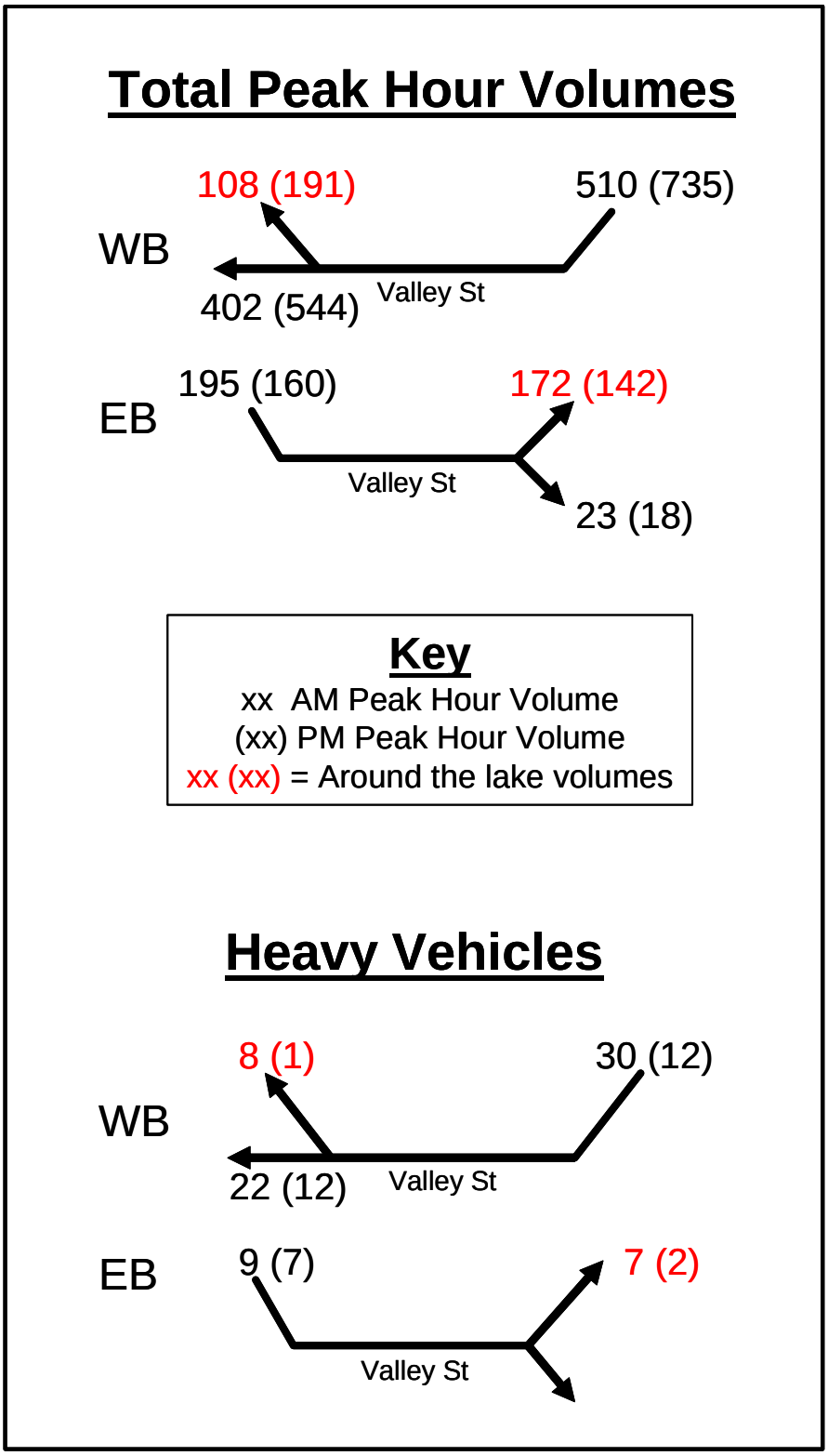


Figure 4.9: Valley Street Traffic Pattern Study Results

Transit Service

Due to a number of factors (limited bus service, relatively inexpensive and plentiful parking, etc.) the great majority of employees commute to the South Lake Union by automobile. Year 2000 census data indicates an 11-percent transit mode share for work trips to the SLU area, while 71 percent drove alone.

Commute Trip Reduction survey data for the year 2003 indicates a higher share of work trips by transit or about 14 percent.[1] The transit mode share is likely higher for the survey data because it only includes major employers. Many of these major employers have implemented Transportation Demand Management programs that have helped to increase the transit mode share.

Existing Service Levels

Existing bus routes are shown in Figure 4.10. Seventeen bus routes serve the South Lake Union Area, including the area between Aurora Avenue North and Fifth Avenue North. However, as shown in Figure 4.10, because SLU covers a wide area, buses that serve one end of the SLU area may not be useful for those who work in a different area of SLU. For example, most people who work near Fairview Avenue would be unwilling to walk seven (7) blocks to Aurora Avenue N. to catch a bus. There is no east-west transit service north of Denny. Furthermore, a number of these routes only serve the SLU neighborhood during off-peak hours, therefore limiting their ability to adequately serve employees or residents of SLU. The routes which serve the core area of SLU include Route 70 along Fairview Avenue N., and the associated 70 series (71, 72, and 73), which provide the same service after 7:00 pm; Route 17 along Westlake (northbound) and Ninth (southbound) Avenues, and Routes 26 and 28, along Dexter Avenue N. All other routes described below in Table 4.7 primarily serve the periphery of the SLU area.

Descriptions of the following bus routes follow: routes that serve during peak hours, routes that make only limited stops in the SLU area during peak hours, and those that only serve the SLU area during off-peak hours.

Routes that Make Regular Stops During Peak Hours in SLU Area

Route 3 services Madrona, Central District, First Hill, Downtown Seattle, Belltown, Seattle Center East, and North Queen Anne. This route operates seven days a week and has weekday peak-hour headways of 15 minutes.

Route 4 provides service to and from North Queen Anne. Route 4 services Judkins Park, Central District, First Hill, Downtown Seattle, Belltown, Seattle Center East, and East Queen Anne. This route operates seven days a week and has weekday peak-hour headways of 15 minutes.

[1] Based on King County Metro Lake Union/Queen Anne weighted survey data for Potential, 1 Year, 2 Year, and 3+ Year AFP Customers.

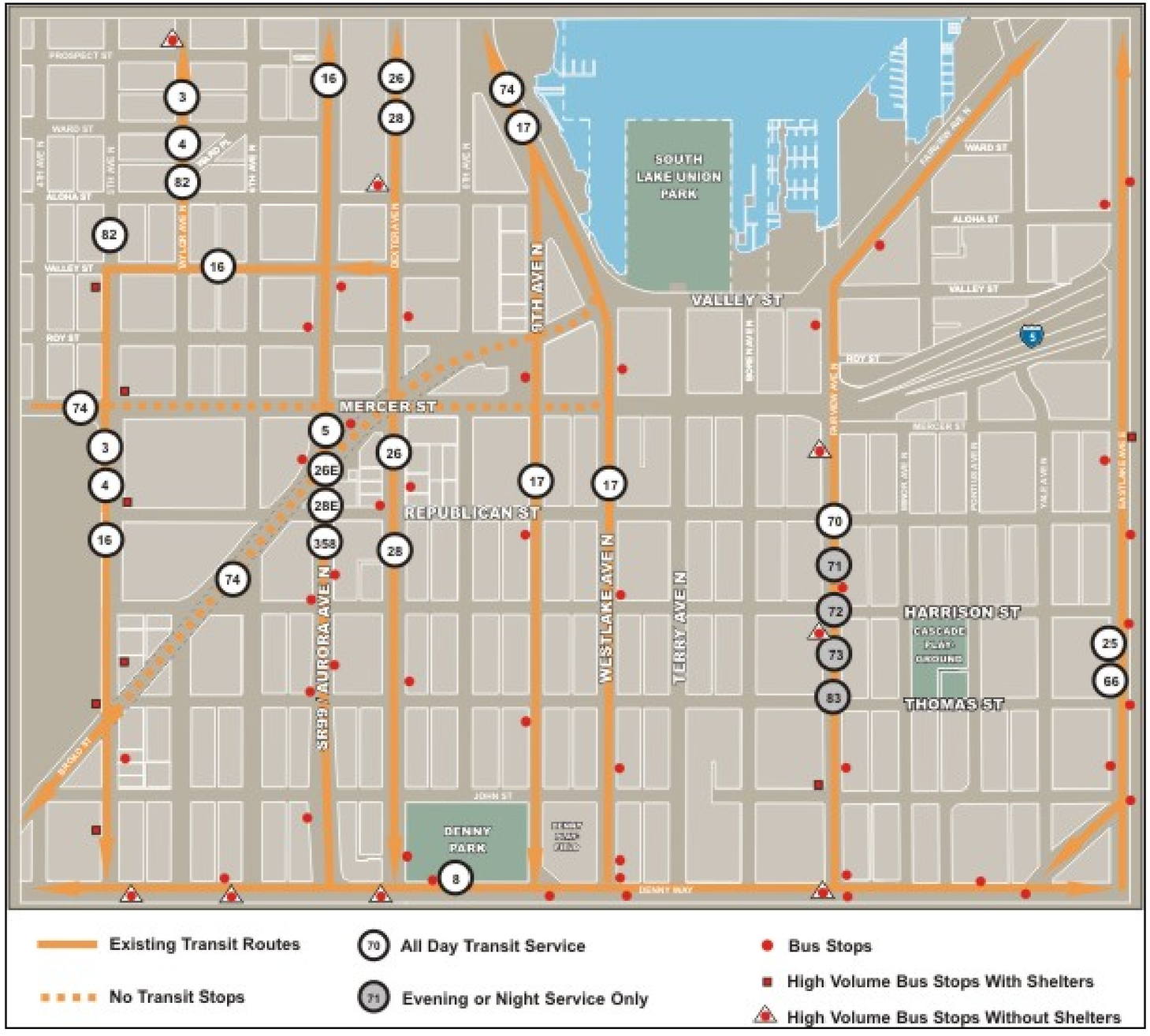


Figure 4.10: Existing Transit Routes and Facilities

Table 4.7: Existing Transit Service by Area

Route	Peak Headway (Minutes)	Seattle Center	Aurora Avenue	Westlake	Fairview	Eastlake	Denny Way
Route 3	15	X					
Route 4	15	X					
Route 5	30		(L)				
Route 8	30						X
Route 16	20	X					
Route 17	10			X			
Route 25	30					X	
Route 26	10		X				
Route 28	15		X				
Route 66	20					X	
Route 70	15				X		
Route 71	30				(X)		
Route 72	30				(X)		
Route 73	30				(X)		
Route 74	30	X		X			
Route 83	N/A				(X)		
Route 358	7		(L)				

(X) Indicates off-peak service only

(L) Indicates limited stops in SLU area

Route 8 travels east-west along Denny Way through the study area and services Rainier Valley, Capitol Hill, Group Health Hospital, the Seattle Center, and Lower Queen Anne. This route operates seven days a week and has peak-hour headways of 30 minutes.

Route 16 services the Coleman Dock-Ferry Terminal, Downtown Seattle, the Seattle Center, Wallingford, East Green Lake, North Seattle Community College, the Northgate Mall, and the Northgate Transit Center. This route operates seven days a week and has peak-hour headways of 20 minutes.

Route 17 services Downtown Seattle, Westlake, Seattle Pacific University, Ballard, Sunset Hill, and Loyal Heights. This route operates seven days a week and has peak-hour headways of 10 minutes.

Route 25 services Downtown Seattle, Eastlake, Montlake, the University District, Children's Hospital, and Laurelhurst. This route operates weekdays with 30 minute headways during peak hours.

Route 26 services Downtown Seattle, Dexter Avenue N., Fremont, Wallingford, Latona Avenue NE, and East Green Lake. In the South Lake Union area, this route follows along Dexter Avenue. This route operates seven days a week and has peak-hour headways of ten minutes.

Route 28 services Downtown Seattle, Dexter Avenue N., Fremont Avenue, Ballard, Whittier Heights, and Broadview. This route operates seven days a week and has peak-hour headways of 15 minutes.

Route 66 services Coleman Dock-Ferry Terminal, Downtown Seattle, Eastlake (limited stops), University District, Maple Leaf, Northgate Transit Center, Northgate Mall, and Northgate Park and Ride. This route operates seven days a week and has peak-hour headways of 20 minutes.

Route 70 services Downtown Seattle, Fairview Avenue N., Eastlake, and the University District. This route operates six days a week and has peak-hour headways of 15 minutes.

Route 74 services Downtown Seattle, Queen Anne, Fremont, Wallingford, the University District, Ravenna, and Sand Point. This route operates seven days a week and has peak-hour headways of 30 minutes.

Routes that Make Limited Stops During Peak Hours in SLU Area

Route 5 services Downtown Seattle, Queen Anne, Fremont, Greenwood and Shoreline with a peak-hour headway of about 30 minutes. It makes limited stops in the SLU area.

Route 358 services Downtown Seattle, Seattle Center (limited stops), Bitter Lake and Shoreline. Peak-hour headways are about every 7 minutes.

Routes that Serve SLU Only During Off-Peak Hours

Route 71 services Downtown Seattle (Tunnel), Eastlake, University District, Ravenna, View Ridge, and Wedgwood. This route operates seven days a week and has peak-hour headways of 30 minutes. During peak hours it is an express route between the University District and downtown Seattle and either does not travel through or does not make stops in the South Lake Union neighborhood.

Route 72 services Downtown Seattle (Tunnel), Eastlake, University District, Maple Leaf, and Lake City. This route operates seven days a week and has peak-hour headways of 30 minutes. During peak hours it is an express route between the University District and downtown Seattle and either does not travel through or does not make stops in the South Lake Union neighborhood.

Route 73 services Downtown Seattle (Tunnel), Eastlake, University District, Green Lake Park and Ride, Maple Leaf, and Jackson Park. This route operates seven days a week and has peak-hour headways of 30 minutes. During peak hours it is an express route between the University District and downtown Seattle and either does not travel through or does not make stops in the South Lake Union neighborhood.

Route 83 offers weekday night owl service serving Downtown Seattle, Fairview Avenue, Eastlake Avenue, University District, and Ravenna. Two night owl runs occur each night.

Shelters

According to King County Metro, a bus stop is generally eligible for a shelter if it has more than 50 people boarding each day. King County Metro provided year 2003 daily boarding

data at each bus stop within the South Lake Union area. [2] Table 4.8 shows the locations of the bus stops having greater than 40 boardings per day in the South Lake Union area, and indicates whether or not bus shelters are provided at these bus stops. While the threshold for providing a shelter is 50 boardings, stops with 40 to 50 boardings per day are also identified here to highlight stops that may reach the 50 boardings threshold in the near future. This table identifies 18 stops with more than 50 boardings per day, and four bus stops having daily boardings between 40 and 50 persons.

Table 4.8: Heavy Use Bus Stops in the South Lake Union Area and Shelters

Route(s)	Direction	On Street	Cross Street	Daily Boardings	Bus Shelter
3, 4, 16	N	5th Avenue N	Broad Street (Thomas)	99	**Yes**
3, 4, 16	S	5th Avenue N	Broad Street (Thomas)	254	**Yes**
3, 4, 16	S	5th Avenue N	Valley Street	160	**Yes**
3, 4, 16	S	5th Avenue N	John Street	95	**Yes**
3, 4, 16	S	5th Avenue N	Mercer Street	88	**Yes**
3, 4, 16	N	5th Avenue N	Republican Street	78	**Yes**
5, 26E, 28E, 358	N	Aurora Avenue N	Mercer Street	94	**Yes**
5, 26, 28	N	Dexter Avenue N	Denny Way	247	**Yes**
25, 66, 74E	S	Eastlake Avenue E	Mercer Street	42	**Yes**
70, 71, 72, 73	S	Fairview Avenue N	John Street	88	**Yes**
3, 4	S	5th Avenue N	Cedar Street	191	**No**
3, 4, 16	N	5th Avenue N	Denny Way	41	**No**
8	E	Denny Way	Stewart Street	100	**In Design/ Construction**
8	E	Denny Way	Cedar Street (5th Avenue)	83	**No**
8	E	Denny Way	Dexter Avenue	75	**In Design/ Construction**
8	E	Denny Way	6th Avenue	71	**No**
8	E	Denny Way	Fairview Avenue	53	**No**
8	W	Denny Way	Pontius Avenue N	43	**In Design/ Construction**
26, 28	S	Dexter Avenue N	Aloha Street	51	**No**
70, 71, 72, 73	S	Fairview Avenue N	Harrison Street	82	**No**
70, 71, 72, 73	S	Fairview Avenue N	Mercer Street	54	**No**
3, 4	S	Taylor Avenue N	Prospect Street	49	**No**

[2] Daily Boardings from King County Metro data tabulated by Randy Young and Tom Noguchi in a memo with subject heading "Existing Transit Deficiencies" to Mike Podowski at the City of Seattle, dated January 8, 2004.

As shown in Table 4.8, ten bus stops that either meet or nearly meet the 50 boardings threshold for a bus stop shelter currently do have shelters, while twelve do not (although three are in design and construction). Recommendations regarding future bus stop shelter improvements are provided in Chapter 7.

Pedestrian Network

The SLU neighborhood has sidewalks along most blocks. However, along Mercer and Valley Streets the sidewalks are in disrepair and the streetscape is not appealing or comfortable for pedestrians. Significant barriers to pedestrian travel include Aurora, Broad, Mercer and Valley Streets.

Figures 4.11 and 4.12 show the condition of the sidewalks along Mercer and Valley Streets, as well as the overall street environment. As can be seen in these photos, although facilities are available for pedestrians, the disrepair of the sidewalks and the overall streetscape is neither inviting nor comfortable.

Figure 4.11 Existing Pedestrian Pathway on the North Side of Valley Street

Mercer and Valley Streets both have high traffic volumes and limited traffic-controlled crossings for pedestrians, making it difficult to get to South Lake Union Park and the waterfront from the rest of the neighborhood. There are no traffic signals on either Valley or Mercer, between Westlake and Fairview Avenues, so pedestrians must travel an extra block or two to cross the street safely. In addition, pedestrian crossings at the intersection of Fairview and Valley are not allowed on the west (Valley) approach.

Table 4.9 shows the locations where there are either no sidewalks or very limited/intermittent sidewalk facilities in the SLU neighborhood. In addition to Mercer and Valley, sections of Harrison Street and Terry Avenue have inadequate sidewalks.

Table 4.9: South Lake Union Streets with Limited or No Sidewalks

Street	From - Cross Street	To - Cross Street
East/West Streets		
Valley Street	Westlake Avenue	Terry Avenue
Mercer Street	Westlake Avenue	Fairview Avenue
Harrison Street	Terry Avenue	Westlake Avenue
North/South Streets		
Terry Avenue	Valley Street	Denny Way

Figure 4.12 Existing Sidewalk Facilities on Mercer Street

There is a pedestrian path around the south end of Lake Union along Westlake, Fairview, and to a limited extent Valley Street. However, the path is not signed and appears to wind through private property, which likely discourages some users. Additionally, the path is made up of differing facility types (sidewalks, asphalt path next to roadway, crushed gravel pathway, and wooden boardwalks) which does not provide continuity and may cause some confusion to users as to whether the path continues or not.

South of Mercer Street, pedestrian travel within the neighborhood is relatively easy and direct. There are some differences in grade, particularly between Boren and Minor. Most of

the sidewalks in this area are in reasonable condition. Generally, blocks that have been recently redeveloped have adequate and pleasant sidewalks and pedestrian areas.

Figure 4.14 Existing Sidewalk Facilities on Ninth Avenue

Figure 4.15 Existing Sidewalk Facilities on Ninth Avenue

However, options for traveling east beyond Eastlake Avenue E. or west past Aurora Avenue are rather limited. Interstate 5 presents a major barrier to all travel, not just pedestrian travel, and crossings of I-5 are limited to Denny Way and Lakeview Boulevard from the SLU study area. Both the Denny Way and the Lakeview Boulevard routes are rather steep and sidewalks on these streets are not generous. The Denny Way crossing of I-5 has a sidewalk only on the south side of the roadway, furthering the inconvenience for pedestrians traveling east across I-5. While the Lakeview Boulevard crossing has sidewalks on both sides of the roadway, it is a long curving bridge that leads to a narrow and steep roadway east of I-5, making it a relatively intimidating route for pedestrians or bicyclists traveling between SLU and Capitol Hill.

To the west, Aurora Avenue and Broad Street present a major barrier, again to all travel, but especially pedestrian and bicycle travel. Other than Denny Way at the southern end of the study area, there are only two locations for pedestrians to cross Aurora Avenue, and both are inconvenient and sub-standard. There is a five-block gap between Denny and Mercer, requiring significant out-of-the-way travel by pedestrians. The Mercer Street underpass has very narrow sidewalks with no handrails or other safety measures (other than the curb height) to improve the comfort level of pedestrians using the underpass. The Broad Street underpass is also located in the northern portion of the neighborhood and like Mercer has relatively narrow sidewalks on both sides of the roadway, again without handrails. The crossing distance for Broad Street is relatively long, with blank walls.

Bicycle Network

The bicycle lanes on Dexter Avenue are the only on-street bicycle facilities in the SLU neighborhood. They are located on the west side of the neighborhood and serve as a connector route from Fremont and points north to Downtown. While cyclists are able to access the multi-use/pedestrian path around Lake Union, it is not a commuter or fast cyclist facility.

Cyclists also use Eastlake, Fairview, Ninth and Westlake as north/south routes. Commuters from Eastlake and areas in northeast Seattle typically use Eastlake Avenue to commute to Downtown. Traffic conditions in the Mercer/Valley corridor make access to Fairview, Westlake and Ninth Avenues difficult for bicyclists, especially on Fairview Avenue at the I-5 ramps.

There are no designated bicycle facilities for east/west travel in SLU. Cyclists commonly use Harrison for east/west travel and to access the Dexter Avenue bike lanes. Non-arterial streets, such as Harrison, are not typically striped for bicycle lanes or other traffic control. Cyclists face the same difficulty as pedestrians when trying to cross Aurora Avenue – limited and inadequate facilities. Cyclists can cross Aurora at Mercer or Broad Streets, however most are likely to feel rather vulnerable or inconvenienced when using these facilities, because they are either in the travel lane with high volumes of traffic at relatively high speeds; or they are sharing a narrow, raised sidewalk with pedestrians immediately next to a travel lane.

Cyclists can use the multi-use pedestrian path/sidewalks around Lake Union, but in general this is a better recreational facility. The multi-use path isn't a viable option for fast or advanced cyclists because of the mix of pavement type and condition and the difference in speed between walkers and cyclists.

Parking

As shown in Table 4.10, a considerable amount of parking is provided in the SLU Area. This includes over 10,000 off-street parking spaces either in garages or surface lots, and approximately 3,600 on-street parking spaces. Much of the on-street parking is free and some is unregulated.

The City of Seattle's Comprehensive Neighborhood Parking Study indicates a very high utilization of on-street parking spaces, about 96 percent as shown in Table 4.10. Of the on-street parking, sample data indicates that about 71 percent of on-street parking is unrestricted, 24 percent is restricted to two-hour parking, and five percent is restricted to one-hour parking.

Table 4.10: Estimated Existing Parking Supply in the SLU Area and Utilization

		Parking Utilization (Based on Sample Study)		
Parking Type	**Total Estimated Supply**	**Sample Supply**	**Sample Demand**	**Demand to Supply Ratio**
Off Street	10,681	2251	1,554	0.69
On Street	3,600	763	735	0.96

The City of Seattle recently installed parking pay stations in the Chandler's Cove area of South Lake Union. As the area grows additional pay station for on-street parking may be considered, along with other time restrictions.

Transportation Demand Management (TDM)

The term transportation demand management (TDM) often refers to programs that encourage people to use alternatives to single occupant vehicle trips. Programs such as carpool ride-matching services, bus pass sales and distribution programs, and parking cash-out are often the types of activities associated with TDM. However, TDM is also a much broader approach to meeting transportation needs and as such it examines the physical and operational characteristics of a given transportation environment, and identifies and implements changes to the physical environment that facilitate the use of non-SOV modes. Thus while some TDM programs are called out individually in this document, it is also important to note that all the existing conditions in the neighborhood affect the ability to manage its transportation demand.

The pedestrian environment, in particular, is a key factor affecting mode choice—poor walking conditions, for example discourage both walk trips and transit trips. Pleasant and safe walking environments extend the distances people are willing to walk to reach transit.

Similarly, providing bicycle lanes and marked routes encourages bicycling in ways that educational and promotional TDM programs cannot. Adjusting transit service to fit changing needs (frequency, proximity, and usefulness of service) is also an essential part of managing transportation demand.

Existing TDM Programs in the SLU Area

There are number current TDM efforts ongoing in South Lake Union which focus on promoting non-SOV trips but work with the existing physical conditions as a given. Commute Trip Reduction programs are the most notable among these. The Washington State Legislature passed the CTR Law in 1991, incorporating it into the Washington Clean Air Act. The goals of the program are to reduce traffic congestion, reduce air pollution, and petroleum consumption through employer-based programs that decrease the number of commute trips made by people driving alone. King County Metro has been working with current and future major employers in the South Lake Union area to implement Commute Trip Reduction (CTR) programs.

Several employers in the South Lake Union area are moving additional employees to the area. For example, the Fred Hutchinson Cancer Research Center recently moved about 900 employees from Ninth Avenue N. and Howell Street to their campus on Fairview Avenue. Children's Hospital moved several hundred employees into the study area, and the University of Washington will be locating research facilities in the Blue Flame building in the fall of 2004 as the first phase of what will be a significant presence in SLU. KC Metro has had discussions with Tommy Bahamas and NBBJ as well, both of whom will be moving into the area in the near future. In addition to employers, King County has been working with neighborhood-based groups, including South Lake Union Friends and Neighbors (SLUFAN) and the South Lake Union Network (SLUNET).

CTR program elements include the following:

- Flex Pass (a greatly reduced transit pass, by neighborhood, rather than by employer as it is now – the majority of employers in SLU have this now)
- Commuter Bonus Plus (a transportation benefit to employees who carpool, walk or bicycle to work)
- Guaranteed Ride Home (for those who participate by purchasing a Flex Pass, for example, the employer guarantees a free ride home via taxi in case of emergency)
- Parking Management (e.g., through pricing or reducing hours allowed for free parking)
- Rideshare Plus (vanpool, carpool and ride matching)
- Vanpool and Vanshare (vanshare uses vans from a transportation hub such as a ferry terminal to a worksite)

Stakeholder interviews with several employers in the SLU area were conducted in December of 2003 (see Chapter 3). The interviews briefly touched on TDM programs currently in place at these worksites. The Seattle Times indicated that incentive and CTR programs for employees commuting include free carpool parking, bike facilities, and guaranteed ride home program. SBRI indicated that it is currently developing a Transportation Management Plan

for its new facility, and that bike storage and shower facilities are provided in the parking garage. REI indicated that a high proportion of employees bike to work, and that the company offers incentives and raffles each month for employees who bike or walk to work.

Types of TDM Benefits Offered

Employers in the SLU area offer a wide range of TDM benefits to their employees. Generally speaking, King County Metro plays a much larger role than the City of Seattle in terms of CTR program development. Table 4.11 indicates the percent of South Lake Union employers who stated that they either did or did not offer a TDM program.

Table 4.11: Employer TDM Benefits

TDM Program Element		1995	1997	1999	2001
Compressed Work Week	Yes	45%	57%	53%	44%
	No	55%	43%	47%	56%
Telecommuting	Yes	45%	46%	60%	63%
	No	55%	54%	40%	38%
Flex Time	Yes	55%	57%	80%	75%
	No	45%	43%	20%	25%
Guaranteed Ride Home	Yes	64%	86%	53%	44%
	No	36%	14%	47%	56%
Ridematching Services.	Yes	55%	71%	53%	50%
	No	45%	29%	47%	50%
Shuttle Service	Yes	9%	7%	7%	6%
	No	91%	93%	93%	94%
Bike Subsidy	Yes	9%	50%	20%	31%
	No	91%	50%	80%	69%
Walking Subsidy	Yes	9%	14%	20%	25%
	No	91%	86%	80%	75%
Carpool Subsidy	Yes	9%	14%	20%	38%
	No	91%	86%	80%	63%
Vanpool Subsidy	Yes	82%	71%	93%	75%
	No	18%	29%	7%	25%
Transit Subsidy	Yes	100%	93%	93%	81%
	No	0%	7%	7%	19%
Ferry Subsidy	Yes	64%	64%	67%	56%
	No	36%	36%	33%	44%
Gen. Trans Allowance	Yes	0%	0%	0%	0%
	No	100%	100%	100%	100%
Clothes Locker	Yes	73%	71%	73%	69%
	No	27%	29%	27%	31%
Uncovered Bicycle Pkg	Yes	27%	29%	33%	0%
	No	73%	71%	67%	100%
Covered Bicycle Pkg	Yes	73%	71%	87%	75%
	No	27%	29%	13%	25%
Passenger Loading	Yes	55%	50%	47%	0%
	No	45%	50%	53%	100%
Shower Facilities	Yes	82%	79%	87%	81%
	No	18%	21%	13%	19%

Source: *Modeling TDM Effectiveness: Developing a TDM Effectiveness Estimation Methodology (TEEM)* and Case Studies for the SR 520 Corridor based on King County data

It is clear that these TDM programs are having a positive influence on commuting behavior. For example, of employers in the SLU area who have offered FlexPasses to employees for 3 or more years, the percentage of employees taking transit to work is almost 19 percent, which is much higher than the 11 percent transit/rail mode share found in general census data.

Alaskan Way Viaduct "Flexible Transportation" Package

Although the geographic scope of this study is limited, a discussion of TDM must recognize that issues outside the immediate vicinity will impact how transportation demand can be managed in South Lake Union. The Alaskan Way Viaduct and Seawall Replacement Project (AWVSRP) will have a great influence on the neighborhood and on the menu of TDM options available. Each of the AWVSRP build alternatives includes a Flexible Transportation Package (FTP). The FTP is a set of programs that bring together synergistic transportation strategies that benefit from being considered and implemented in a coordinated fashion. It comprises strategies that are usually categorized as transportation system management (TSM), transportation demand management (TDM), intelligent transportation systems (ITS), transit services and pedestrian and bicycle improvements. It comprises a range of mostly low-cost transportation demand and system management and human powered strategies that are targeted at specific challenges or travel markets.

Following is a list of potential flexible transportation strategies included in the AWVSRP:

- Pedestrian and Bicycle Surface Street Improvements
- Pedestrian Over-Crossings To/From Colman Dock Ferry Terminal
- Waterfront Streetcar Track Capacity Expansion
- Expansion Of Vanpool/Vanshare Program
- Direct Transit Service Enhancements, Including Potential Water Taxi Service
- Construction Worker/Commuter Shuttle Service
- Expand FlexPass Program in Downtown Seattle During Construction
- Conversion of Long-Term Downtown Commuter Parking To Short-Term and Carpool Parking
- Traveler Information Systems
- Parking Lot Information Systems
- Small Employer Market Development
- Personalized Transportation Consultation
- Incident Management Systems
- WSDOT Traffic Systems Management Center Upgrade
- Transit Priority Measures And Facilities
- Enhanced Traffic Signal System
- Enhanced Signage and Intelligent Transportation Systems
- Remote Ferry Holding Area Or Alternative Management Concept
- Ramp Metering
- Ramp Pricing With HOV Exemptions
- Smart Work Zones
- Event Management Systems and Services
- Temporary Transit or Truck-only Lanes
- Truck/Commercial Vehicle Travel Operations Restrictions and Prioritizations
- Flexible Transportation Program Management and Monitoring

- Demonstration and Research Programs

Because the SLU Study and AWVSRP project areas overlap, the SLU study will develop TDM strategies that are compatible with and, if possible, build upon the strategies being discussed as part of the AWVSRP project.

Open Space

Most of the open space in the SLU area consists of parks. In addition, several "Green Streets" have been designated by the City of Seattle.

Existing Parks

The South Lake Union area includes three existing parks, as shown in Figure 4.16.

Cascade Playground

Cascade Playground is located in the block bordered by Thomas Street, Pontius Avenue N., Harrison Street, and Minor Avenue N. Cascade Playground has a children's play area, a basketball hoop, a shady picnic table, a wide field, and restrooms. The park is adjacent to an active community p-patch, and is undergoing improvements, including increased access on all sides.

Denny Park

Denny Park is a 6.4-acre park located in the block bordered by Denny Way, Ninth Avenue, John Street, and Dexter Avenue N. Of historical note, it is the very first City Park, built in 1884.

Lake Union Park

The south end of Lake Union is currently home to an under-utilized park and marine facility. The existing park will be redeveloped to create a 12-acre regional park and waterfront activities center.

Green Streets

A "Green Street" is one in which a variety of treatments (such as sidewalk widening, landscaping, traffic calming, and pedestrian-oriented features) are emphasized for pedestrian circulation and open space use. Thomas and Harrison Streets, between Fairview and Eastlake Avenues, are designated "Green Streets" in the South Lake Union area. At this time, the streetscape on these streets is not significantly different than other streets in the SLU neighborhood. Changes proposed for these streets will focus on improved pedestrian facilities and connections to pedestrian oriented locations and uses.

Figure 4.16: Existing Parks Map

CHAPTER 5 FUTURE BASELINE CONDITIONS, PROJECTED PROBLEMS AND DEFICIENCIES

The Future Baseline scenario represents future conditions expected in the study area assuming year 2030 land-use, employment and housing levels currently identified by the City of Seattle and the Puget Sound Regional Council. It also assumes only limited improvements to the transportation system – typically only those that are programmed in either the Regional or the City of Seattle's Transportation Improvement Plan, and have committed funding.

Simplistically, the Future Baseline scenario reflects expected traffic and travel conditions in the SLU study area for the study horizon year (2030) with roughly the same transportation system as exists today and the projected growth in employment and housing for South Lake Union, the rest of the city and the four-county region.

This chapter summarizes analysis results of the year 2030 future baseline scenario and identifies expected problems and deficiencies associated with the transportation network. Problems and deficiencies were identified through a variety of means and sources. Existing problems and deficiencies that had been identified through the analysis of existing data, field observations, and discussion with study area stakeholders were carried forward unless specific programs had been identified that would mitigate them. Additionally, based on analysis of projected land use growth and associated travel demand, future operational issues were identified. The project team then solicited information on existing deficiencies or problems from SDOT staff, King County Metro staff, neighborhood, and stakeholder groups to ensure that the study team fully understood as many of the deficiencies and problems in the SLU neighborhood as possible.

Planned Growth

The Future Baseline scenario horizon year for this analysis is 2030. It is expected that the study area will experience significant growth by that time. Table 5.1 summarizes the projected growth in employment and housing within SLU, neighboring Denny Triangle, the city, and the region, all of which have an impact on travel within SLU.

Table 5.1: 2000 to 2030 Growth Projections

Area	Employment		Household	
	2000	**2030**	**2000**	**2030**
South Lake Union	20,300	45,400	2,800	15,500
Denny Triangle	29,730	50, 410	2,580	8,640
City of Seattle	535,860	706,550	258,500	353,130
Region	1,748,800	2,535,900	1,282,970	1,889,100

The expected growth in housing and employment in this area and surrounding areas will have a significant impact on the project area. To estimate these impacts with respect to traffic and the rest of the transportation system, the land use projections were input into the City of Seattle travel demand model to develop year 2030 travel forecasts. Analysis of these forecasts is summarized in subsequent sections of this chapter.

Roadway Network

With respect to roadways, the Year 2030 Future Baseline network was similar to the existing network within the study area. The main changes to the future baseline network were related to optimization of the signal timing splits (green time) and signal offsets (start of green) to maximize traffic flow on key arterials such as Mercer Street, Fairview Avenue, Dexter Avenue, Westlake Avenue, and Ninth Avenue N. In addition, the simulation network included the operation of the South Lake Union streetcar, but it is not reflected in the mode share forecasts.

At the regional level, the travel demand model includes transportation projects that are included in the Metropolitan Transportation Plan, *Destination 2030*. One exception to the Destination 2030 network is that the City's travel demand model network assumes that only HOV or High-Capacity-Transit lanes would be added to SR 520 across Lake Washington, whereas Destination 2030 includes additional general purpose lanes. Other projects in the future baseline network include:

- The 14-mile monorail Green Line connecting Greenwood with West Seattle
- SR-520 expansion by an additional HOV lane in each direction
- I-405 expansion by two lanes in each direction + additional HOV lane
- Sound Transit Link Light Rail line from Northgate to SeaTac Airport
- SR-167 expansion by one lane in each direction
- SR-509 extension from S 188th Street to I-5
- High Capacity Transit (HCT) crossing Lake Washington, on I-405, and on SR 99 (Bus Rapid Transit)

Figure 5.1 and 5.2 graphically display the expected intersection turning movement volumes in 2030. Table 5.2 presents the AM peak hour LOS analysis results for both the existing and future baseline. In the future baseline, the following intersections are projected to experience the greatest impacts, assuming no changes to the existing street network:

- Roy Street and 9th Avenue N. (from an existing LOS C to LOS D)
- Mercer Street and 9th Avenue (from an existing LOS B to LOS C)
- Mercer Street and Dexter Avenue (from an existing LOS D to LOS E)
- Republican Street and Fairview Avenue (from an existing LOS B to LOS C).

Another measure used to assess system-wide performance of the study area network is the total average network delay. This measures the average amount of delay each vehicle experiences as it travels through the network. The total network average delay is expected to increase from 3.8 to 7.1 minutes per vehicle by 2030. This is not unexpected, given the growth projected for this part of the City, no changes to the existing street network, and limited changes to transit service affecting this area.

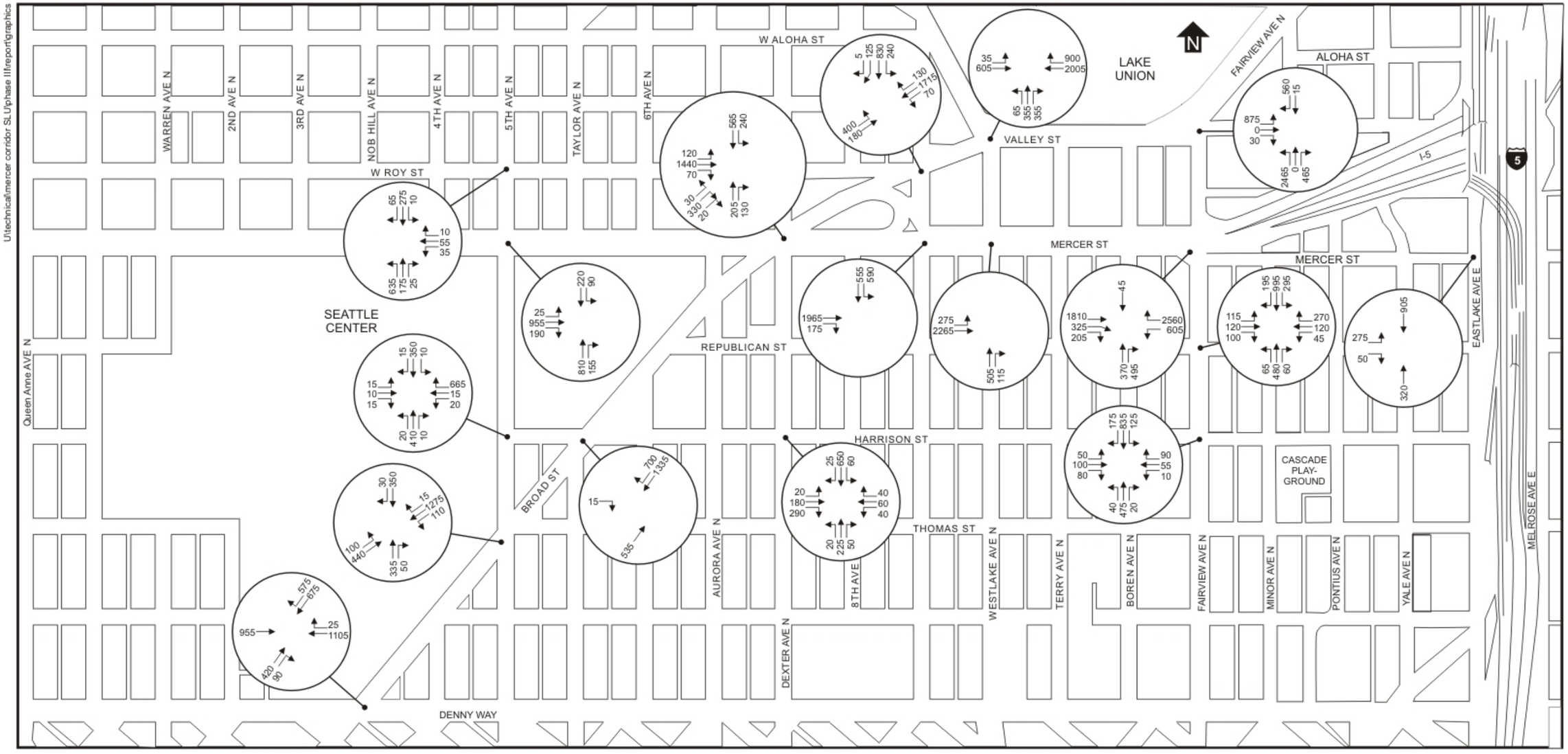


Figure 5.1: South Lake Union – 2030 Future Baseline AM Peak Hour Intersection Volumes

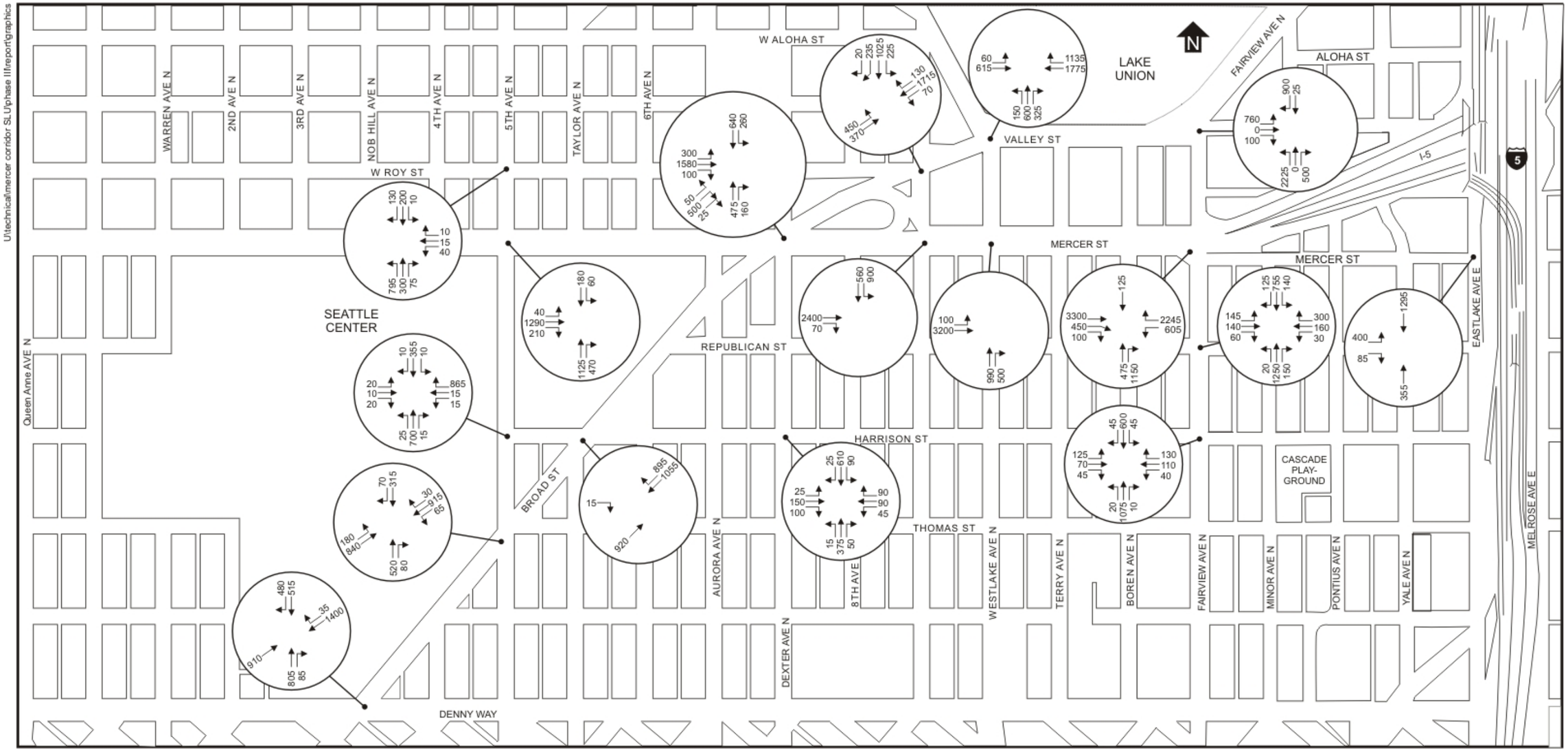


Figure 5.2: South Lake Union – 2030 Future Baseline PM Peak Hour Intersection Volumes

The results of this analysis also include a reduction in delay by 2030 for a few intersections, likely due to signal timing changes and arterial progression enhancements to optimize traffic flow (where possible). Nonetheless, the analysis results clearly indicate that the roadway system is expected to experience a substantial increase in delay and congestion.

Table 5.2: AM Peak Hour Delay and LOS Summary (Existing and 2030 No-Build at Selected Intersections)

ID	Cross Street 1	Cross Street 2	Existing AM Peak Hour		2030 No-Build AM Peak Hour	
			Delay	LOS	Delay	LOS
9	Mercer Street	Westlake Avenue	29.8	C	33.4	C
10	Broad Street	Westlake Avenue	12.0	B	12.2	B
14	Mercer Street	Fairview Avenue	56.6	E	57.9	E
17	Valley Street	Fairview Avenue	21.4	C	21.8	C
18	Fairview Avenue	I-5 Off-Ramp	4.9	A	6.6	A
27	Harrison Street	Fairview Avenue	9.1	A	13.3	B
28	5th Avenue	Broad Street	22.1	C	20.9	C
31	Roy Street	9th Avenue	28.3	C	39.3	D
32	Mercer Street	9th Avenue	17.8	B	26.7	C
36	Mercer Street	Dexter Avenue	38.8	D	59.0	E
39	Harrison Street	Dexter Avenue	26.9	C	16.1	B
57	Mercer Street	5th Avenue	23.4	C	26.1	C
58	Roy Street	5th Avenue	33.9	C	23.4	C
63	Harrison Street	Broad Street	6.8	A	7.6	A
65	Mercer Street	Eastlake Avenue	9.8	A	7.5	A
66	Denny Way	Broad Street	14.2	B	15.7	B
203	Republican Street	Fairview Avenue	15.1	B	29.8	C
Total Network Average Delay (sec/veh)			226.3		424.6	

Note: Total Network Average Delay is a weighted average delay per vehicle for all intersections in the study area (beyond those listed in the table). Delays reported from SimTraffic microsimulation analysis (Synchro/SimTraffic V5 Build 323)

PM peak hour LOS analysis results are shown in Table 5.3 for both the existing and future baseline. In the future baseline, the following intersections are projected to experience the greatest impacts, assuming no changes to the existing street network:

- Harrison Street and Fairview Avenue (from an existing LOS B to LOS D)
- Mercer Street and Dexter Avenue (from an existing LOS E to LOS F)
- Mercer Street and 5th Avenue (from an existing LOS C to LOS D)
- Republican Street and Fairview Avenue (from an existing LOS B to LOS E).

The total network average delay for the 2030 PM peak-hour period is projected to more than double from 3.7 to 8.1 minutes per vehicle. Similar to existing conditions, the Mercer corridor shows a high concentration of traffic levels and overall congestion. By 2030, Fairview Avenue will also become considerably more congested due growth in traffic volumes and the limited capacity on Fairview to accommodate the high-demand turning movements to/from I-5 in combination with transit movements along Fairview destined for the Eastlake community (Routes 70, 71, 72, 73). Similar to the AM peak-hour scenario, the PM peak hour has a few intersections with reductions in delay by 2030, which are likely due to various signal timing changes implemented to enhance traffic circulation.

Table 5.3: PM Peak Hour Delay and LOS Summary (Existing and 2030 No-Build at Selected Intersections

ID	Cross Street 1	Cross Street 2	Existing PM Peak Hour		2030 No-Build PM Peak Hour	
			Delay	LOS	Delay	LOS
9	Mercer Street	Westlake Avenue	37.3	D	37.6	D
10	Broad Street	Westlake Avenue	13.7	B	25.5	C
14	Mercer Street	Fairview Avenue	48.3	D	53.8	D
17	Valley Street	Fairview Avenue	21.5	C	22.3	C
18	Fairview Avenue	I-5 Off-Ramp	9.5	A	10.2	B
27	Harrison Street	Fairview Avenue	10.1	B	52.6	D
28	5th Avenue	Broad Street	26.8	C	33.2	C
31	Roy Street	9th Avenue	50.0	D	43.7	D
32	Mercer Street	9th Avenue	38.1	D	29.1	C
36	Mercer Street	Dexter Avenue	80.0	E	>120	F
39	Harrison Street	Dexter Avenue	9.7	A	11.1	B
57	Mercer Street	5th Avenue	25.1	C	44.3	D
58	Roy Street	5th Avenue	14.8	B	18.2	B
62	Harrison Street	5th Avenue	10.8	B	24.3	C
63	Harrison Street	Broad Street	20.3	C	11.0	B
65	Mercer Street	Eastlake Avenue	19.0	B	16.3	B
66	Denny Way	Broad Street	20.3	C	31.2	C
203	Republican Street	Fairview Avenue	19.0	B	59.1	E
Total Network Average Delay (sec/veh)			223.2		478.5	

Note: Total Network Average Delay is a weighted average delay per vehicle for all intersections in the study area (beyond those listed in the table). Delays reported from SimTraffic microsimulation analysis (Synchro/SimTraffic V5 Build 323)

Table 5.4 presents estimated travel times for both the existing and future baseline networks during the AM peak hour. The travel times for these routes include the intersection delays summarized in Table 5.2. It is not surprising that travel times will increase by 2030 without any major improvements. The east-west routes in the study area are expected to experience the greatest increases in travel times, particularly the eastbound routes from the Seattle Center to I-5. With regard to the north-south routes, the travel time on southbound Ninth Avenue is projected to experience the greatest travel time increase (from 5.7 minutes to 7.6 minutes). Figures 5.3, and 5.4 show the identified travel paths and associated travel times.

Table 5.4: Existing and 2030 No-Build AM Peak Hour Travel Time Estimates

Path ID	Travel Path (East-West Routes)	Existing AM Travel Time	2030 No-Build AM Travel Time
	WB - I-5 to North Side Seattle Center	7.0 min	7.9 min
2	EB – North Side Seattle Center to I-5	6.8 min	8.0 min
3	WB - I-5 to South Side Seattle Center	5.3 min	6.4 min
4	EB – South Side Seattle Center to I-5	6.1 min	7.6 min
5	WB - Eastlake to North Side Seattle Center	5.4 min	6.1 min
6	EB – North Side Seattle Center to Eastlake	4.7 min	5.4 min
7	WB - I-5 to Westlake/Aloha	3.3 min	4.0 min
8	EB – Westlake/Aloha to I-5	5.7 min	7.8 min
Path ID	**Travel Path (North-South Routes)**	**Existing AM Travel Time**	**2030 No-Build AM Travel Time**
1	NB - Fairview Avenue	3.5 min	3.9 min
2	SB – Fairview Avenue	6.9 min	8.0 min
3	NB - Westlake Avenue	4.6 min	5.3 min
3a	SB - Westlake Avenue		
4	SB - 9th Avenue	5.7 min	7.6 min
4a	NB - 9th Avenue		
5	NB - Dexter Avenue	3.0 min	4.8 min
6	SB - Dexter Avenue	5.2 min	4.4 min
7	WB - Eastlake to South Side Seattle Center	3.7 min	4.6 min
8	EB – South Side Seattle Center to Eastlake	3.4 min	3.9 min
	Ramp Queue Delay at I-5 & Fairview (WB)	1.5 min	1.7 min

The queue delay at the I-5 off-ramp to Fairview Avenue is also expected to increase, although not as dramatically, from 1.5 to 1.7 minutes on average for vehicles exiting this ramp.

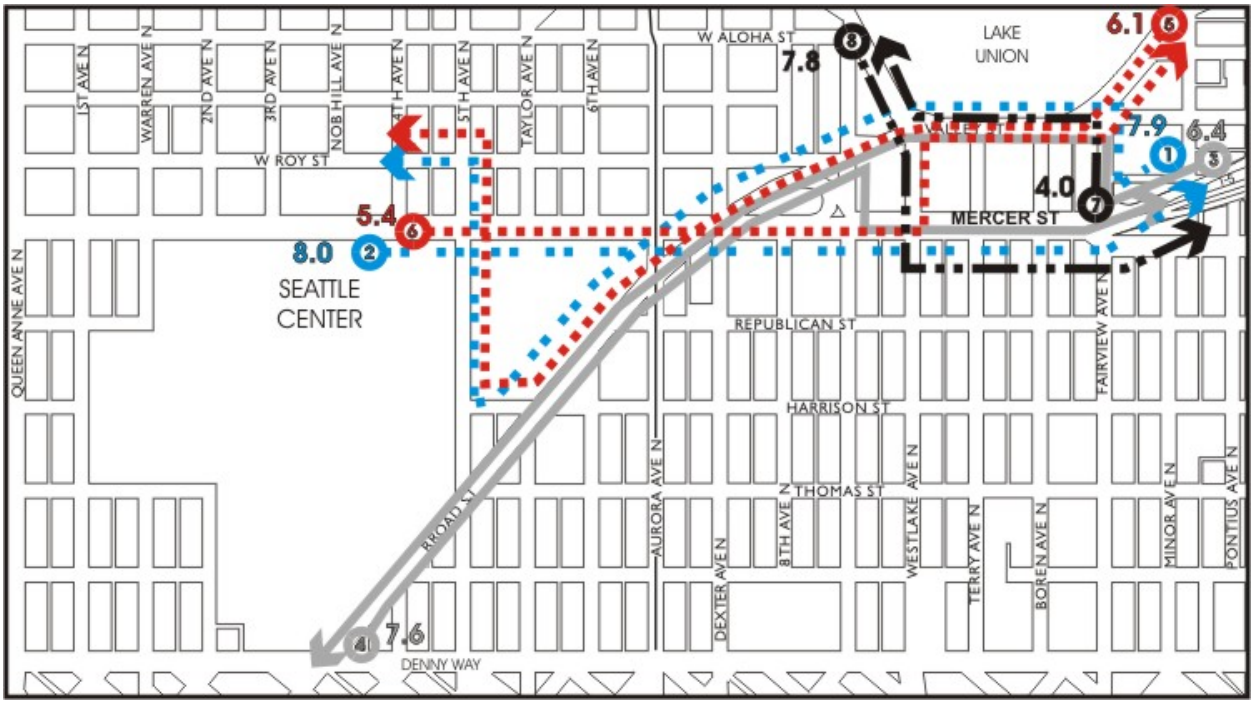


Figure 5.3: 2030 Future No-Build East/West AM Peak Travel Time Path Summaries

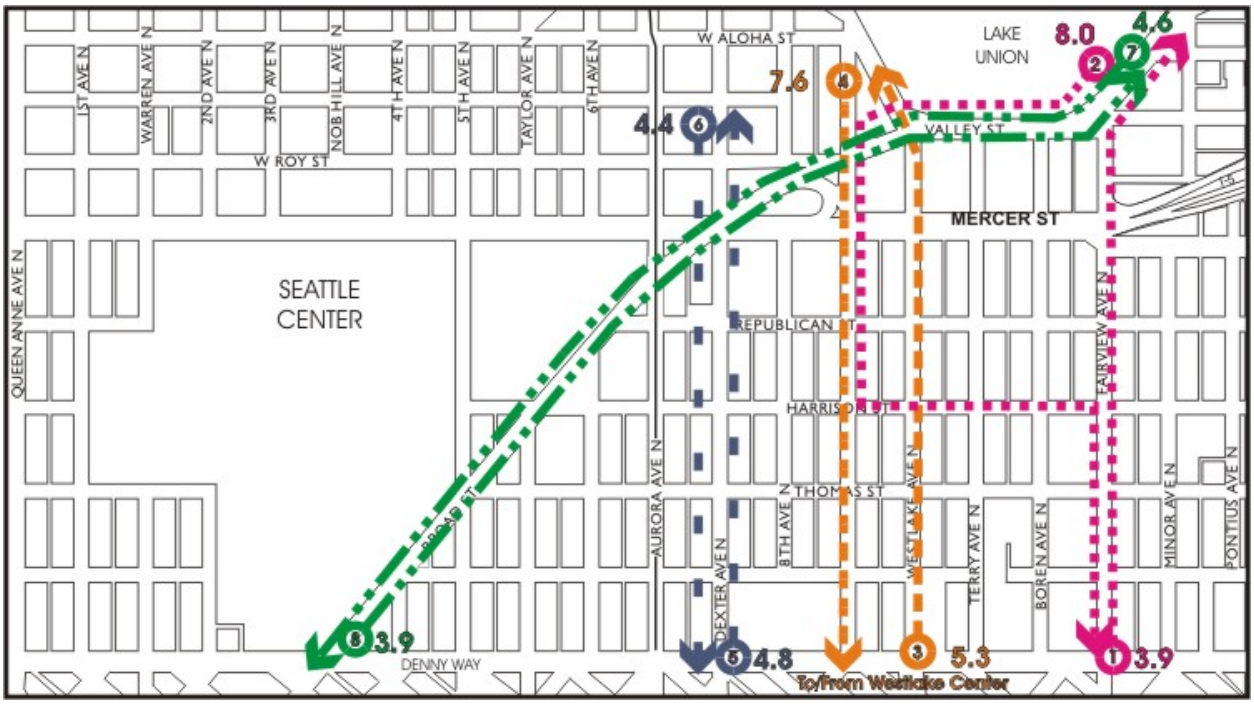


Figure 5.4: 2030 Future No-Build North/South AM Peak Travel Time Path Summaries

Table 5.5 summarizes the future baseline PM peak-hour travel times for key routes in the study area. As expected, travel times will increase noticeably by 2030. Based on the analysis calculations, the east-west routes in the study area will experience the greatest increases in travel times, particularly the eastbound routes from the north side of Seattle Center to I-5. In addition, the travel time on northbound Fairview Avenue will almost double by 2030. Figures 5.5, and 5.6 show the identified travel paths and associated travel times.

Table 5.5: Existing and 2030 No-Build PM Peak Hour Travel Time Estimates

Path ID	Travel Path (East-West Routes)	PM Existing Travel Time	PM 2030 No-Build Travel Time
1	WB – I-5 to North Side Seattle Center	6.4 min	8.2 min
2	EB – North Side Seattle Center to I-5	8.4 min	11.7 min
3	WB – I-5 to South Side Seattle Center	5.5 min	5.8 min.
4	EB – South Side Seattle Center to I-5	10.4 min	7.9 min
5	WB - Eastlake to North Side Seattle Center	4.9 min	6.6 min
6	EB – North Side Seattle Center to Eastlake	6.0 min	9.7 min
7	WB – I-5 to Westlake/Aloha	3.2 min	3.3 min
8	EB – Westlake/Aloha to I-5	8.1 min	11.8 min
Path ID	**Travel Path (North-South Routes)**	**PM Existing Travel Time**	**PM 2030 No-Build Travel Time**
1	NB - Fairview Avenue	4.6 min	8.5 min
2	SB - Fairview Avenue	9.2 min	10.1 min
3	NB - Westlake Avenue	4.8 min	6.8 min
3a	SB - Westlake Avenue		
4	SB - 9th Avenue	8.0 min	11.9 min
4a	NB – 9th Avenue		
5	NB - Dexter Avenue	3.0 min	3.2 min
6	SB - Dexter Avenue	4.7 min	5.3 min
7	WB - Eastlake to South Side Seattle Center	4.0 min	4.2 min
8	EB – South Side Seattle Center to Eastlake	5.6 min	5.1 min
	Ramp Queue Delay at I-5 & Fairview (WB)	1.3 min	1.4 min

Similar to the AM peak hour, delays at the I-5 off-ramp to Fairview Avenue are expected to increase slightly, from 1.3 to 1.4 minutes of average delay.

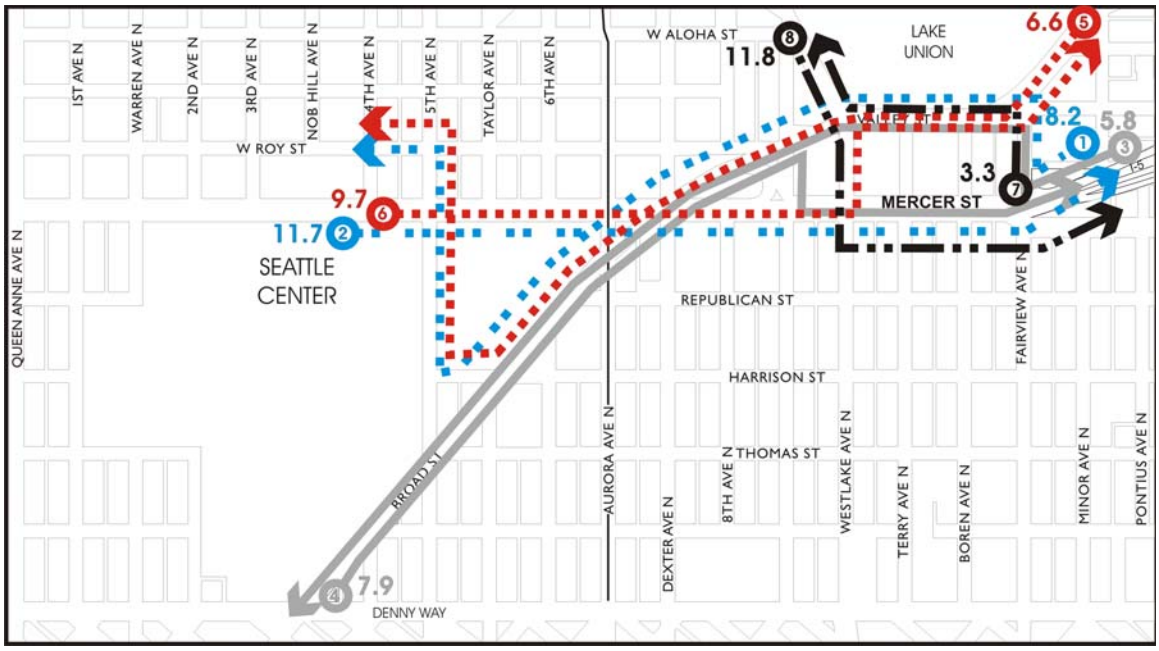


Figure 5.5 2030 Future No-Build East/West PM Peak Travel Time Path Summaries

Figure 5.6 2030 Future No-Build North/South PM Peak Travel Time Path Summaries

Identified Problems and Deficiencies in the Roadway Network

Based on the examination of the existing conditions in the South Lake Union project area and feedback from study area stakeholders, the study team identified a number of problems and deficiencies, which are listed below. Figure 5.7 also displays these issues.

- There are no direct ramp connections to SR 99 (Aurora) in the project area. All other connections require right-angle turns to and from local streets. Furthermore, some connections to/from SR 99 are practically non-existent.
- There is no direct westbound connection from I-5 to the Seattle Center, but rather a circuitous route via Fairview Avenue N., Valley Street, and Broad Street.
- The events at the Seattle Center impact traffic operations on a number of roads including: westbound Broad Street, eastbound Mercer Street, Valley Street (both directions), Fifth Avenue (both directions), southbound Ninth Avenue and Denny Way (both directions).
- Frequent southbound backups occur on Dexter Avenue at Mercer Street due to the signal timing and congestion levels on Mercer Street.
- The northbound SR 99 off-ramp to Mercer Street experiences back-ups.
- The skewed intersections along Denny Way inhibit vehicle and pedestrian flow.
- Mercer Street, Valley Street and SR 99 (Aurora Avenue) are significant barriers to pedestrians and bicyclists.
- The overall street system in the study area is not conducive to urban development.

From these issues, it was determined that the existing transportation system in the study area requires improvement to support City plans and policies, as well as planned development.

Traffic Issues

- Lack of Direct Westbound Connection From I-5 to Seattle Center
- Special Events Impact Operations On: WB Broad, EB Mercer, Valley, 5th, SB 9th and Denny
- SB Backups on Dexter Avenue at Mercer Street
- NB SR 99 Off-Ramp to Mercer Street Experiences Back-Ups
- Skewed Intersections Along Denny Way Inhibit Traffic Flow

Congested Roadways

Cross Traffic Barriers

Weaving, Limited Access and Limited Connections

High Accident Intersections

Unsignalized Intersections

Signalized Intersections

Review Signal Operations

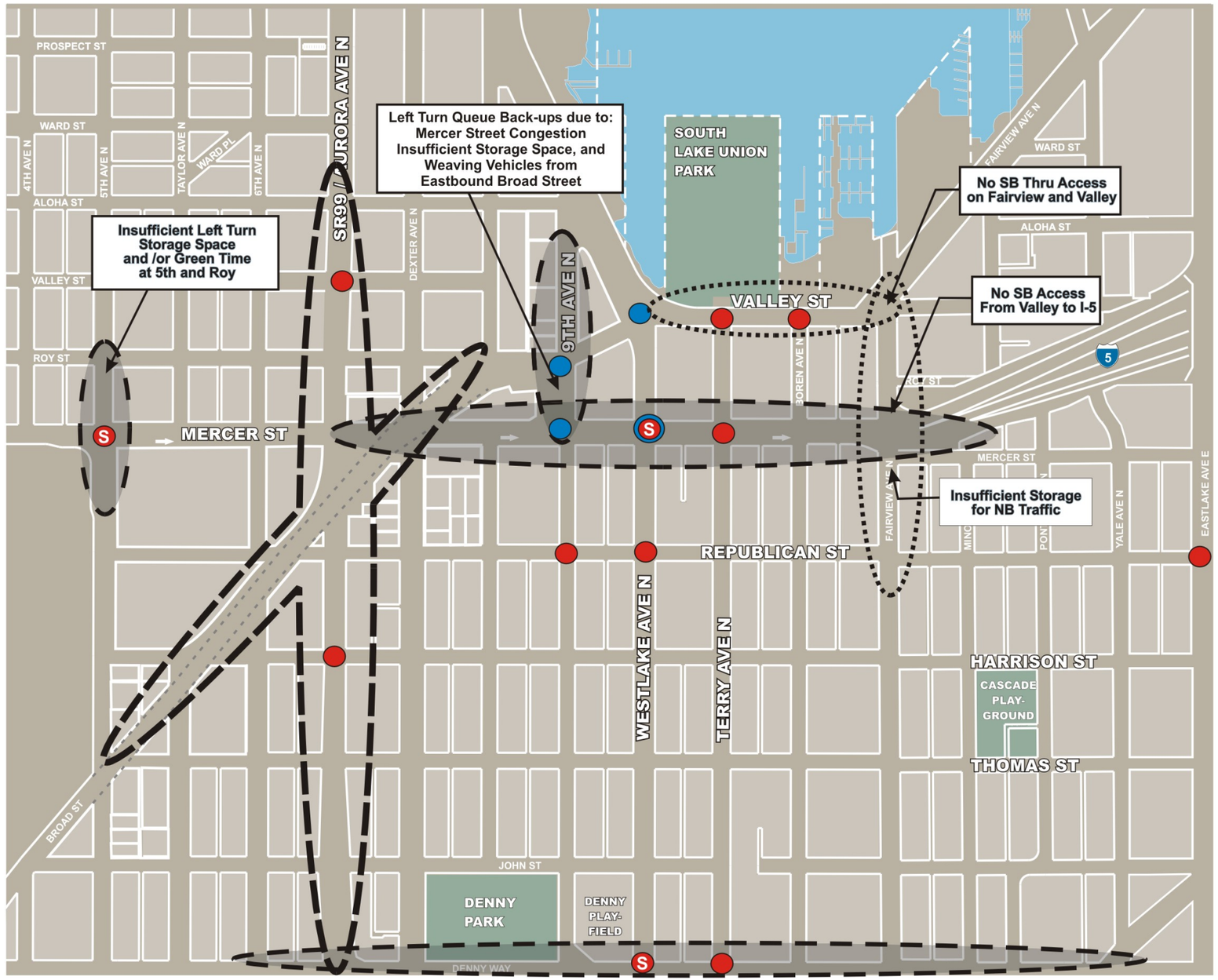


Figure 5.7: Traffic Issues in the South Lake Union Neighborhood

Transit

The year 2030 baseline model estimates the transit and HOV mode share shown in Table 5.6. Note that the travel demand model does not estimate pedestrian and bike trips, so a direct comparison to the 2000 Census data is not possible.

Table 5.6: 2030 Future Baseline Mode Share Estimates

	Mode Share	
Work Trips	**Trips to SLU Destinations**	**Trips from SLU Origins**
SOV and 2+ Carpools	78%	65%
Transit	13%	30%
3+ Carpools	9%	5%
Non-Work Trips		
SOV & Carpool	91%	88%
Transit	9%	12%

It should be noted that the PSRC Regional Demand Model (the source for mode share forecasts) assumes a three-person occupancy requirement for carpools in 2030. As a result, the mode share model estimates a lower carpool share than for 2000, where the requirement is two persons per vehicle.

The draft Comprehensive Plan update for 2004 proposes significantly higher mode share goals for the SLU and other Center City neighborhoods. The goal is that no more than 50 percent of work trips to SLU would be by SOV. The Future Baseline forecasts do no reflect this goal. However, the study recommendations presented in Chapter 8 will help us move toward that goal.

The Future Baseline model includes the 14-mile monorail Green Line connecting neighborhoods with downtown. Local transit service on existing routes is assumed to increase in the SLU area, but no additional regional service directly to the SLU area is assumed. No other specific transit improvements are assumed in the 2030 Future Baseline scenario.

Identified Problems and Deficiencies in the Transit Network

Bus service deficiencies have been identified through public meetings, stakeholder interviews, meetings with King County Metro staff, and previous studies. Following are several of the transit issues that have been identified for the SLU area:

- Need for increase transit options, reliability and ease of use
- Inadequate transit service within SLU
- Inadequate regional transit service identified to meet the needs of this growing urban village
- Streetscape is not conducive to pedestrian access to transit
- Transit vehicles are stuck in congestion at difficult intersections
- Route 70 service is perceived to be slow and overcrowded

- Some north/south transit service bypasses SLU for downtown
- There are currently limited bus shelter facilities
- There is no east/west transit service within SLU
- Some bus weaving movements are disruptive to transit and potentially unsafe (e.g., on Fairview Avenue at Mercer and Valley Streets)

Pedestrian and Bicycle

As was noted in the Existing Conditions chapter, there are a number of barriers to pedestrian and bicycle travel both within SLU and between SLU and adjacent neighborhoods. Mercer and Valley Street are difficult for pedestrians to cross and make it difficult to access the Lake Union waterfront from the rest of the neighborhood. I-5 to the east and Aurora Avenue N/SR 99 to the west present barriers to Capitol Hill and Queen Anne, respectively. There are some gaps, especially in the bicycle network, that limit the potential for these modes to serve as viable alternatives for residents, employees and others.

As can be seen in Figure 5.8, the existing non-motorized system has the following challenges:

- No east/west bicycle lanes, off-street trails, or other routes through SLU
- No north/south bike routes for cyclists from the Eastlake neighborhood and areas to the north
- Limited access to Capitol Hill, Queen Anne, and Seattle Center.
- High volumes on Mercer and Valley with no traffic control between Fairview and Dexter Avenues.
- The shared-use trail along the north side of Valley Street is in poor condition and lacks continuity.
- Long distances between signalized crossings on Denny

In addition, the general streetscape environment, while adequate, is not conducive to pedestrian travel. In particular, the narrow sidewalks and lack of landscaping along high volumes streets, like Mercer and Valley, make these streets feel unappealing and uncomfortable for pedestrians. Likewise, SR-99/Aurora Avenue and Broad Street present major barriers to pedestrian and bicycle travel by severing the street grid, accommodating high traffic volumes, and limiting access points.

As the number of people living in SLU grows, the need for a street system that facilitates safe and convenient pedestrian and bicycle circulation will become more and more important. Lack of these changes could result in a greater increase in congestion, if people continue to feel that the automobile is the only way to get around within the neighborhood.

Non-Motorized System Issues

- East Side of SLU Neighborhood Lacks a North/South Bike Facility
- No East/West Bicycle Facilities
- Very Limited and Intimidating Pedestrian Crossings of SR 99
- Difficult Pedestrian & Bicycle Environment on Valley & Mercer Streets
- Streetscape is Unfriendly for Pedestrian Travel
- Limited Access to Capitol Hill

Non-Motorized Facilities

- Bicycle Lane
- Street Commonly Used By Cyclists
- Existing Pedestrian Path
- Designated Green Street

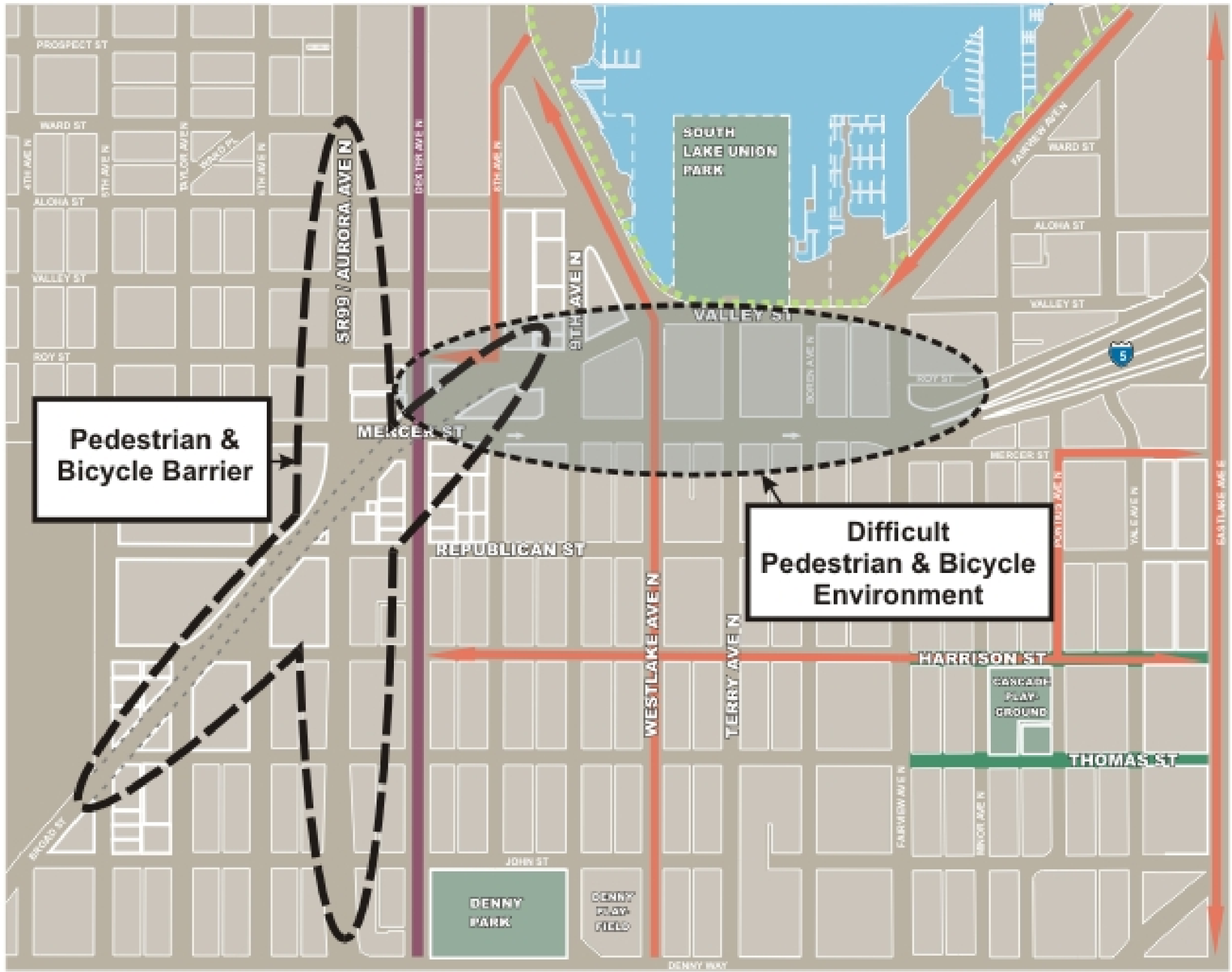


Figure 5.8: Non-Motorized Deficiencies and Areas for Improvement

Transportation Demand Management

Employment in the South Lake Union is expected to increase by over 20,000 employees by the year 2020. In addition, employment in the adjacent Denny Triangle and nearby Central Business District is expected to grow by about 40,000 jobs over the same period. Without aggressive transportation demand management this increase in employment will result in a tremendous impact on the number of vehicles traveling to and through the SLU area. This increase in activity presents a number of challenges, including impacts to the transportation system and parking.

In the year 2000 seventy-one percent (71%) of workers commuting to South Lake Union drove alone. If current commute trends continue, accommodating the transportation needs of planned growth will require nearly 11,500 new parking spaces (equivalent to about 13, eight-story garages). Providing this quantity of parking could cost private developers as much as $286 million. This estimate doesn't include the cost to replace existing surface parking that may eventually be developed, so the cost of providing parking if 71 percent of people continue to drive alone would likely be much higher. In addition to the cost of parking structures, continued use of automobiles at current rates would also significantly worsen traffic congestion for travel to and through South Lake Union. Aggressive transportation demand management will reduce these costs and impacts to manageable levels.

The Future Baseline scenario for Transportation Demand Management assumes similar TDM programs in the future as currently exist. There are several differences, however, between 2030 baseline and existing:

- The modeling analysis estimates that 13 percent of work trips to the SLU area are via transit in the future baseline network (compared to 11 percent estimated today).
- The future baseline model assumes a 1.5% per year increase in parking price.

Identified Problems and Deficiencies in the TDM Programs/Policies

The baseline scenario presented above does not reflect the type of neighborhood mode split necessary to achieve the broader goals of an accessible, sustainable, livable neighborhood. In order to achieve mode splits and travel patterns that meet the goal of a livable urban neighborhood, the City of Seattle, transit providers, developers, residents, and businesses must implement transportation strategies that differ greatly from those that inform the baseline model.

Although a number of excellent, and successful, TDM programs have been implemented in the SLU area, there are several constraints that limit the long-term goal of increasing non-SOV modes of travel in the SLU area. These include the following:

- Existing TDM programs are focused primarily on large employers (100 or more employees). Thus, these programs fail to reach employees of small companies in the area.
- Free and low cost parking is widely available in SLU. Abundant parking discourages the use of non-SOV modes.

- Parking and land use regulations permit the construction of unlimited numbers of parking spaces. This erodes the long term effectiveness of TDM.
- On-street parking is not well regulated.
- Existing transit service to SLU destinations will not support the growth in transit trips needed for effective TDM.
- The pedestrian environment is deficient in many parts of SLU. Deficiencies include physical barriers, real and perceived traffic hazards, and lack of facilities. Poor pedestrian environments discourage transit use, reduce flexibility in parking management and encourage short automobile trips.
- Bicycle conditions are poor. There is a lack of bicycle lanes, signed routes and paths through the neighborhood. There is little on-street bicycle parking. Some street surfaces are in poor condition and present obstacles to bicyclists.
- The available data regarding the supply and uses of parking is insufficient to develop an effective neighborhood parking plan.

CHAPTER 6 IDENTIFICATION OF POTENTIAL IMPROVEMENTS AND DEVELOPMENT OF ALTERNATIVE PACKAGES

After a comprehensive review of existing conditions and expected land-use growth and transportation demand by 2030, as well as input from the community and other stakeholders and the SLU Neighborhood Plan, the study team developed a list of potential improvements to reach the goals for the SLU Transportation Study.

First a list of all previously studied improvements was compiled to ensure that no potential transportation improvement would be overlooked. The study team then developed a variety of measures to mitigate the deficiencies and issues uncovered during analysis of the existing and future baseline conditions stages of the study. Again, the study team worked with SDOT and King County Metro staff, neighborhood groups and project area stakeholders to gather additional ideas and potential alternatives to address the known deficiencies and problems.

Initial Screening

During the alternatives development effort, the project team categorized the alternatives by transportation mode: auto, pedestrian, bicycle, and transit. The auto projects were then divided into short-term and/or lower cost alternatives and more long-term and/or higher cost solutions. The project team then screened this initial "long" list, to determine if each proposed improvement would be considered feasible based on engineering or cost reasons, or on the expected level of neighborhood/political opposition.

Some proposed improvements had been previously identified as infeasible in earlier studies. The project team revaluated the alternatives that were previously considered infeasible to take into account applicable SLU Transportation Study goals, neighborhood input and feedback, and any other changes that might justify re-consideration. In cases where an alternative had been ruled out due to engineering infeasibility or high cost compared to the potential benefit, the SLU study team chose to eliminate the alternative, e.g. grade separation of the I-5 ramps/Mercer Street and the Fairview Avenue intersection. Appendix B includes a full listing of the various alternatives that were considered, but deleted from further study.

The initial screening process resulted in three long-term traffic alternatives and a number of short-term traffic, pedestrian, bicycle and transit projects. The project team then attempted to further refine the long-term traffic alternatives and individual improvement projects that passed the initial screening. Some projects needed no additional analysis and others required considerable design and coordination between the project team, SDOT, and King County Metro staff. Generally, the short-term and/or low-cost traffic improvements, pedestrian improvements and bicycle improvements were relatively straightforward and did not require extensive refinement. The long-term and/or high-cost traffic improvements were generally complex and required additional traffic analysis and design work to arrive at a concept-level solution that could be evaluated.

The study team then compiled the remaining project improvements into three logical groupings, or packages of improvements, and evaluated the packages as a whole as to how well they were likely to meet the stated SLU area goals and objectives.

The three alternative scenarios carried forward for further evaluation were categorized as the Area Improvements Scenario, the Roy Street Underpass and Fairview/Valley Intersection Realignment scenario, and the Two-Way Mercer/Narrow Valley scenario. One of the primary distinguishing characteristics of these alternative scenarios is that they each include a different proposed treatment of the Mercer Corridor. The Area Improvement Scenario assumed Mercer and Valley Streets operate similar as they do today; while the other two scenarios assume changes in the configuration and operation of the Mercer Corridor. Other SLU area improvements that were compatible with or could build upon the particular Mercer Corridor solution designated were added to the alternative package. Note that some individual improvements are contained in more than one alternative package. Each alternative scenario package is described in more detail below.

Area Improvements with Existing Mercer/Valley Configuration

The Area Improvements package is shown in Figure 6.1. This scenario assumes that the existing SLU area transportation infrastructure, including the Mercer Corridor, is essentially unchanged from today. Mercer Street remains four lanes in the eastbound direction, Valley Street serves as the westbound portion of the couplet between Fairview and Westlake Avenues, and Broad Street serves as the westbound portion between Westlake and Fifth Avenues. One change, however, is that an additional crossing of Aurora Avenue is proposed at Thomas Street to provide a new connection between SLU and Seattle Center and to relieve some of the congestion on the Mercer Street/Valley Street/Broad Street system. This would also include the modification of Thomas Street from Dexter to Fairview Avenues from a two-lane cross-section to a three-lane cross-section with one travel-lane in each direction and left-turn lanes.

The major pedestrian elements of this scenario include minor improvements to sidewalks (landscaping and repair) within the existing right-of-way on both Mercer and Valley Streets, implementation of a limited Lake-to-Bay multi-purpose facility that crosses Aurora Avenue N./SR 99 using the Thomas overcrossing, and an improved pedestrian crossing to Capitol Hill at Denny. The pedestrian improvements along Mercer and Valley Streets also include signals at the Terry Avenue/Valley Street and Terry Avenue/Mercer Street intersections to facilitate crossings, landscaping, and countdown signals at all intersections.

The Lake-to-Bay Trail facility would begin at the Valley Street/Westlake Avenue intersection, heading west on a slightly modified Roy Street to the Dexter Avenue bike lanes and travel south to the proposed Thomas Street overpass. It would then continue west to Fifth Avenue N. where it would split into a walking facility that would travel around the south side of the Seattle Center campus and a bicycle facility that would travel around the north side of the campus.

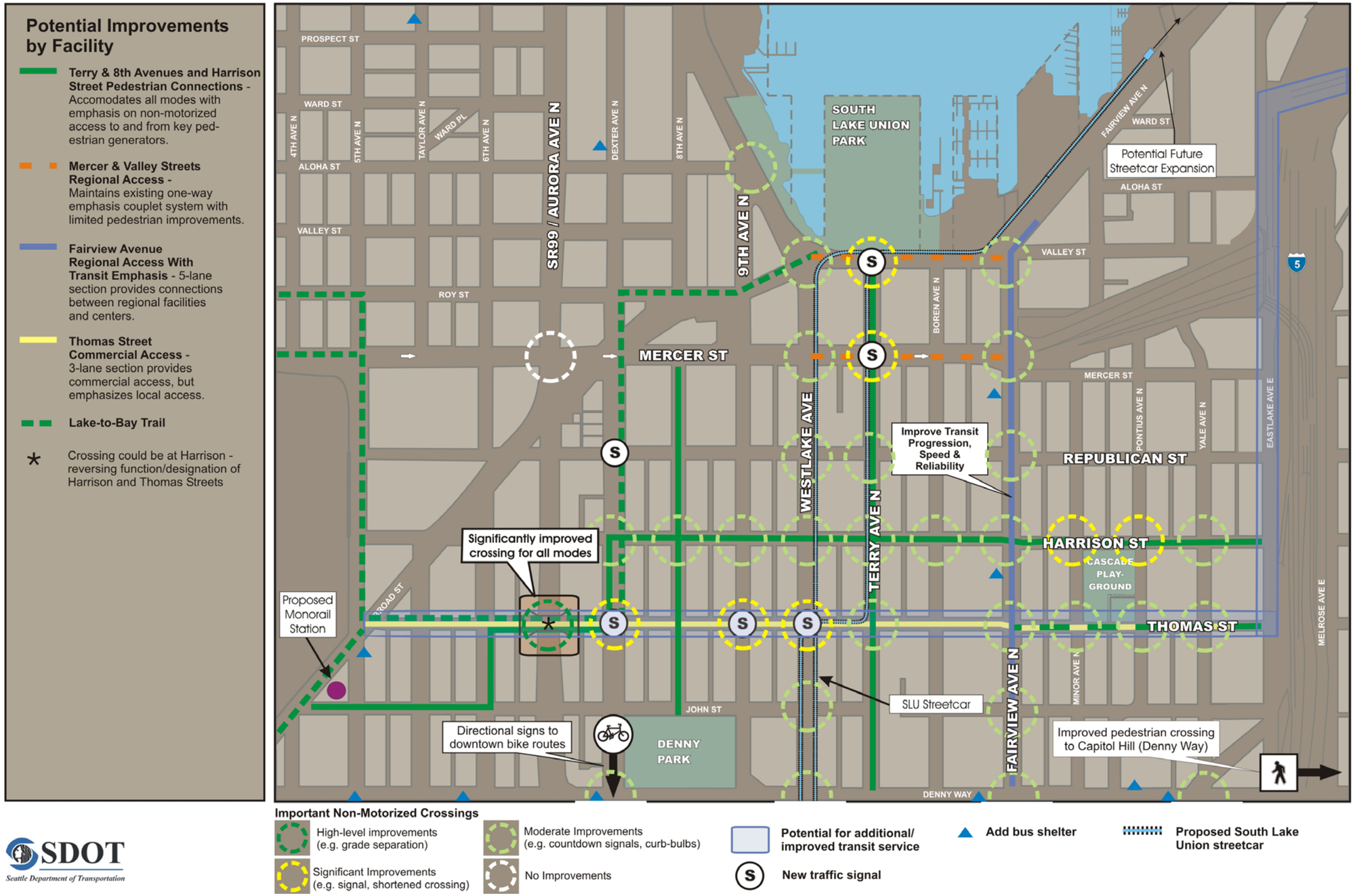


Figure 6.1: Area Improvements with Existing Mercer\Valley Scenario

The improved pedestrian crossing to Capitol Hill would utilize the Denny Way overpass of I-5 and would require the construction of a new, ten-foot sidewalk on the north side of the overpass. The Area Improvements Scenario would also include the implementation of the Terry Avenue design guidelines as development occurs, and extension of the Green Street designation on Harrison Street, providing non-motorized connections to Terry Avenue, the Thomas Street overcrossing, the Lake-to-Bay Trail, and eventually to the proposed monorail station at Fifth Avenue N. and John Street. In addition, Eighth Avenue between John and Mercer Streets, is proposed to be designated as a Green Street as well.

As can be seen in Figure 6.1, extension of the Green Street on Harrison Street includes the construction of curb bulbs and countdown signals at nearly all intersections, but also includes widening the sidewalks on Harrison Street by two feet and reducing the travel lane widths by two feet. In addition, the SLU study team is recommending the widening of sidewalks around the Cascade Playground. And finally, other intersection improvements are proposed at a number of key pedestrian crossings as noted in Figure 6.1 by the dashed circles.

The major bicycle elements include the construction of a limited Lake-to-Bay facility to improve connectivity between SLU and areas west of Aurora Avenue N. Other bicycle elements included in the Area Improvements Scenario are signage along streets commonly traveled by cyclists in the SLU neighborhood, such as on Harrison Street from Dexter Avenue N. to Eastlake Avenue E., Eastlake Avenue E. from E. Garfield Street to Denny Way, and Lakeview Boulevard from Eastlake to Belmont Avenues. In addition, the study is recommending the installation of bike route signs from the existing Dexter Avenue bike lanes to the existing Second Avenue bike lanes and from the proposed Fourth Avenue bike lanes (Center City Access Report, 2004) via Bell and Battery Streets.

The major transit elements included in the Area Improvements Scenario include the Westlake/SLU Streetcar, transit signal priority features on Fairview Avenue N., a transit queue jump on Fairview Avenue (northbound) at Harrison Street, improved transit service on Denny Way via the Route 8, and new transit service between Uptown and North Capitol Hill. The new transit route could cross Aurora Avenue N/SR 99 using Mercer Street then travel on Republican to access Eastlake Avenue and Lakeview Boulevard to north Capitol Hill.

Roy Street Undercrossing and Realigned Fairview/Valley Intersection

The Roy Street Undercrossing scenario (see Figure 6.2) maintains the existing Mercer/Valley couplet system between Fairview and Westlake Avenues and extends the westbound Valley couplet along Roy Street from Westlake Avenue, under Aurora Avenue, to connect to the existing westbound Roy system at Fifth Avenue N. The westbound movement of traffic from I-5 is further improved by realigning the Fairview Avenue N./Valley Street intersection to the west and reducing the sharp right turn onto Fairview Avenue from the off-ramp and reducing the angle of the left turn onto westbound Valley Street from northbound Fairview Avenue.

The Thomas Street crossing of Aurora Avenue is also proposed under this scenario, again to serve as an additional crossing of Aurora Avenue and better connect SLU to the Seattle Center and neighborhoods to the west. This also includes the improvement of Thomas Street from a two-lane to a three-lane cross section from Dexter Avenue to Fairview Avenue.

The major pedestrian elements included in the Roy Street Undercrossing scenario are the same as those included and discussed for the Area Improvement scenario: minor pedestrian improvements on both Mercer and Valley Streets, construction of the Lake-to-Bay trail, an improved pedestrian crossing along Denny Way to Capitol Hill, implementation of the Terry Avenue design guidelines, extension of the Green Street designation on Harrison Street, Green Street designation of Eighth Avenue N between John and Mercer Streets, wider sidewalks around the Cascade Playground and other intersection improvements at key pedestrian crossings.

While the pedestrian elements proposed as part of the Roy Street Undercrossing scenario are the same as those for the Area Improvements Scenario, the route of the Lake-to-Bay Trail would be modified. Again, the trail would start at the Valley Street/Westlake Avenue intersection, would head west on a reconstructed Roy Street, and travel westbound under Aurora Avenue to Fifth Avenue N. where the bike route would continue westbound around the north side of Seattle Center and the pedestrian/slow bike facility would travel south on Fifth Avenue N. around the south side of Seattle Center.

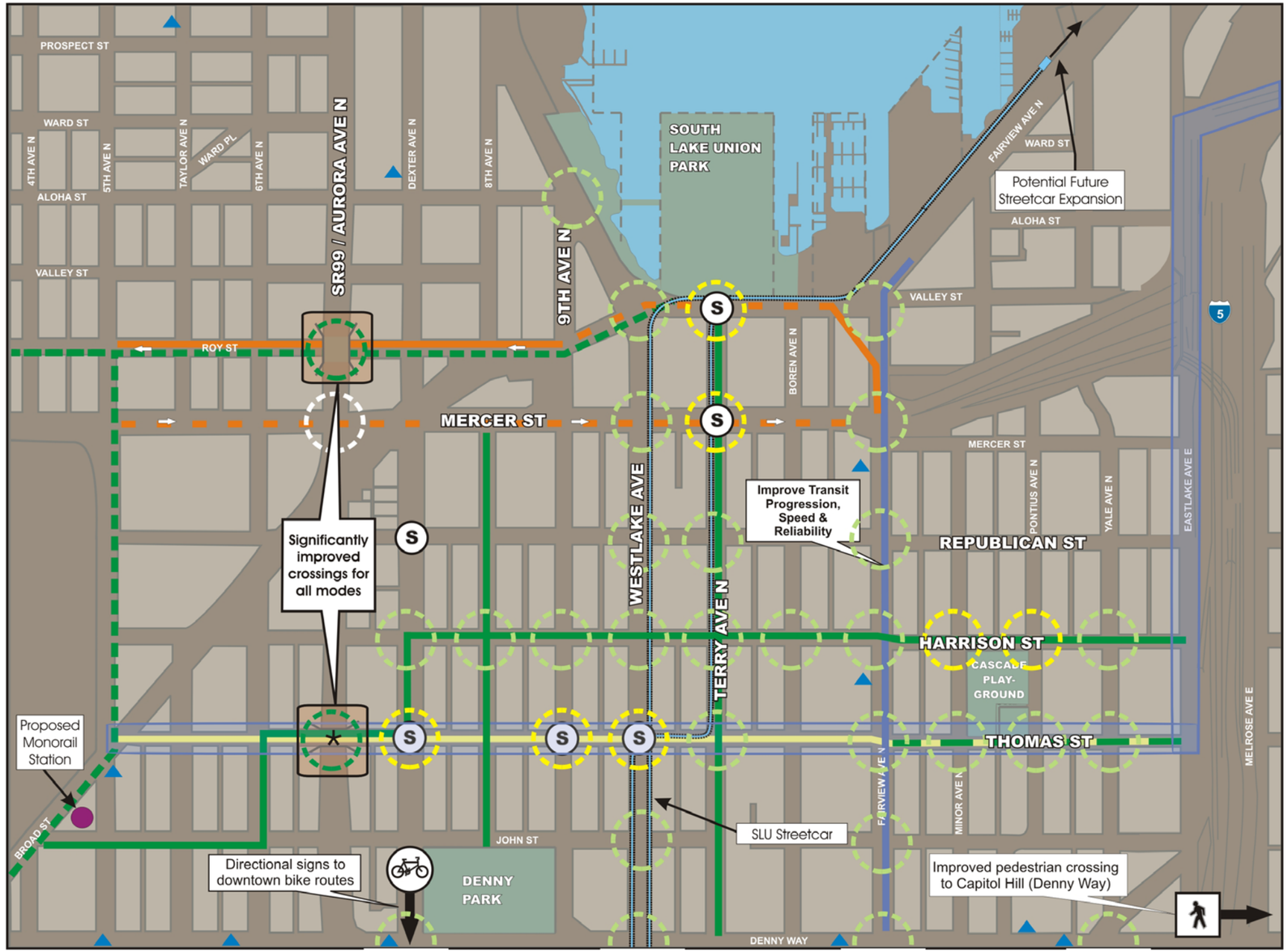
The major bicycle elements included in the Roy Street Undercrossing scenario are the same as those discussed for the Area Improvement scenario: construction of the Lake-to-Bay trail, bicycle route and/or way finding signage of streets commonly traveled by cyclists, signed bicycle routes on Eastlake Avenue E. and Lakeview Boulevard, and bicycle way finding signing between the end of the Dexter bike lanes at Denny Way to the Second Avenue bike lake and the proposed Fourth Avenue bike lanes.

The major transit elements included in the Roy Street Undercrossing scenario are the same as those discussed for the Area Improvement scenario: construction of the Westlake/SLU Streetcar, the implementation of transit signal priority features on Fairview Avenue N., the implementation of a transit queue jump facility on northbound Fairview Avenue N. at Harrison Street, improved transit service on Denny Way, and proposed new transit service to North Capitol Hill via Eastlake Avenue and Lakeview Boulevard.

In addition to the above noted transit improvements, the construction of the Roy Street underpass provides a more direct westbound route across Aurora Avenue as compared to the existing Broad Street configuration. This new route makes the likelihood of new or modified east/west transit service in north SLU possible. However, congestion on Mercer Street is still expected to hamper the implementation of new or modified east/west service in the northern area of SLU, as it is the most logical corresponding eastbound route.

Potential Improvements by Facility

- **Terry & 8th Avenue and Harrison Street Pedestrian Connections** - Accomodates all modes with emphasis on non-motorized access to and from key pedestrian generators.
- **Mercer & Valley Streets Regional Access** - Maintains existing one-way emphasis couplet system with limited pedestrian improvements.
- **Valley/Fairview Re-Alignment & Roy Street Underpass Regional Access** - Modifies Valley/Fairview intersection, modifies Roy Street between 9th and 5th Avenues and provides a westbound underpass.
- **Fairview Avenue Regional Access With Transit Emphasis** - 5-lane section provides connections between regional facilities and centers.
- **Thomas Street Commercial Access** - 3-lane section provides commercial access, but emphasizes local access.
- **Lake-to-Bay Trail**
- * Crossing could be at Harrison - reversing function/designation of Harrison and Thomas Streets



Important Non-Motorized Crossings

- High-level improvements (e.g. grade separation)
- Significant Improvements (e.g. signal, shortened crossing)
- Moderate Improvements (e.g. countdown signals, curb-bulbs)
- No Improvements
- **Potential for additional/ improved transit service**
- **New traffic signal**
- **Add bus shelter**
- **Proposed South Lake Union streetcar**

SDOT Seattle Department of Transportation

Figure 6.2: Roy Street Undercrossing & Valley/Fairview Intersection Re-Alignment Scenario

Two-Way Mercer Corridor

The Two-way Mercer Corridor Scenario (see Figure 6.3) eliminates the existing Mercer and Valley/Broad Street couplet by widening Mercer Street to accommodate three lanes of traffic in the westbound direction, as well as the existing four lanes in the eastbound direction between Fairview and Westlake Avenues. West of Westlake Avenue the typical section for Mercer Street would be reduced by one lane in the eastbound direction, providing three lanes in each direction between Westlake and Fifth Avenues N. While this study did not include modifying Mercer Street west of Fifth Avenue to a two-way street, it is compatible with such an option. It is anticipated that further study of the two-way Mercer Street west of Fifth Avenue will be conducted in conjunction with the Mercer Corridor Project EIS.

Under this scenario, Valley Street would be narrowed to a three-lane typical section, one travel lane in each direction with left-turn lanes in the center, because nearly all of the westbound traffic from I-5 would be carried on Mercer Street. It is expected that the traffic most likely to continue to use Valley Street under this scenario would be the "around-the-lake" traffic (i.e., southbound Fairview Avenue N. to westbound Valley Street to northbound Westlake Avenue N., and vice-versa). As a result of the Valley Street origin-destination study (see Chapter 4), it was determined that the volume of this traffic would be of such levels as to be satisfactorily accommodated by one lane in each direction. The widened two-way Mercer and narrowed Valley scenario also allows for the modification of Fairview Avenue North. North of the Valley Street intersection, Fairview Avenue north is proposed to be reduced from two travel lanes in each direction with a center turn-lane to one travel-lane in each direction, a center turn-lane, and bicycle lanes in each direction.

Unlike the other two improvement packages, the two-way Mercer scenario includes the proposal to change operations of the existing Westlake and Ninth Avenue one-way couplet to two-way operations on both streets. Westlake Avenue is proposed to have two travel-lanes in each direction with left-turn pockets at Republican, Mercer and Valley Streets. Parking on both sides of Westlake Avenue would be maintained between Denny Way and Republican Street. Ninth Avenue is proposed to be reduced from three southbound travel lanes to one-lane in each direction and left-turn pockets. Ninth Avenue is proposed to be the "working" street providing local access and a north-south alternative to Westlake. Parking on both sides of Ninth Avenue would be maintained under the new narrower cross-section.

As included in the other two improvement packages, the two-way Mercer Street scenario also includes the Thomas Street overcrossing of Aurora Avenue and the corresponding change from a two-lane cross-section to a three-lane cross-section between Dexter and Fairview Avenues.

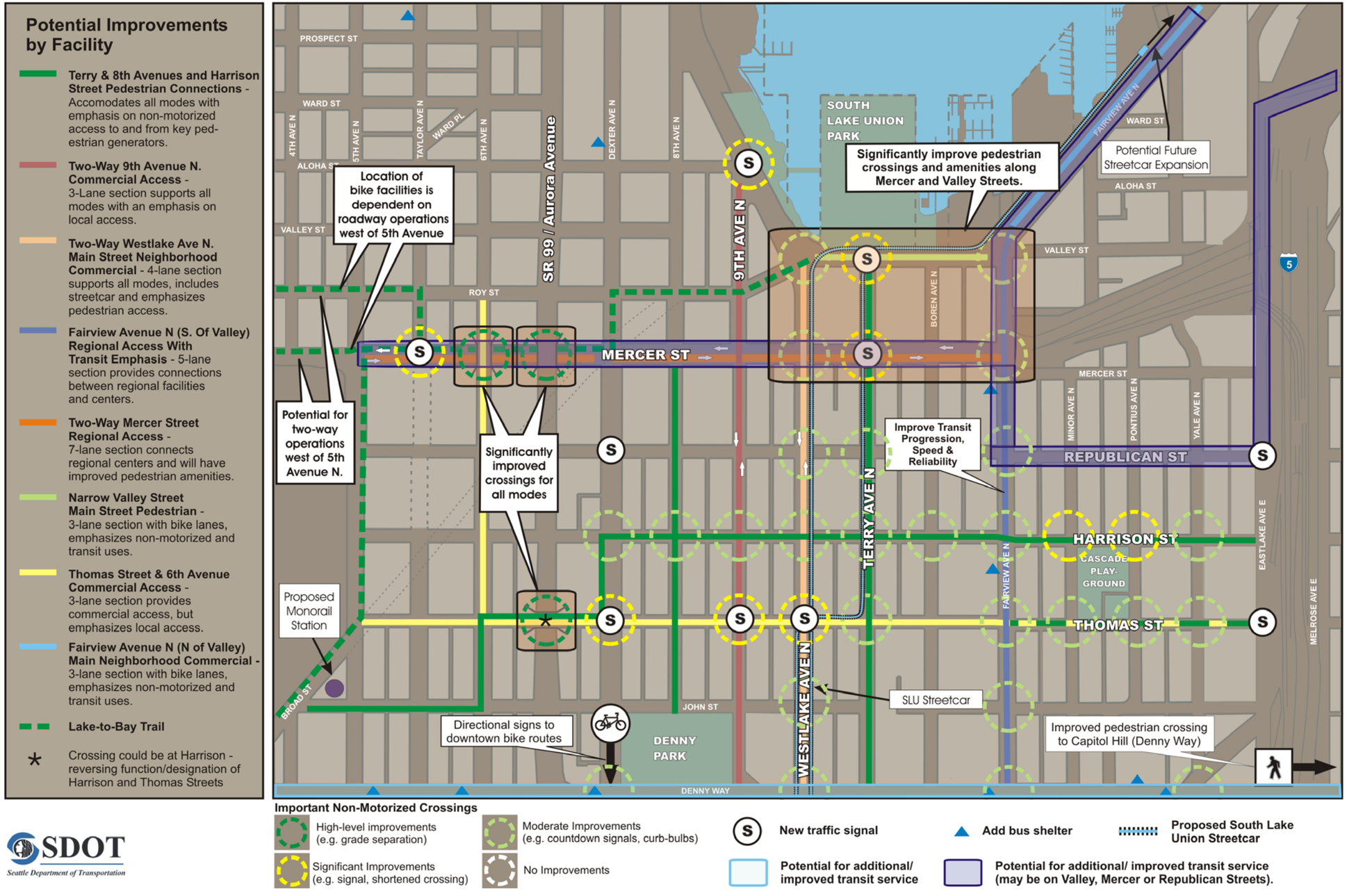


Figure 6.3: Two-Way Mercer Corridor Scenario

The major pedestrian elements included in the Two-Way Mercer scenario are the same as those discussed for the Area Improvement and Roy Street Undercrossing scenarios. However, the Two-Way Mercer scenario allows for additional and significant changes to the streetscape and pedestrian amenities on both Valley and Mercer Streets, rather than the limited improvements under the Area Improvements and the Roy Underpass scenarios.

Under the Two-Way Mercer scenario, both Mercer and Valley Streets would be completely reconstructed to include the following pedestrian facilities and amenities: a 16' sidewalk on the south side of both Mercer and Valley Street, a 21-foot sidewalk on the north side of Mercer Street, a wide plaza linking to the proposed SLU Park that is integrated with streetcar facilities on the north side of Valley Street. Additionally, Mercer Street is proposed to include a 21-foot median between the eastbound and westbound lanes, as well as street trees and on-street parking (which also provides a pedestrian buffer) on both sides of Mercer Street. A parking lane is proposed on the south side of Valley Street, providing a buffer for pedestrians between the travel lane and sidewalk.

As with the other scenarios the Lake-to-Bay Trail route would be slightly modified based on the proposed transportation infrastructure. Under the Two-Way Mercer scenario the trail would again start at the Valley/Westlake intersection, head west on a reconstructed Roy Street, connect with the Dexter Avenue bike lanes and the widened Mercer Street to cross under Aurora Avenue heading westbound to Fifth Avenue N. At Fifth Avenue N. an on-street bike route could continue westbound around the north side of Seattle Center (possibly using Roy and Mercer Streets) and the pedestrian/slow bike facility would travel south on Fifth Avenue N. around the south side of Seattle Center.

The major bicycle elements included in the Two-Way Mercer scenario are the same as those discussed for the Area Improvement and Roy Street Undercrossing scenarios. However, as a result of the reduced traffic volumes on Valley Street (due to the widening and two-way operations on Mercer Street), bike lanes in both the eastbound and westbound direction are included on Valley Street between Fairview and Westlake Avenues, as well as on a reconstructed Roy Street between Westlake and Dexter Avenues. The reduction of Fairview Avenue N. from five travel lanes to three provides room within the curb line to provide bike lanes in each direction between Valley Street and Eastlake Avenue. These bike lanes would connect to the new bike lanes on Valley Street, the existing Westlake Trail multi-use facility, the new bike lanes on Roy Street, the Lake-to-Bay Trail facility, and the Dexter Avenue bicycle lanes.

The major transit elements included in the Two-Way Mercer scenario are the same as those discussed for the Area Improvement and Roy Street Undercrossing scenarios. However, the implementation of a two-way Mercer Street allows more east/west transit possibilities in the north part of the SLU neighborhood. More possibilities are available because transit can use the widened Mercer underpass to cross Aurora Avenue and then continue on the two-way Mercer or move to either Valley Street or Republican Street to travel in either the east or west directions. These alternative routes have the advantage of consolidating a given transit route on one street, making the system easier for riders to understand.

A new east/west transit route between Uptown and North Capitol Hill could use the Mercer Street underpass then continuing on Republican Street through SLU to Eastlake Avenue E and then to Lakeview Boulevard and up Belmont Street to a termination point near Roy Street and

Broadway Avenue. A new or modified Route 74 could use the Mercer Street underpass and then travel on Roy and Valley Streets to Fairview Avenue N. to Eastlake and the University District. Both of these routes would provide needed east/west transit service through the northern part of SLU, just one block off of Mercer Street, stopping at important pedestrian connections such as Terry Avenue, the SLU Park, numerous employers, and the Westlake/SLU streetcar route.

CHAPTER 7: EVALUATION OF ALTERNATIVES

Evaluation Criteria and Rating System

As was discussed in Chapter 2 (Methodology) the SLU study team developed objectives that corresponded to the overall study goals and applied these as criteria to evaluate the alternative packages. The study goals and corresponding objectives are shown in Table 7.1 on the following page.

Each of the three alternative scenarios were then assessed for general performance and were given a high, medium or low rating for each criteria listed under a specific study goal. The high, medium and low ratings were then "rolled up" to a single overall "consumer report" type rating for each study goal. The SLU study team used a five-scale system to rate each scenario's success in supporting the SLU study goals. A full dot means that the given alternative was highly effective in meeting the stated goal (i.e., the evaluation criteria were generally given a high rating for a majority of the evaluation criteria). A three-quarter circle means the alternative is considered generally effective at supporting the stated goal (i.e., a mix of high and medium ratings for the individual evaluation criteria). A half-dot indicates an average rating (attained by a mix of ratings). A quarter dot means the alternative, with respect to the stated goal, generally scored low. And an empty dot means that the scenario may actually hinder achievement of the stated SLU Transportation Study goal.

Table 7.1: SLU Study Goals and Corresponding Objectives

Goal	Objectives
Improve Mobility and Access for All Modes within and between SLU, Surrounding Neighborhoods, and Downtown Seattle	Provide improved connections across SR 99/Aurora Avenue
	Improve transit service possibilities within SLU, surrounding neighborhoods, and downtown Seattle
	Improve pedestrian and bicycle connection throughout SLU, across SR 99/Aurora and to Eastlake and Capitol Hill
	Improve non-motorized connections across Mercer & Valley Streets to SLU Park
	Encourage pedestrian, bicycle and transit use as a way to accommodate travel demand
	Improve transit speed and/or reliability through and within SLU
	Improve arterial connections between SLU and surrounding neighborhoods and downtown Seattle
	Improve or maintain vehicle travel times on key routes through SLU
	Improve or maintain average vehicle system delay throughout SLU
Improve Safety for All Transportation Modes	Improve roadway and intersection geometry (e.g., to reduce weaving movements, improve way finding, etc.)
	Provide appropriate separation between pedestrians, bicyclists and vehicles
	Provide safe pedestrian crossings
	Provide safe pedestrian access to transit
Improve Regional Access To and Through South Lake Union	Improve arterial street connections to and from I-5 and SR 99
	Improve connections between I-5 and SR 99
	Improve regional transit service to SLU
	Improve local transit connections to regional transit service/lines
	Improve bicycle connections to regional bicycle facilities and routes
	Improve or maintain regional freight routes
Promote Economic Vitality, Neighborhood Livability, Sustainable Development and Quality of Life	Improve streetscape design
	Accommodate local business access and circulation needs
	Encourage transit and/or pedestrian oriented development.
	Provide for a safe and active pedestrian environment within SLU
	Improve non-motorized access to SLU park
	Manage parking appropriately to reflect a sustainable balance between parking demand and supply, and study area mode split goals
	Minimize adverse environmental impacts
	Minimize residential and business displacements
Work Toward Implementing Comprehensive Plan Goals and Other City Policies and Plans	Support projected growth and planned land-use patterns
	Support SLU Neighborhood Plan Goals and Policies
	Support City Plans and Policies
	Support other infrastructure and development plans
	Support the Mercer Corridor Project recommendations
	Reflect feedback from SLU Stakeholders
Implementation Feasibility (not a formal goal)	Constructability (relative ease or difficulty in constructing the improvements)
	Financial limitations
	Public/Political Acceptability
	Cost effectiveness (qualitative)

Table 7.2 shows the five-scale rating system and the corresponding qualitative evaluation text developed and used by the study team.

Table 7.2: Evaluation Rating System

Dot Rating	Descriptive Evaluation Text
●	Highly effective in supporting goal
◕	Effective in supporting goal
◑	Some effectiveness in supporting goal
◔	No effectiveness in supporting goal
○	Does not support goal, may have negative impacts

Results of the Rating of Alternatives

The three alternative improvement scenarios were evaluated qualitatively against the above noted criteria. The following summarizes the results of the evaluation.

Area Improvement Scenario

Results of the evaluation process for the Area Improvements Scenario are shown in Table 7.3. The Area Improvements Scenario was found to be somewhat effective in supporting the "improve mobility and access" goal. However, this scenario was rated not effective for all other SLU Transportation Study goals: improving safety, improving regional access, promoting economic vitality and working towards implementing comprehensive and City plans or policies. While the Area Improvements is not very effective at supporting the SLU Transportation Study goals, it requires the least amount of construction and is the least expensive of the three scenarios. For this reason it was rated as somewhat effective with regards to implementation feasibility. On the whole, however, the Area Improvements Scenario is generally considered to be not effective in supporting the SLU Transportation Study goals.

Table 7.3: Area Improvements Scenario

Overall Goal Rating	Goal	Criteria	Level of Improvement
◑	**Improve Mobility and Access for All Modes within and between SLU, Surrounding Neighborhoods, and Downtown Seattle**	Provide improved connections across SR 99/Aurora Avenue	Medium - adds Thomas crossing, Broad St retained
		Improve transit service possibilities within SLU, surrounding neighborhoods, and downtown Seattle	Medium - adds Thomas crossing
		Improve pedestrian and bicycle connection throughout SLU, across SR 99/Aurora and to Eastlake and Capitol Hill	Medium - adds Thomas crossing, Terry Ave, and connections to Capital Hill
		Improve non-motorized connections across Mercer & Valley Streets to SLU Park	Low - adds Terry Ave signals
		Encourage pedestrian, bicycle and transit use as a way to accommodate travel demand	Low to medium - adds Thomas St crossing, Terry Ave, and potential future connections to Capital Hill
		Improve transit speed and/or reliability through and within SLU	Medium - Fairview Improvements & SLU streetcar. Also, Thomas crossing provides additional routing opportunities
		Improve arterial connections between SLU and surrounding neighborhoods and downtown Seattle	Low to Medium - Thomas crossing of Aurora adds connectivity
		Improve or maintain vehicle travel times on key routes through SLU	Medium
		Improve or maintain average vehicle system delay throughout SLU	Medium
◔	**Improve Safety for All Transportation Modes**	Improve roadway and intersection geometry (e.g., to reduce weaving movements, improve way-finding, etc…)	Low - minimal improvements
		Provide appropriate separation between pedestrians, bicyclists and vehicles	Low - limited locations
		Provide safe pedestrian crossings	Low - minimal improvements over existing. Thomas provides a safe crossing of Aurora. Signals on Terry at Mercer and Valley
		Provide safe pedestrian access to transit	Medium - some improvement over existing
◔	**Improve Regional Access To and Through South Lake Union**	Improve arterial street connections to and from I-5 and SR 99	No improvement
		Improve connections between I-5 and SR 99	No improvement
		Improve regional transit service to SLU	Low (direct service from regional P&R lots would increase this rating, though current street configuration is not conducive to this service)
		Improve local transit connections to regional transit service/lines	Medium to high - via Fairview transit improvements, SLU streetcar, and improved connections to the Monorail station with Thomas St overcrossing
		Improve bicycle connections to regional bicycle facilities and routes	Low
		Improve or maintain regional freight routes	No improvement
◔	**Promote Economic Vitality, Neighborhood Livability, Sustainable Development and Quality of Life.**	Improve streetscape design	Low to medium - Terry Ave, Westlake Ave, Harrison St and other limited locations
		Accommodate local business access and circulation needs	Low - some improvement with Thomas crossing of SR 99
		Encourage transit and/or pedestrian oriented development.	Low - Terry and Westlake Ave conducive
		Provide for a safe and active pedestrian environment within SLU	Low - Terry Ave and other limited locations
		Improve non-motorized access to SLU park	Low - Terry Ave an improvement, but Mercer/Valley Street still barriers
		Manage parking appropriately to reflect a sustainable balance between parking demand and supply, and study area mode split goals	TBD
		Minimize adverse environmental impacts	Medium - does not rate high for aesthetics, multi-modal support, and traffic congestion
		Minimize residential and business displacements	High - Few residential or business displacements
◔	**Work Toward Implementing Comprehensive Plan Goals and Other City Policies and Plans**	Support projected growth and planned land-use patterns	Low - Does not support the expected growth nor integrate with expected or desired land-use patterns
		Support SLU Neighborhood Plan Goals and Policies	Low - Does not provide a systemwide improvement plan for the Mercer/Valley corridor that supports the SLU Park Master Plan
		Support City Plans and Policies	Low - Does not support the HUB Urban Village concepts, the SLU Park Master Plan or the overall vision for an improved SLU neighborhood.
		Support other infrastructure and development plans	Low - Does not integrate well with the AWV Project plans or the SLU Park plan, could be adapted to integrate with the Westlake/SLU Streetcar and Terry Avenue plans
		Support the Mercer Corridor Project recommendations	TBD
		Reflect feedback from SLU Stakeholders	Low to Medium - Addresses few of the Stakeholder concerns
◑	**Implementation Feasibility (not a formal goal)**	Constructability (relative ease or difficulty in constructing the improvements)	High - Minimal construction is required and proposed Thomas Street crossing of SR 99/Aurora is relatively straight forward
		Financial feasibility	Medium - Relatively low cost items, but no dedicated funding source
		Public/Political Acceptability	Low - Does not reflect the public desire to improve the SLU neighborhood for current and future uses or re-connect the SLU neighborhood with the SLU Park and waterfront area
		Cost effectiveness (qualitative)	Low to Medium - Low cost but low effectiveness in meeting study goals

Roy Street Undercrossing and Realignment of Fairview/Valley Intersection Scenario
Evaluation results of the Roy Street Undercrossing and Realignment of Fairview/Valley Intersection scenario were somewhat better than for the Area Improvements with Existing Mercer/Valley scenario.

The Roy Street Underpass scenario was found to be supportive of the improve mobility and access goal by providing another westbound crossing of Aurora Avenue for all modes. With regard to improving safety and regional access to and through SLU, the Roy Street Undercrossing scenario was found to be somewhat effective at supporting these goals because it improves some intersection geometry for auto and truck traffic and provides a better regional connection westbound to the Seattle Center from I-5.

It was also found moderately effective in terms of supporting City plans and policies, in that it implements some improvements contained in the SLU Neighborhood Plan. However, the Roy Street Undercrossing alternative was found to have low effectiveness in relation to promoting economic vitality, livability, and sustainability. This is primarily because it provides only a moderate improvement to non-motorized facilities; does not significantly enhance the pedestrian environment, including pedestrian access to transit; and maintains a wide high-volume Valley Street which is considered incompatible with, and an access barrier to the planned SLU Regional Park.

The Roy Undercrossing alternative is also expected to have low effectiveness towards supporting the informal, implementation feasibility goal, as it requires considerable construction work and funds to complete the project. On the whole, the Roy Street Undercrossing and Realigned Fairview/Valley Intersection scenario has some effectiveness in supporting some of the SLU Transportation Study goals, and limited effectiveness in others. Table 7.4 details the results of the qualitative evaluation.

Table 7.4: Roy Street Undercrossing and Realignment of Fairview/Valley Intersection

Overall Goal Rating	Goal	Criteria	Level of Improvement
◕	**Improve Mobility and Access for All Modes within and between SLU, Surrounding Neighborhoods, and Downtown Seattle**	Provide improved connections across SR 99/Aurora Avenue	Medium to High - adds Thomas and Roy St crossings, retains Broad St
		Improve transit service possibilities within SLU, surrounding neighborhoods, and downtown Seattle	Medium - Thomas and Roy St crossings provide additional opportunity for transit routing
		Improve pedestrian and bicycle connections throughout SLU, across SR 99/Aurora and to Eastlake and Capitol Hill	Medium - adds Thomas and Roy St crossings, Terry Ave, and potential future connections to Capital Hill
		Improve non-motorized connections across Mercer & Valley Streets to SLU Park	Low - adds Terry Ave signals
		Encourage pedestrian, bicycle and transit use as a way to accommodate travel demand	Medium - Lake-to-Bay trail included as part of the undercrossing and curb-bulbs throughout area.
		Improve transit speed and/or reliability through and within SLU	Medium - Fairview Improvements & SLU streetcar. Also, Thomas and Roy St crossings provide additional routing opportunities
		Improve arterial connections between SLU and surrounding neighborhoods and downtown Seattle	Medium - Thomas and Roy crossings of Aurora adds connectivity
		Improve or maintain vehicle travel times on key routes through SLU	Medium - some key routes are improved while others degrade slightly.
		Improve or maintain average vehicle system delay throughout SLU	Medium - average vehicle delay through the system is similar to Area Improvements
◑	**Improve Safety for All Transportation Modes**	Improve roadway and intersection geometry (e.g., to reduce weaving movements, improve way finding, etc.)	Low to Medium- some signage improvements. Roy underpass provides more direct connection across SR 99. Weaving on Fairview and Valley still occurs, though realignment of Fairview/Valley intersection should improve this slightly.
		Provide appropriate separation between pedestrians, bicyclists and vehicles	Low to medium - limited locations with improvements. Roy undercrossing will include a multi-use non-motorized trail.
		Provide safe pedestrian crossings	Low to Medium - minimal improvements over existing in most areas. Thomas and Roy provide safe crossings of Aurora
		Provide safe pedestrian access to transit	Medium -- some improvements over existing (curb-bulbs, etc.)
◑	**Improve Regional Access To and Through South Lake Union**	Improve arterial street connections to and from I-5 and SR 99	Low to medium - Roy St provides more direct route to SR 99 from I-5
		Improve connections between I-5 and SR 99	Medium - Roy St provides a relatively direct WB route between I-5 and SR 99
		Improve regional transit service to SLU	Low (direct service from regional P&R lots would increase this rating, though proposed street configuration may pose some limitations to this type of service)
		Improve local transit connections to regional transit service/lines	Medium to high - via Fairview transit improvements, SLU streetcar, and improved connections to Monorail station with Thomas St overcrossing
		Improve bicycle connections to regional bicycle facilities and routes	Medium - Roy undercrossing provides bicycle link across Aurora (Lake-to-Bay Trail)
		Improve or maintain regional freight routes	Medium - Roy connection provides more direct WB freight route as compared to existing

● Highly effective in supporting goal
◕ Effective in supporting goal
◑ Some effectiveness in supporting goal
◔ No effectiveness in supporting goal
○ Does not support goal, may have negative impacts

Table 7.4: (continued):
Roy Street Undercrossing and Realignment of Fairview/Valley Intersection

◔	**Promote Economic Vitality, Neighborhood Livability, Sustainable Development and Quality of Life**	Improve streetscape design	Low to medium - Terry Ave, Westlake Ave, Harrison St and other limited locations
		Accommodate local business access and circulation needs	Low - some improvement with Thomas crossing of Aurora
		Encourage transit and/or pedestrian oriented development.	Low - Terry and Westlake Ave conducive
		Provide for a safe and active pedestrian environment within SLU	Low - Terry Ave, Harrison St, and other limited locations
		Improve non-motorized access to SLU park	Low - Terry Ave an improvement, but Mercer/Valley Street still barriers
		Manage parking appropriately to reflect a sustainable balance between parking demand and supply, and study area mode split goals	TBD
		Minimize adverse environmental impacts	Medium - does not rate high for aesthetics, multi-modal support, and traffic congestion
		Minimize residential and business displacements	Medium - properties west of Aurora along Roy, and adjacent to the realigned Fairview/Valley intersection impacted
◑	**Work Toward Implementing Comprehensive Plan Goals and Other City Policies and Plans**	Support projected growth and planned land-use patterns	Low - Does not integrate with expected or desired land-use patterns or planned growth
		Support SLU Neighborhood Plan Goals and Policies	Medium - Provides a systemwide improvement plan for the Mercer/Valley corridor, but does not support the SLU Park Master Plan
		Support City Plans and Policies	Low to Medium - Does not adequately support the HUB Urban Village concepts, the SLU Park Master Plan or the overall vision for an improved SLU neighborhood.
		Support other infrastructure and development plans	Low to Medium - Does not integrate well with the AWV Project plans or the SLU Park plan, could be adapted to integrate with the Westlake/SLU Streetcar and Terry Avenue plans
		Support the Mercer Corridor Project recommendations	TBD
		Reflect feedback from SLU Stakeholders	Medium -- Addresses some of the Stakeholder concerns
◔	**Implementation Feasibility (not a formal goal)**	Constructability (relative ease or difficulty in constructing the improvements)	Low to Medium -- Project would require an additional below-grade crossing of Aurora Avenue at a difficult location, but would not require complicated construction techniques or staging
		Financial limitations	Low to Medium - project is relatively expensive and does not have a dedicated funding mechanism
		Public/Political Acceptability	Low to Medium - Does not reflect the public desire to improve the SLU neighborhood for current and future uses or re-connect the SLU neighborhood with the SLU Park and waterfront area
		Cost effectiveness (qualitative)	Low to Medium - Relatively high cost for rather limited effectiveness in supporting study goals (doesn't open waterfront to neighborhood, maintains high volume couplet system).

● Highly effective in supporting goal
◕ Effective in supporting goal
◑ Some effectiveness in supporting goal
◔ No effectiveness in supporting goal
○ Does not support goal, may have negative impacts

Two-Way Mercer and Narrow Valley Street Scenario

The Two-Way Mercer scenario was found to be highly effective in supporting goals related to mobility and access, safety for all modes, and implementation of the comprehensive and City plans and policies. The two-way Mercer Street allows for considerably improved arterial connections and intersection geometry as well as improved way-finding for both familiar and unfamiliar drivers arriving from the I-5 freeway ramps. The two-way Mercer and narrow Valley concept not only allows for significant improvements to pedestrian amenities near and around the waterfront and South Lake Union park areas, but also considerably improves safety and mobility of bicycle and pedestrian travel in this area. This scenario was found to be

effective in improving regional access to and through SLU as well as promoting the economic vitality and livability of the SLU neighborhood. As would be expected with any major construction undertaking, implementation can be complex and costly. However, one benefit of this scenario is the proposed Mercer Street underpass of Aurora Avenue, as it would be a widening of an existing structure, rather than the construction of a new underpass, which would occur at Roy Street under the Roy Street scenario. However, the Two-Way Mercer scenario will still require considerable funding and was therefore rated as having low effectiveness in supporting the implementation feasibility goal.

In total, the Two-Way Mercer and Narrow Valley Street scenario was found to be effective to highly effective in supporting the SLU Transportation Study goals. Table 7.5 details the results of the qualitative evaluation.

Table 7.5: Two-Way Mercer and Narrow Valley Street Scenario

Overall Goal Rating	Goal	Criteria	Level of Improvement
●	**Improve Mobility and Access for All Modes within and between SLU, Surrounding Neighborhoods, and Downtown Seattle**	Provide improved connections across SR 99/Aurora Avenue	Medium to High - Adds Thomas, removes Broad, widened 2-way provides more direct WB connection across Mercer
		Improve transit service possibilities within SLU, surrounding neighborhoods, and downtown Seattle	Medium to High - Adds Thomas and 2-way Mercer improves function for transit
		Improve pedestrian and bicycle connections throughout SLU, across SR 99/Aurora and to Eastlake and Capitol Hill	Medium to High - Adds Thomas and improves Mercer for non-motorized crossings of SR 99, potential future connection to Capital Hill
		Improve non-motorized connections across Mercer & Valley Streets to SLU Park	High - Narrow Valley St; traffic signals, curb bulbs and Median on Mercer at ped crossings; and widened sidewalks w/ped buffers all significantly improve non-motorized access
		Encourage pedestrian, bicycle and transit use as a way to accommodate travel demand	Medium to High - Valley St & Fairview Ave N bike lanes will better tie to regional system. Improved pedestrian environment facilitates access to transit
		Improve transit speed and/or reliability through and within SLU	Medium to High - Fairview Improvements & SLU streetcar. Also, Thomas and two-way Mercer crossings provide additional routing opportunities
		Improve arterial connections between SLU and surrounding neighborhoods and downtown Seattle	Medium to High - Thomas crossing of Aurora; two-way Mercer and two-way Westlake/9th adds connectivity
		Improve or maintain vehicle travel times on key routes through SLU	Medium - some key routes are improved while others degrade slightly.
		Improve or maintain average vehicle system delay throughout SLU	Medium - average vehicle delay through the system is similar to Area Improvements
●	**Improve Safety for All Transportation Modes**	Improve roadway and intersection geometry (e.g., to reduce weaving movements, improve way-finding, etc...)	High - Major weaving movements on Fairview and Valley St are eliminated. Direct WB route from I-5 to SR 99 and Seattle Center/Queen Anne established
		Provide appropriate separation between pedestrians, bicyclists and vehicles	Medium to High - Mercer and Valley Streets greatly improved, Lake-to-Bay Trail, Fairview & Valley Bike lanes
		Provide safe pedestrian crossings	High - Crossings of Mercer and Valley Streets greatly improved. Thomas and 2-way Mercer provide safer crossings of Aurora
		Provide safe pedestrian access to transit	High - widened sidewalks, enhanced buffers between peds and travel lanes, and improved ped crossings in the area.

● Highly effective in supporting goal
◕ Effective in supporting goal
◑ Some effectiveness in supporting goal
◔ No effectiveness in supporting goal
○ Does not support goal, may have negative impacts

Table 7.5: (continued): Two-Way Mercer and Narrow Valley Street Scenario

◕	**Improve Regional Access To and Through South Lake Union**	Improve arterial street connections to and from I-5 and SR 99	Medium to High - 2-way Mercer provides more direct route to/from SR 99 and I-5; Fairview/Mercer intersection improved to allow new access from SB Fairview to the I-5 ramps and better accommodate existing turn movements to I-5
		Improve connections between I-5 and SR 99	Medium to High - 2-way Mercer provides more direct route between I-5 and SR 99
		Improve regional transit service to SLU	Medium (street system may better accommodate direct service from regional P&R lots)
		Improve local transit connections to regional transit service/lines.	Medium to High - via Fairview transit improvements, SLU streetcar, and improved connections to Monorail station with Thomas St overcrossing. Two-way Mercer provides additional opportunities for transit connections
		Improve bicycle connections to regional bicycle facilities and routes	High - Bicycle lanes along Valley St and Fairview Ave N provide a better connection to Dexter bike lanes and the future Lake-to-Bay trail; Also to the Burke Gilman trail via East Lake Union route.
		Improve or maintain regional freight routes	High - Two-way Mercer provides more direct/improved regional freight route
◕	**Promote Economic Vitality, Neighborhood Livability, Sustainable Development and Quality of Life**	Improve streetscape design	Medium to High - Terry Ave, Westlake Ave, Mercer and Valley Streets greatly improved
		Accommodate local business access and circulation needs	Medium to High - 2-way Mercer, Westlake and 9th provide improved local access and circulation. 2-way Mercer and Thomas crossings of Aurora provide better connections
		Encourage transit and/or pedestrian oriented development.	Medium to High - Terry Ave, Westlake Ave, Valley Street and to a lesser degree, Mercer St - will be more conducive to transit and/or pedestrian oriented development
		Provide for a safe and active pedestrian environment within SLU	High - Terry Ave, Mercer and Valley Streets provide greatly improved pedestrian environment
		Improve non-motorized access to SLU park	High - Terry Ave, Mercer and Valley Streets provide greatly improved pedestrian environment
		Manage parking appropriately to reflect a sustainable balance between parking demand and supply, and study area mode split goals	TBD
		Minimize adverse environmental impacts	Medium to High - No significant impacts anticipated, though traffic congestion still exists, provides better opportunities for alternate modes of travel
		Minimize residential and business displacements	Low to Medium - widened Mercer will require ROW takes and may displace of businesses
●	**Work Towards Implementing Comprehensive Plan Goals and Other City Policies and Plans**	Support projected growth and planned land-use patterns	High - Very supportive of projected growth and integrates well with expected or desired land-use patterns
		Support SLU Neighborhood Plan Goals and Policies	High - Provides a systemwide improvement plan for the Mercer/Valley corridor that includes support of the SLU Park Master Plan
		Support City Plans and Policies	High - Supports the current City plans for creation of a SLU HUB Urban Village
		Support other infrastructure and development plans	High - integrates well with AWV Project Plans, Terry Avenue, Streetcar, and SLU Park
		Support the Mercer Corridor Project recommendations	TBD
		Reflect feedback from SLU Stakeholders	Medium to High - Addresses a high percentage of Stakeholder concerns
◔	**Implementation Feasibility (not a formal goal)**	Constructability (relative ease or difficulty in constructing the improvement)	Medium to High - Project does not require extensive structures or complicated construction techniques or staging
		Financial limitations	Low to Medium - Project is relatively expensive and does not have a dedicated funding mechanism
		Public/Political Acceptability	Medium to High - Reflects the public desire to improve the SLU neighborhood for existing and future users and re-connect the SLU neighborhood with the SLU Park and waterfront area
		Cost effectiveness (qualitative)	Medium to High - High cost improvements, but proposed improvements strongly support overall study goals.

● Highly effective in supporting goal
◕ Effective in supporting goal
◑ Some effectiveness in supporting goal
◔ No effectiveness in supporting goal
○ Does not support goal, may have negative impacts

Table 7.6 shows the overall ratings of the three scenarios for comparative purposes. As was discussed previously, the general rating for the Area Improvements Scenario is typically

"little to no effectiveness" in supporting the goals (four of the six goals were rated as "not effective" and two were rated as somewhat effective.). The Roy Street Undercrossing scenario results are quite mixed with one "effective" rating, three "some effectiveness" ratings, and two no effectiveness ratings in supporting the specific goals. Lastly, the Two-Way Mercer and Narrow Valley Street alternative is generally rated as effective to highly effective, with three "highly effective" ratings, two "effective" ratings and one "no effectiveness" rating.

Table 7.6: Alternative Scenarios Ratings Comparison

Goal	Area Improvements with Existing Mercer/Valley	Roy Undercrossing	Two-Way Mercer
Improve Mobility and Access for All Modes within and between SLU, Surrounding Neighborhoods, and Downtown Seattle	◑	◕	●
Improve Safety for All Transportation Modes	◔	◑	●
Improve Regional Access To and Through South Lake Union	◔	◑	◕
Promote Economic Vitality, Neighborhood Livability, Sustainable Development and Quality of Life	◔	◔	◕
Work Towards Implementing Comprehensive Plan Goals and Other City Policies and Plans	◔	◑	●
Implementation Feasibility (not a formal goal)	◑	◔	◔

● Highly effective in supporting goal
◕ Effective in supporting goal
◑ Some effectiveness in supporting goal
◔ No effectiveness in supporting goal
○ Does not support goal, may have negative impacts

Draft Recommendation

Based on the above noted ratings results, the SLU Transportation Study team determined that the Two-Way Mercer and Narrow Valley Street improvement scenario clearly did the most to support or meet the goals set forth at the beginning of the study. The SLU study team designated the Two-Way Mercer and Narrow Valley Street scenario as the draft recommended improvement scenario. The draft recommendation then was presented to both the SLU Stakeholders Group and a team of agency representatives for their feedback.

SLU Stakeholders Group

The study team asked the stakeholders group, formed at the beginning of the study, to reconvene to evaluate the three improvement scenarios from their perspective (neighborhood, employer, employee, resident, and developer). The study team presented the improvement scenarios to the stakeholders as a group, discussing the various elements of each scenario, and then asked the stakeholders to form two groups. Three members of the study team were assigned to each of the two groups to answer questions and provide more detailed information. The stakeholder groups then developed their own study goal ratings of each scenario. The results of these stakeholder group ratings are presented in Tables 7.7 and 7.8.

As can been seen in Table 7.7, the first stakeholder group rated the Area Improvements Scenario very similarly to the SLU study team, with the only difference being the implementation feasibility rating, which was rated at "no effectiveness" compared to "some effectiveness" by the SLU study team.

Stakeholder Group 1 also rated the Roy Street Undercrossing scenario similarly to the SLU study team, with some minor changes that included changing their "improve mobility and access" rating to "some effectiveness" as opposed to "effective"; promoting "economic activity" to "some effectiveness" rating, up from "no effectiveness" rating; and reducing "implementation feasibility" to "does not support goal" down from "no effectiveness" as rated by the study team.

Finally, regarding the Two Way Mercer Scenario, Stakeholder Group 1 reduced the ratings for the first, second and fifth goal to "effective" down from "highly effective" as noted by the study team, and reduced implementation feasibility from "no effectiveness" to "does not support." Generally speaking, while specific ratings of goals varied somewhat, Stakeholder Group 1 agreed that the Two-Way Mercer Scenario was the most effective of the three and that the Area Improvements Scenario was least effective in meeting study area goals.

Table 7.7: Stakeholder Group 1 Scenario Ratings

Goal	Area Improvements with Existing Mercer/Valley	Roy Undercrossing	Two-Way Mercer
Improve Mobility and Access for All Modes within and between SLU, Surrounding Neighborhoods, and Downtown Seattle	◑	◑	◕
Improve Safety for All Transportation Modes*	◔	◑	◕
Improve Regional Access To and Through South Lake Union	◔	◑	◕
Promote Economic Vitality, Neighborhood Livability, Sustainable Development and Quality of Life	◔	◑	◕
Work Towards Implementing Comprehensive Plan Goals and Other City Policies and Plans	◔	◑	◕
Implementation Feasibility (not a formal goal)	◔	○	○

* One group member assigned a full circle to the Area Improvements with Existing Mercer/Valley Scenario for this goal, with the rationale that no change was safer.

● Highly effective in supporting goal
◕ Effective in supporting goal
◑ Some effectiveness in supporting goal
◔ No effectiveness in supporting goal
○ Does not support goal, may have negative impacts

Stakeholder Group 2 rated the Area Improvements Scenario exactly the same as the SLU study team, with four of the six ratings being "no effectiveness" and two rated as "some effectiveness." One rating for the Roy Street Undercrossing scenario was reduced by Stakeholder Group 2; the "improving mobility and access" rating was reduced from "effective" to "some effectiveness" by the second stakeholder group. Lastly, Stakeholder Group 2 rated the Two-Way Mercer scenario exactly the same as the SLU study team with nearly all "highly effective" or "effective" ratings.

Table 7.8: Stakeholder Group 2 Scenario Ratings

Goal	Area Improvements with Existing Mercer/Valley	Roy Undercrossing	Two-Way Mercer
Improve Mobility and Access for All Modes within and between SLU, Surrounding Neighborhoods, and Downtown Seattle	◑	◑	●
Improve Safety for All Transportation Modes	◔	◑	●
Improve Regional Access To and Through South Lake Union	◔	◑	◕
Promote Economic Vitality, Neighborhood Livability, Sustainable Development and Quality of Life	◔	◔	◕
Work Towards Implementing Comprehensive Plan Goals and Other City Policies and Plans	◔	◑	●
Implementation Feasibility (not a formal goal)	◑	◔	◔

● Highly effective in supporting goal
◕ Effective in supporting goal
◑ Some effectiveness in supporting goal
◔ No effectiveness in supporting goal
○ Does not support goal, may have negative impacts

Agency Representatives

The SLU study team next met with local agency representatives to discuss the draft recommended improvement scenario as well as feedback obtained from the SLU Stakeholders Group. The SLU study team presented the improvement scenarios to the agency representatives (King County Metro, SDOT, Seattle City Light, Seattle Popular Monorail, Seattle Public Utilities, Department of Planning and Development, and others) and asked them for their thoughts and feedback on the draft recommendation. In general the agency representatives felt comfortable with the overall evaluation process and ratings of the three scenarios and concurred that the Two-Way Mercer scenario best addressed the goals of the SLU Transportation Study.

The agency representatives also offered feedback on the two-way Mercer scenario noting that they would like to see more analysis of continuation of the two-way configuration to First Avenue North versus ending at Fifth Avenue North. It was determined that this analysis would be best conducted in conjunction with the Mercer Corridor EIS effort in coordination with Seattle Center and surrounding communities. Access to Seattle Center parking lots

south of Mercer Street, between Fifth Avenue N. and Aurora Avenue, should also be further evaluated under this scenario.

A considerable amount of the discussion focused on the need to implement transportation demand management (TDM) strategies and the most appropriate implementation strategies. All participants agreed that TDM is a very important component of the overall transportation infrastructure and any improvement scenario that is selected. However, most all participants noted that the Two-Way Mercer scenario provided transportation infrastructure that was most conducive to TDM strategies. It was agreed that the SLU study team would continue working with King County Metro staff and other County staff, from various divisions/departments, to develop an encompassing TDM strategy.

Summary

Based on the ratings of the SLU study team, the stakeholder groups, and the Agency representatives, the Two-Way Mercer scenario was carried forward as the draft recommended improvement scenario for the South Lake Union Transportation Study. The study team presented the recommendations to the public at an open house on March 18, 2004. Feedback from participants at the open house supported the study recommendations.

CHAPTER 8 RECOMMENDATIONS AND IMPLEMENTATION STRATEGY

Based on the evaluation and rating analysis, a "preferred" package of improvements was selected, as shown in Figure 8.1. This chapter describes the recommended improvements for the roadway network, transit system, non-motorized network, and open space; and also describes recommended transportation demand management strategies.

The Recommended Scenario includes changes on Aurora Avenue N/SR 99 that are part of an AWVSRP Alternative. These changes include the widened Mercer underpass, Thomas overcrossing, and removal of Broad Street. This alternative for Aurora Avenue N. was included as part of all the Build Alternatives for the AWVSRP. Another option for Aurora Avenue N/SR 99 is to lower the grade of Aurora Avenue N and build crossings over the lowered Aurora Avenue N at Thomas, Harrison, Republican, Mercer, and Roy Streets, or a subset of these cross streets. This AWVSRP Alternative would better advance the goal of connecting SLU to Queen Anne and Seattle Center, and it responds to some comments on the SLU Transportation Study draft recommendations that there should be more crossings of Aurora Avenue N. The AWVSRP will be identifying a preferred alternative in the fall of 2004. If the Lowered Aurora Alternative is part of the preferred alternative, or carried forward for additional analysis, the Recommended Scenario for the SLU Transportation Study will be amended to reflect the AWVSRP.

The following renderings graphically display some of the components of the Recommended Scenario (see Figures 8.2 through 8.4).

Roadway Network

The Year 2030 Recommended Scenario network includes the following roadway improvements for the South Lake Union Area:

Implement Two-Way Mercer/Narrow Valley

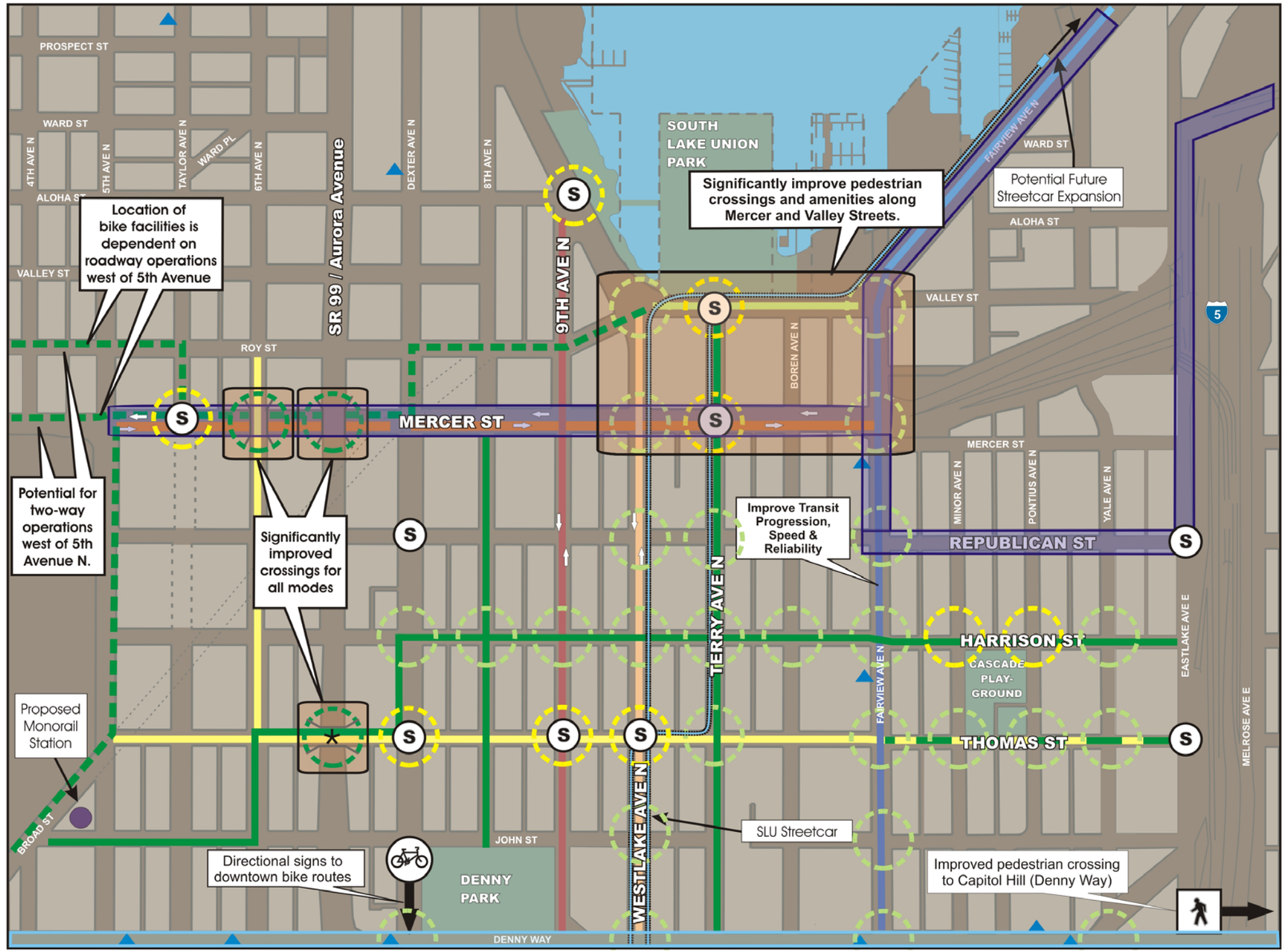
- Modify Mercer Street so that it operates as a two-way facility from Fairview Avenue to Fifth Avenue North:
  - Between Fairview and Dexter Avenues, construct a seven-lane two-way facility (three lanes each direction plus turning lane) with parking on both the north and south side of the street. See Figure 8.2 (cross section), Figure 8.3 (plan view) and Figure 8.4 (rendering of Mercer Street at Westlake Avenue). Note that for year 2030 operations, it was assumed that the south side parking lane between Westlake Avenue and Fairview Avenue would be converted to a fourth eastbound travel lane.
  - From Dexter to Fifth Avenue, widen Mercer Street to the above noted seven-lane section and widen the existing Aurora Avenue underpass to accommodate the expanded cross section (note that the proposed improvement does not include parking in this section).
- Reduce the number of traffic lanes on Valley Street to two lanes plus left-turn lanes to enhance the park environment and integrate the park with the neighborhood. This includes adding bicycle lanes in both directions, a parking lane on the south side of

the street, and widened sidewalks. See Figure 8.5 Valley Street Typical Cross Section and Figure 8.6 Valley Street Typical Plan View)

- Roy Street (similar to Valley Street)
- Reconfigure the Valley Street/Fairview Avenue N. intersection to de-emphasize Valley Street and shift "mainline" status to Fairview Avenue. See a rendering of the proposed changes at the Fairview Avenue N and Valley Street intersection in Figure 8.8.
- Reconfigure Fairview Avenue N between Mercer Street and Valley Street to accommodate two NB and two SB lanes (with left turn pocket(s)).
- Add a traffic signal at the intersection of Dexter Avenue and Republican Street.
- Install signals at Terry Avenue N. and Mercer Street and Terry Avenue N and Valley Street to improve north/south access for pedestrians and local traffic.
- With Seattle Center and the surrounding communities, evaluate the conversion of Mercer and Roy Streets to two-way operation (within the existing right-of-way) between Fifth Avenue N and First Avenue N to provide a continuous two-way connection to Elliott Avenue. Initial review of this option identified several advantages, including: direct westbound access to the Mercer Street Parking Garage and Uptown, relief of the bottleneck at Roy Street and Queen Anne Avenue North, and traffic calming on Mercer Street through the Seattle Center Theater District.

Improvements by Facility

- **Terry & 8th Avenues and Harrison Street Pedestrian Connections** - Accomodates all modes with emphasis on non-motorized access to and from key pedestrian generators.
- **Two-Way 9th Avenue N. Commercial Access** - 3-Lane section supports all modes with an emphasis on local access.
- **Two-Way Westlake Ave N. Main Street Neighborhood Commercial** - 4-lane section supports all modes, includes streetcar and emphasizes pedestrian access.
- **Fairview Avenue N (S. Of Valley) Regional Access With Transit Emphasis** - 5-lane section provides connections between regional facilities and centers.
- **Two-Way Mercer Street Regional Access** - 7-lane section connects regional centers and will have improved pedestrian amenities.
- **Narrow Valley Street Main Street Pedestrian** - 3-lane section with bike lanes, emphasizes non-motorized and transit uses.
- **Thomas Street & 6th Avenue Commercial Access** - 3-lane section provides commercial access, but emphasizes local access.
- **Fairview Avenue N (N of Valley) Main Neighborhood Commercial** - 3-lane section with bike lanes, emphasizes non-motorized and transit uses.
- **Lake-to-Bay Trail**
- * Crossing could be at Harrison - reversing function/designation of Harrison and Thomas Streets



Important Non-Motorized Crossings

- High-level improvements (e.g. grade separation)
- Moderate Improvements (e.g. countdown signals, curb-bulbs)
- Significant Improvements (e.g. signal, shortened crossing)
- No Improvements

- **New traffic signal**
- **Add bus shelter**
- **Proposed South Lake Union Streetcar**
- **Potential for additional/ improved transit service**
- **Potential for additional/ improved transit service (may be on Valley, Mercer or Republican Streets).**

SDOT
Seattle Department of Transportation

Figure 8.1: Recommended Scenario

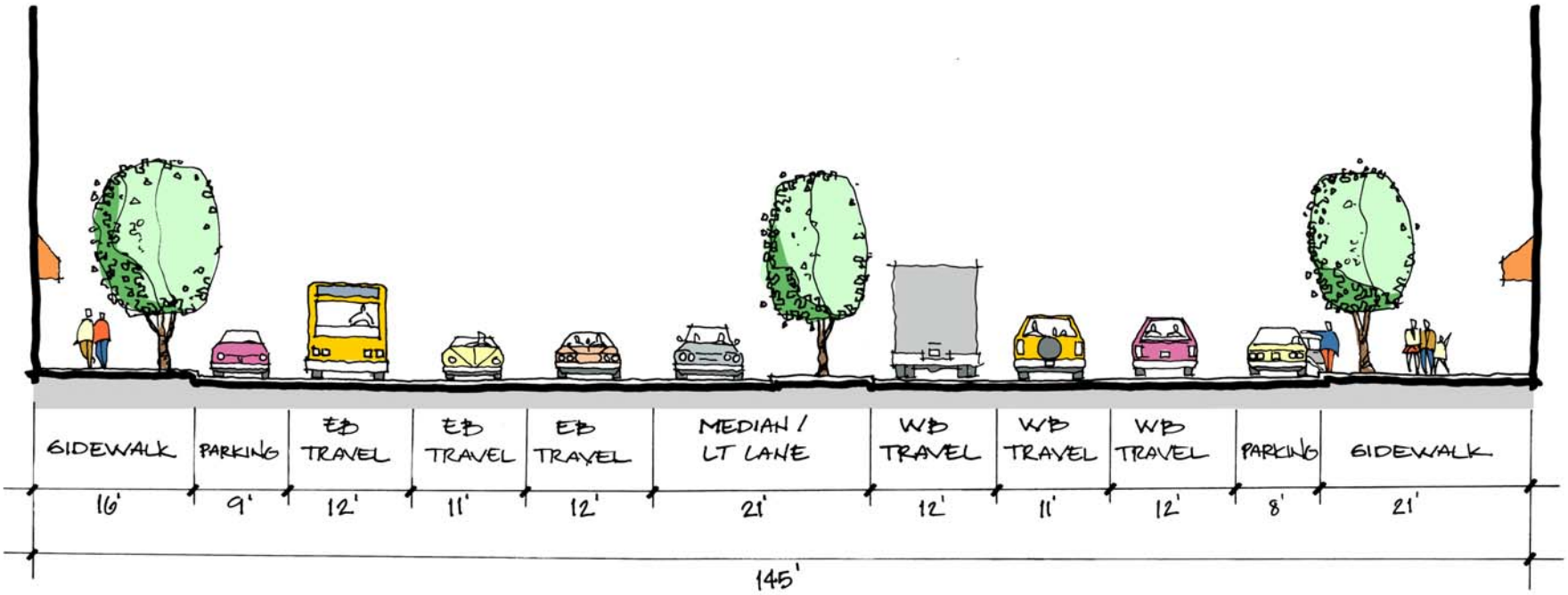


Figure 8.2: Mercer Street Typical Cross-Section

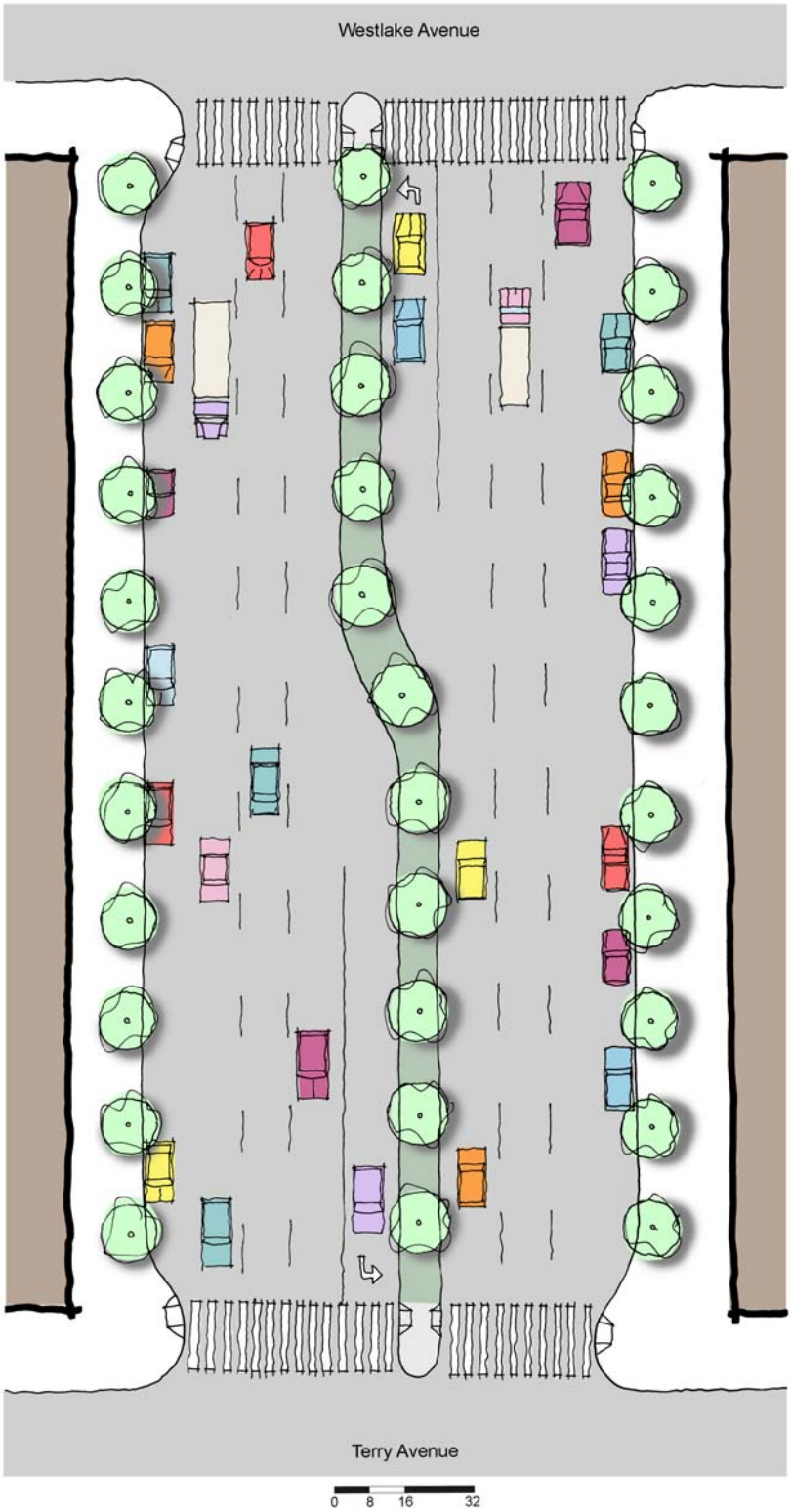


Figure 8.3: Mercer Street Typical Plan View

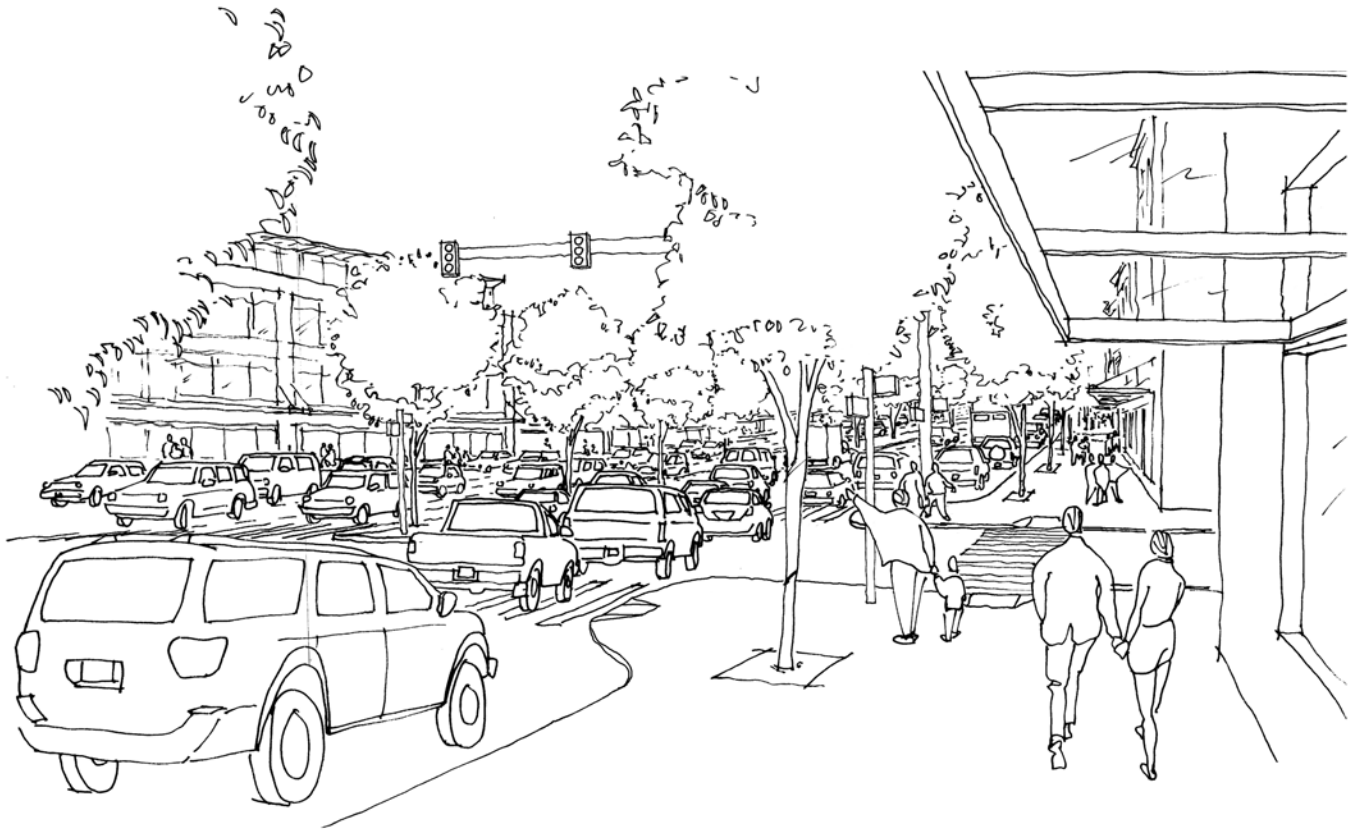


Figure 8.4: Proposed Mercer Street at Westlake Avenue, Looking East

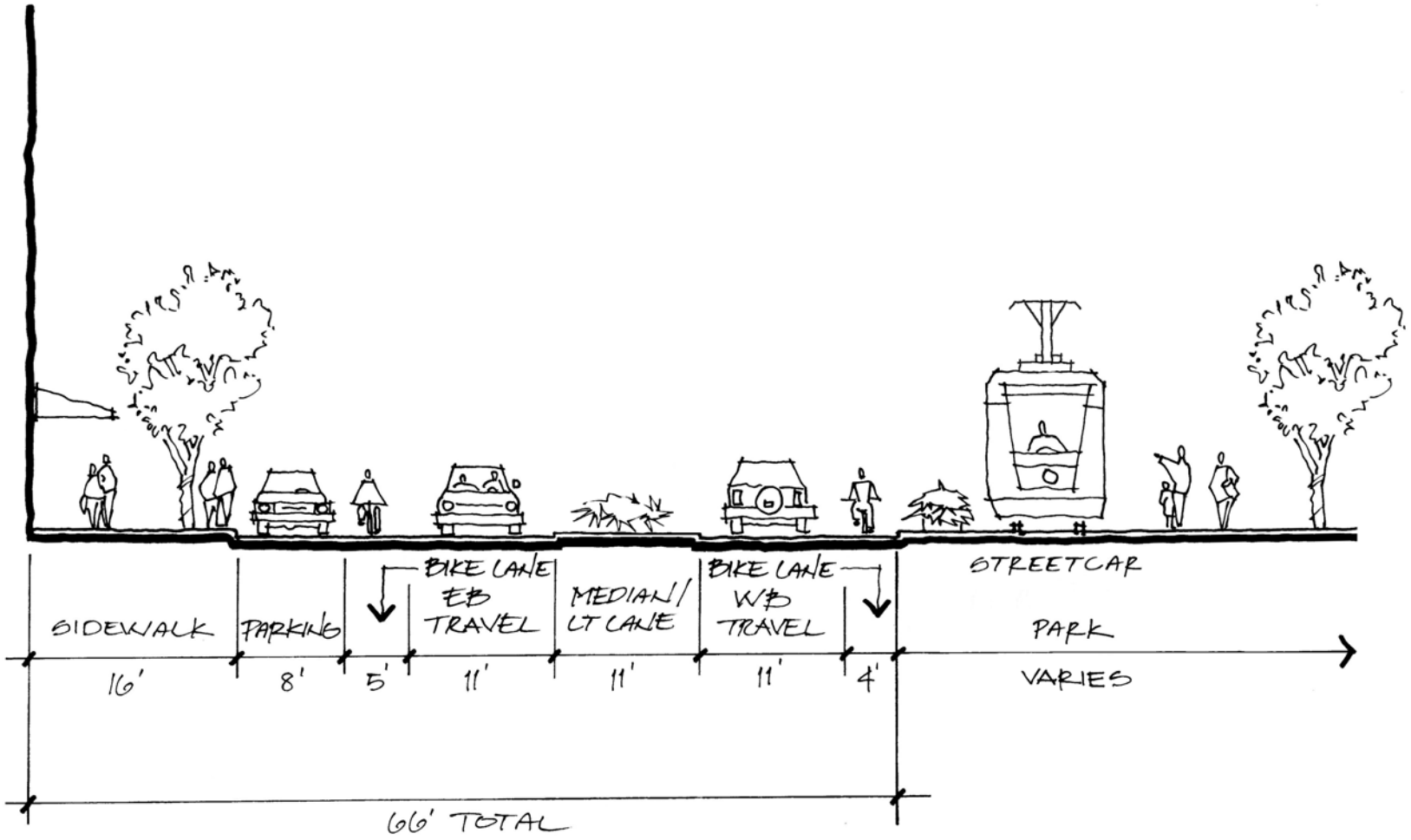


Figure 8.5: Valley Street Typical Cross-Section

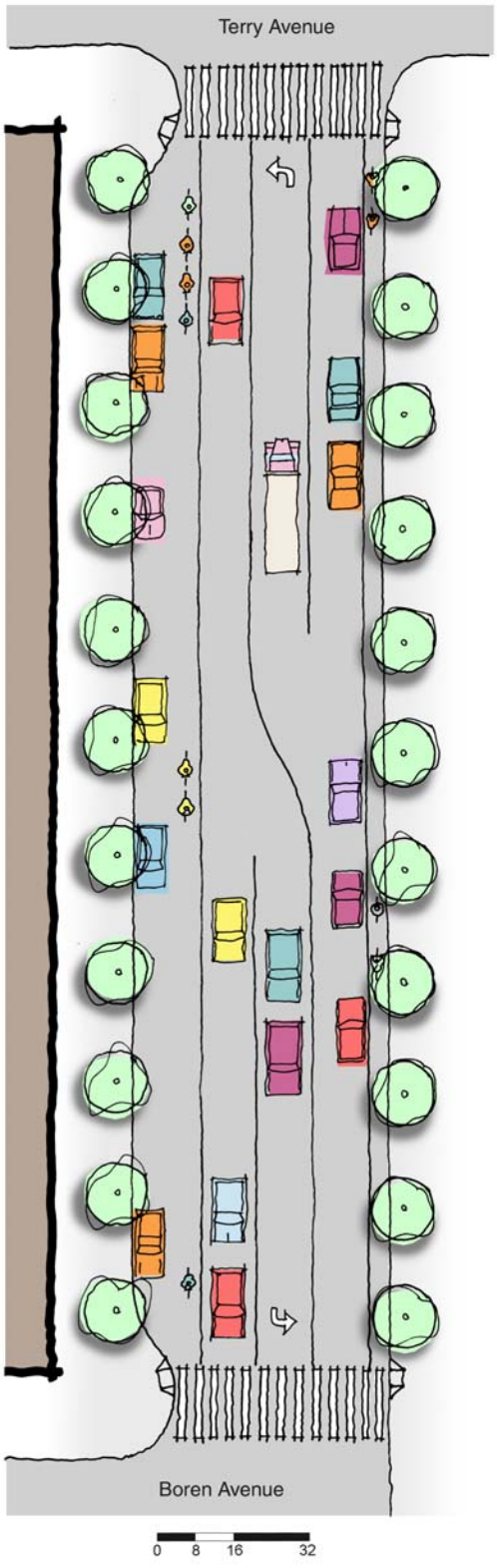


Figure 8.6: Valley Street Typical Plan View

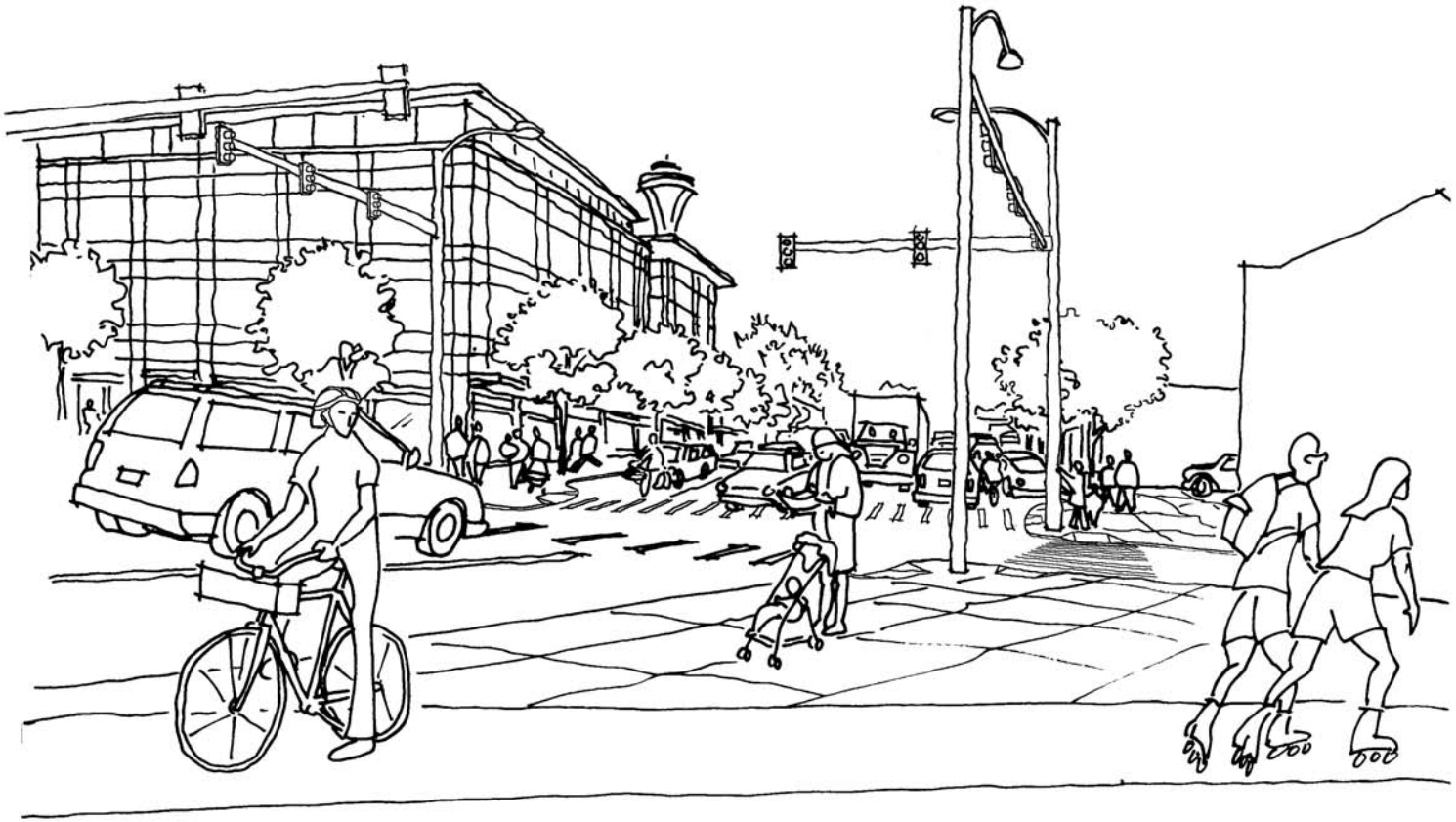


Figure 8.7: Proposed Valley Street at Westlake Avenue, Looking West

Figure 8.8: Proposed Valley Street at Fairview Avenue North, looking west

Modifications to Mercer/Fairview/I-5 Ramp Intersection

The following improvements would logically be included in the Mercer Corridor Project, but could be implemented independently.

- Add a fourth receiving lane to the I-5 on-ramps for eastbound traffic to assist in traffic flow out of SLU and onto I-5.
- On northbound Fairview Avenue at the approach to the I-5 ramps, widen roadway (for an additional northbound right-turn lane) and improve signage.
- Restrict the Mercer Street eastbound through connection to Mercer Place at the Mercer Street and Fairview Avenue intersection to improve the Mercer Street/Fairview Avenue intersection operations.

New Connection Over Aurora Avenue North/SR 99

- Build a new Aurora Avenue N. overpass at Thomas or Harrison Street
- Add left-turn lanes along Thomas (Harrison) Street from Fairview Avenue to Fifth Avenue. Requires removal of parking on one side of the street.

The Widened Mercer Underpass Alternative for the AWVSRP includes an overpass of Aurora Avenue at Thomas Street. However, an overpass at Harrison also appears to be feasible and may be a better route for access to Seattle Center parking. A Harrison overpass may also allow for a wider bridge to better accommodate pedestrians with less impacts to adjacent parcels. The AWVSRP project should coordinate with Seattle Center and others to determine the appropriate location for this overpass.

Two-Way Traffic on Ninth and Westlake

- Modify Westlake Avenue and Ninth Avenue so they operate as two-way facilities from Aloha Street to Denny Way. Westlake would be a four- to five-lane facility, and Ninth Avenue a three-lane facility. Modifications include re-striping, signal modifications and some widening near Mercer Street. Removal of parking would be required between Republican and Mercer Streets to accommodate left-turn lanes. See proposed cross-sections in Figures 8.9 and 8.10.

SDOT will work with the neighborhood and bicyclists that now use Westlake and Ninth Avenues through the design of these streets to determine if bike lanes can be incorporated into the cross-section, or if an alternative route is required.

Build Street Grid West of Aurora Avenue North/SR 99

The removal of Broad Street and new connections across Aurora Ave N/SR 99, allows the City to create a complete street grid between Aurora Avenue N/SR 99 and Fifth Avenue N. This provides new north-south and east-west streets to help relieve existing streets, such as Fifth, and it supports future re-development of properties in this area. SDOT will work with Seattle Center and neighboring communities to design a street network that provides convenient access to Seattle Center and Queen Anne, and supports future plans for this area.

- Build an overpass across Mercer Street at Sixth Avenue to provide a new north-south arterial connection (Queen Anne to Denny) between Aurora Avenue N. and Fifth Avenue N.

- Remove Broad Street from Fifth Avenue to Ninth Avenue to allow for the construction of a widened two-way Mercer Street and reconnection of the street grid west of Aurora Avenue N. in this area.
- Install a signal at the intersection of Taylor Avenue and Mercer Street

Modified Access to Northbound I-5

- Southbound on Eastlake Avenue, add a turn lane (near Denny) to allow left-turns from Eastlake Avenue to the northbound I-5 express lanes.

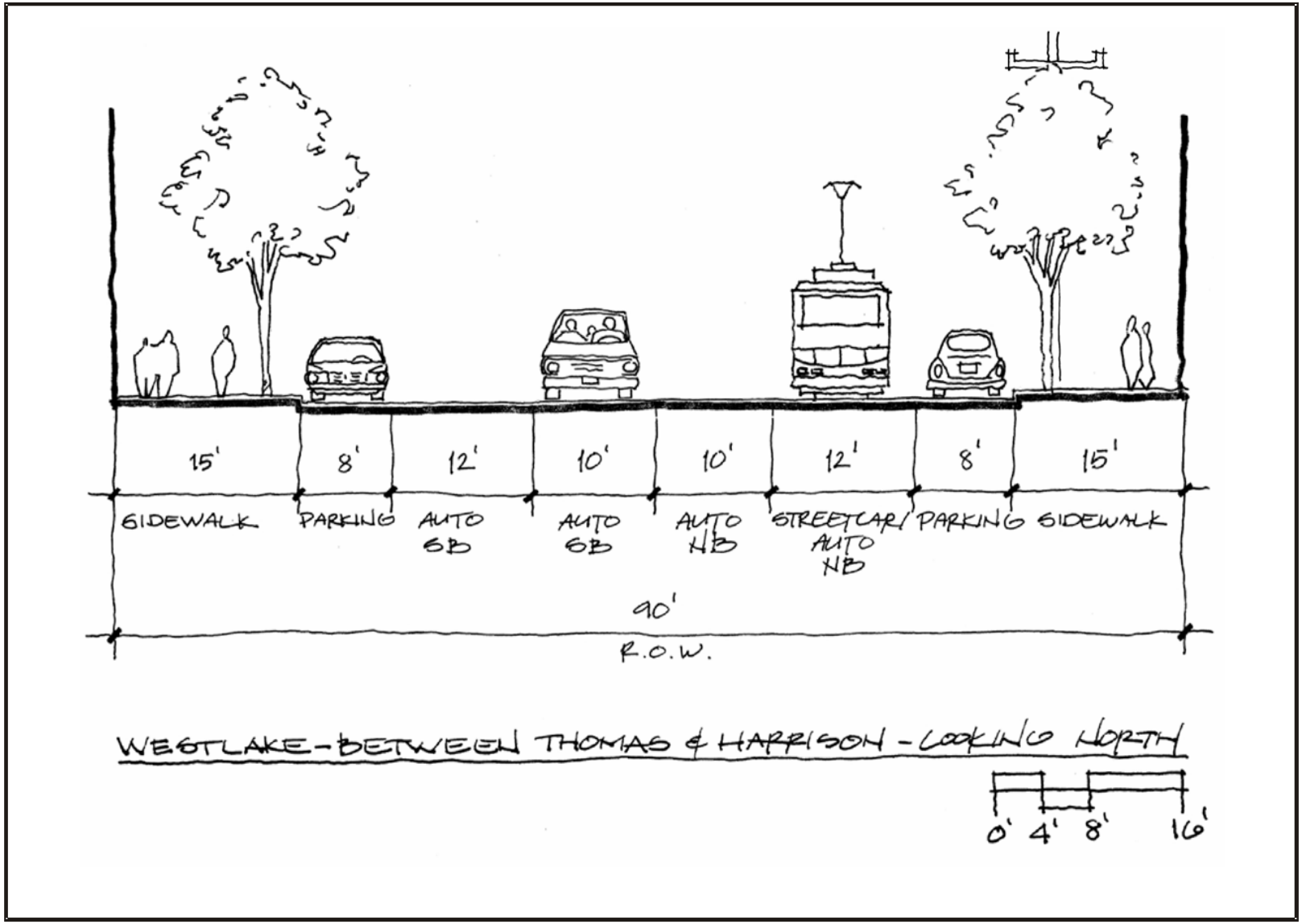


Figure 8.9: Proposed Two-Way Westlake Avenue Typical Cross-Section

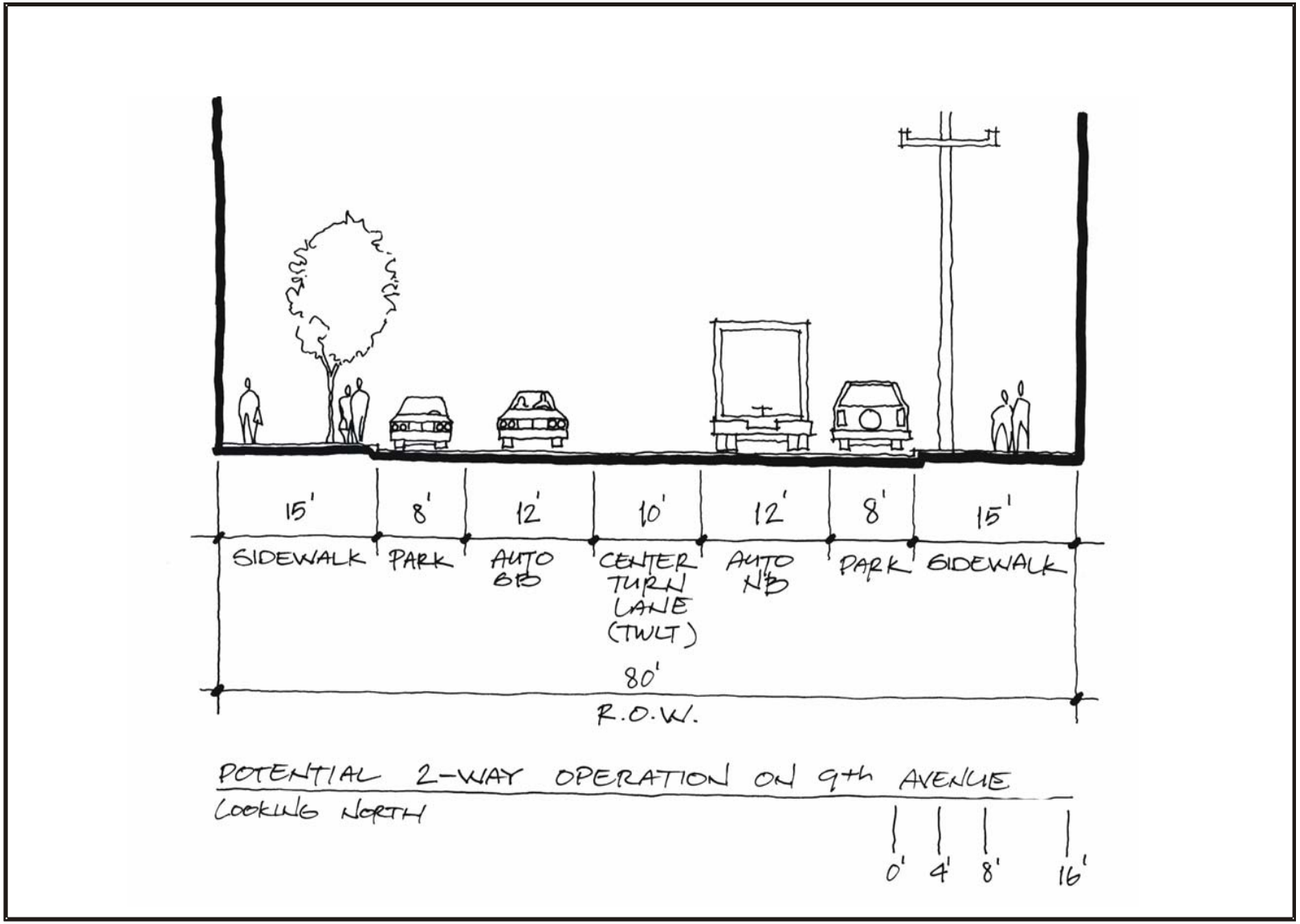


Figure 8.10: Proposed Two-Way Ninth Avenue Typical Cross-Section

Transit

For the Recommended Scenario, the following transit-related improvements are recommended for the SLU area. Figure 8.11 graphically displays many of these recommended improvements. These improvements benefit not only SLU, but adjacent neighborhoods, such as Denny Triangle, Queen Anne and Eastlake.

New or Modified Local Transit Service To/Through the SLU Neighborhood

- A new Streetcar line to better connect downtown to the Denny Triangle and SLU area. The streetcar route would connect the Westlake Center area with South Lake Union via Westlake Avenue northbound and Terry Avenue southbound (between Valley and Thomas Streets).
- Modify route 74 to better serve the SLU area by running through the area, rather than only skimming the edge of the SLU area near the Seattle Center as it does currently. Two potential routing options are possible. The modified route 74 could run east on Mercer Street to Dexter Avenue, north on Dexter Avenue, east on Roy/Valley Streets and then north on Fairview Avenue. Alternatively, it could run east on Mercer Street to Fairview Avenue, then north on Fairview Avenue. At the west end, the new routing could potentially also connect with the Monorail's Fifth Avenue and Broad Street station.
- A new transit route between Uptown and Capitol Hill. This proposed route would run from Uptown through South Lake Union and on to the north side of Capitol Hill. Specifically, it would follow Mercer Street to Dexter Avenue, Dexter Avenue to Republican Street, Republican Street to Eastlake Avenue, Eastlake Avenue to Lakeview Boulevard, Lakeview Boulevard to Belmont Avenue, Belmont Avenue to Roy Street, and Roy Street to Broadway. Because of the grades on Belmont Street, it is likely that this would need to be an electric trolley bus route, or other electric technology. An alternative routing through SLU could be along Mercer Street, rather than Republican.
- Increase the frequency of north/south routes through the SLU area (i.e., routes 70, 26, 28). For example, if service on route 70 is doubled, this would represent an additional 29,800 service hours.
- Increase the frequency of Route 8 along Denny Way from a 30-minute to 15-minute headway.
- Reduce effective headways by consolidating SLU routes to use the same streets through the downtown area.

Create Transit Emphasis/Transit Priority Street on Fairview Avenue North

These improvements are intended to facilitate transit flow along Fairview Avenue N. through the study area. The improvements include the following:

- Transit Signal Priority (TSP) northbound at Denny Way.
- Advanced green signal and queue jump lane on Fairview Avenue northbound at Harrison Street.
- TSP on Fairview Avenue northbound and southbound at Mercer Street.
- TSP on Fairview Avenue southbound at Valley Street.

Routes & Improvements

Potential New Regional Service
New service could come from regional park-and-rides serving South Lake Union and Denny Triangle.

Potential New Regional Service (Alternate)
New service could come from regional park-and-rides providing core South Lake Union service, Monorail stations, the Seattle Center, and/or Uptown.

Proposed New Uptown to N. Capitol Hill Route
Proposed to travel via Republican through SLU adding east-west service between Uptown/Seattle Center and N. Capitol Hill. Steep grades to Capitol Hill would require that this be a trolley bus route. Alternative route via Mercer Street.

Potential Modified Route 74
Would connect Seattle Center and the University District via Fairview (east side of Lake Union) rather than Westlake eliminating the Fremont/Wallingford routing. Alternative route via Mercer Street.

Potential Modified Route 8
Maintains existing route start and end points, but modifies the routing to serve the south end of SLU using the proposed Thomas Street overcrossing.

Existing Route 70
Transit speed and reliability improvements on Fairview Avenue N.

Proposed South Lake Union Streetcar

Add bus shelter

* Crossing could be at Harrison - reversing function/designation of Harrison and Thomas Streets

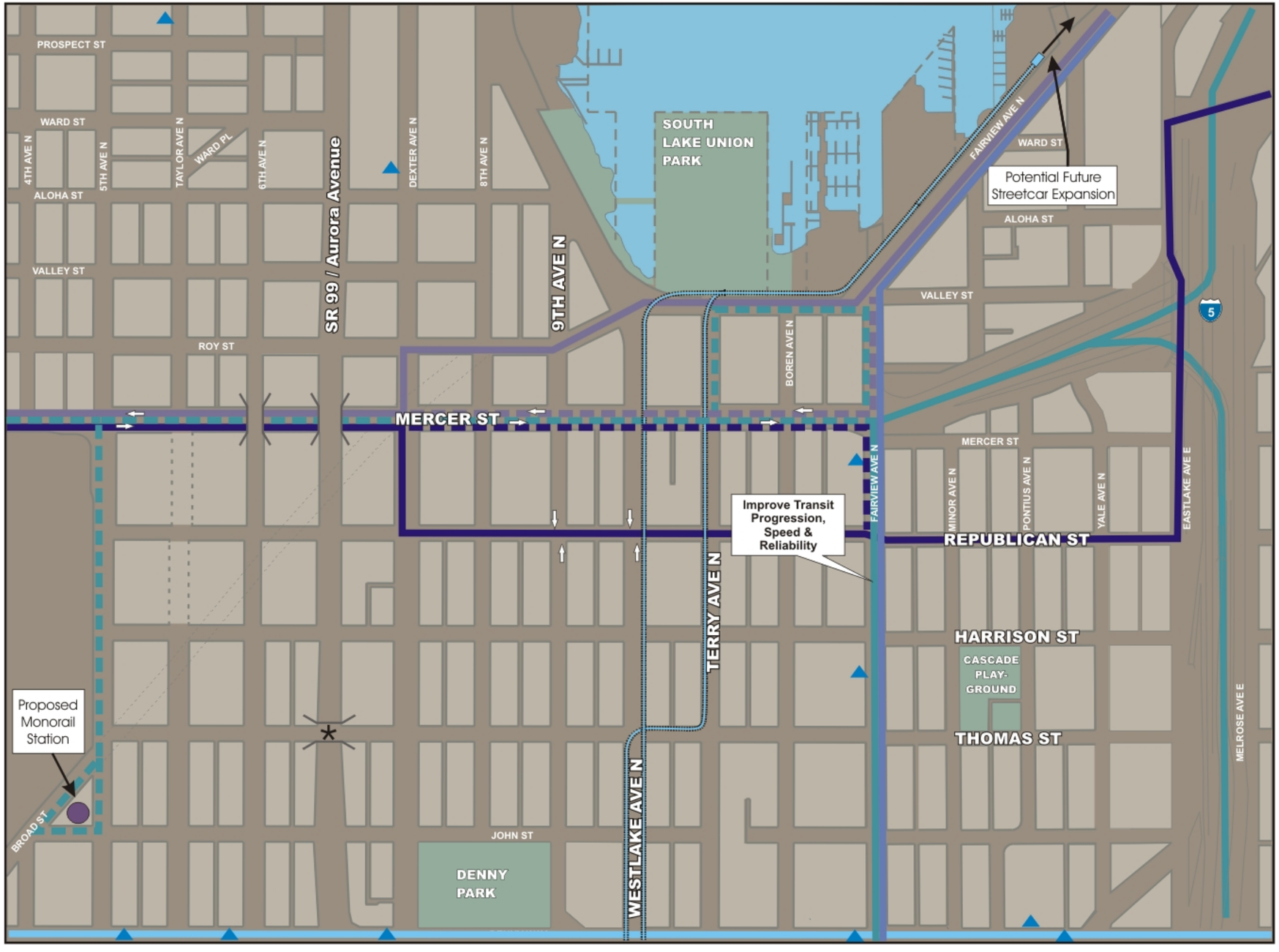


Figure 8.11: Proposed Transit Improvements for the SLU Area

Improve Regional Bus Service to SLU and Adjacent Neighborhoods

If the SLU area is to reach its potential as an urban village and accommodate the level of development projected for it combined with the projected growth in the Denny Triangle area, it is critical that a higher level of regional transit service also be considered for the area. The streetcar and existing bus service will help connect SLU to regional transit service in the downtown area, but increased direct service may be warranted as employment increases. This is important in order to accommodate the higher level of travel to and from the area and to provide a reasonable alternative to making these trips using the single-occupant auto (SOV).

Direct regional service could be provided from park and ride lots to the north, east and south of the Study Area via the Mercer/I-5 ramps or other routing options. Service from the south or from the east of Lake Washington via I-90 might be provided by extending existing regional service through the north end of downtown. New regional service using the Mercer/I-5 ramps could include one or more of the following route options within SLU:

- To SLU and Denny Triangle via Fairview, Westlake or Dexter Avenue.
- To the proposed Monorail station at the intersection of Fifth Avenue N. and Broad Street
- To Uptown and the Monorail station at Key Arena

A recent sample of existing SLU employees revealed that the highest proportion of employees live in the North Seattle area. This suggests that express service from the north end, perhaps from the Northgate Park and Ride lot, might be a first priority for regional service.

Connecting to the Regional Transit System

- Connecting SLU to the Regional Light Rail System. Extend the streetcar to the University of Washington and a UW light rail station. This would enhance the streetcar's role as a connecting route to light rail for Denny Triangle, SLU, and Eastlake with connections in Downtown (Westlake Center) and the University District.
- Connecting SLU to the monorail network. Monorail connections could be considered during Phase 2 Monorail planning.

Bus Layover Space

King County Metro and the City of Seattle have been evaluating potential locations for bus layover space to replace the Convention Place Station (CPS) layover spaces that will be removed when transit-oriented development construction begins at CPS. The blocks bordered by Thomas Street, Dexter Avenue, Denny Way, and Westlake Avenue were evaluated, and several on-street spaces were approved for later implementation by the Seattle Department of Transportation. These spaces are primarily on Westlake Avenue, Ninth Avenue and John Street, surrounding the current Denny Playfield.

However, as bus routes and service is added to the SLU area, additional bus layover space in the SLU area will become increasingly important. It will be particularly critical if new bus service terminates in the SLU area.

Shelters

As presented in Chapter 4 (*Existing Conditions*), a bus stop is generally eligible for a shelter if it has over 50 people boarding at the location each day. Table 8.1 shows the locations of the bus stops that have over 40 boardings per day in the South Lake Union area, and whether or not bus shelters are currently provided and/or improvements are recommended for these bus stops. At this time, three shelters are already in design or under construction and four locations have been identified for new shelters (eastbound on Denny Way at Sixth Avenue, southbound on Dexter Avenue N at Aloha Street, southbound on Fairview Avenue N at Mercer Street, and southbound on Taylor Avenue N at Prospect Street).

In the table below, a response of "*Shelter Constraints*" in the Improvement Recommended column indicates that the location was studied for a potential bus shelter by King County Metro and either private right-of-way issues or limited space constrains the placement of a shelter at this location. As the specific parcels redevelop, setbacks are recommended to allow for the installation of a shelter. For bus stops with either existing shelters, or where space constraints negate the possibility of a shelter, property owners are encouraged to consider awnings and leaning rails when upgrading their exteriors.

Table 8.1: Recommended Improvements to Bus Stops

Route(s)	Dir	On Street	Cross Street	Daily Boardings	Bus Shelter	Improvement Recommended
3, 4, 16	N	5th Avenue N	Broad Street (Thomas)	99	Yes	Property owners are encouraged to consider awnings and leaning rails when upgrading their exteriors.
3, 4, 16	S	5th Avenue N	Broad Street (Thomas)	254	Yes	
3, 4, 16	S	5th Avenue N	Valley Street	160	Yes	
3, 4, 16	S	5th Avenue N	John Street	95	Yes	
3, 4, 16	S	5th Avenue N	Mercer Street	88	Yes	
3, 4, 16	N	5th Avenue N	Republican Street	78	Yes	
5, 26E, 28E, 358	N	Aurora Avenue N	Mercer Street	94	Yes	
5, 26, 28	N	Dexter Avenue N	Denny Way	247	Yes	
25, 66, 74E	S	Eastlake Avenue E	Mercer Street	42	Yes	
70, 71, 72, 73	S	Fairview Avenue N	John Street	88	Yes	
3, 4	S	5th Avenue N	Cedar Street	191	No	*Shelter Constraints.*
3, 4, 16	N	5th Avenue N	Denny Way	41	No	*Shelter Constraints.*
8	E	Denny Way	Stewart Street	100	No	Shelter Already in Design/Construction
8	E	Denny Way	Cedar Street (5th Avenue)	83	No	*Shelter Constraints.*
8	E	Denny Way	Dexter Avenue	75	No	Shelter Already in Design/Construction
8	E	Denny Way	6th Avenue	71	No	Potential new shelter
8	E	Denny Way	Fairview Avenue	53	No	*Shelter Constraints.*
8	W	Denny Way	Pontius Avenue N	43	No	Shelter Already in Design/Construction
26, 28	S	Dexter Avenue N	Aloha Street	51	No	Potential new shelter
70, 71, 72, 73	S	Fairview Avenue N	Harrison Street	82	No	*Shelter Constraints*, Property Owner May Build Own Shelter
70, 71, 72, 73	S	Fairview Avenue N	Mercer Street	54	No	Potential new shelter
3, 4	S	Taylor Avenue N	Prospect Street	49	No	Potential new shelter

Pedestrian and Bicycle

The Recommended Scenario includes a number of bicycle and pedestrian improvements. Some are incorporated into the arterial street recommendations and improvements (e.g., those proposed for Mercer and Valley Street), while others are specific, or independent of other improvements. These improvements are graphically represented in Figure 8.12.

Lake-to-Bay Trail

Incorporate the Lake-to-Bay Trail into the design of the Mercer Corridor Project and the AWVSRP. This includes a continuation of the bicycle lanes on Valley Street west onto Roy Street to Dexter Avenue and an enhanced pedestrian trail along this route. The Lake-to-Bay Trail would be incorporated into the Widened Mercer Underpass and could include on-street bike lanes and/or wide sidewalks. This route allows for a more direct route to the north side of the Seattle Center properties and for a wider non-motorized facility than can be accommodated by the Thomas Street overpass.

New Bike Lanes and Signed Bike Routes

New bike facilities on Fairview Avenue and Valley Street, along with the existing Westlake Trail, will create a comprehensive bike system around the south end of Lake Union and to the Lake-to-Bay Trail. Bike facilities are recommended on Fairview Avenue N., between Eastlake Avenue E. and Valley Street. These could be in the form of a wide curb lane or striped bike lanes and could be combined with the addition of parking along both sides of Fairview Avenue N.

New bike lanes are also proposed on Valley Street between Fairview and Westlake Avenue N. and continuing west on Roy Street between Westlake and Dexter Avenue N.

The design for two-way operation of Westlake and Ninth Avenues should accommodate bikes on one of these streets or a parallel route in the vicinity.

The SLU Transportation Study is also recommending the installation of bike route signs between the Dexter Avenue bike lanes and the existing Second Avenue bike lanes and the proposed Fourth Avenue bike lanes in downtown.

Terry Avenue Design Guidelines Project

This study also recommends the implementation of improvements proposed by the Terry Avenue Street Design Guidelines project, which will transform Terry Avenue into a key pedestrian corridor. Pedestrian and bicycle use will be the main focus, but cars will continue to use Terry Avenue for access to adjacent properties.

Improved Street Crossings

The SLU Transportation Study is also recommending the modification of a number of key intersections to improve pedestrian access and mobility as well as increasing the comfort of non-motorized travel. Improved pedestrian crossings are incorporated into the Two-Way

Mercer and Valley Street project, including curb bulbs, wide sidewalks, landscaping and new signals at Terry Street.

Other streets proposed to receive improved intersection crossings include Westlake Avenue, Republican Street, Thomas Street, and Fairview Avenue.

Proposed Non-Motorized Improvements

Terry & 8th Avenue and Harrison Street Pedestrian Connections - Accomodates all modes with emphasis on non-motorized access to and from key pedestrian generators.

Narrow Valley Street Main Street Pedestrian - 3-lane section with bike lanes, emphasizes non-motorized and transit uses.

Fairview Avenue N (N of Valley) Main Neighborhood Commercial - 3-lane section with bike lanes, emphasizes non-motorized and transit uses.

Lake-to-Bay Trail

Important Non-Motorized Crossings

- High-level improvements (e.g. grade separation)
- Significant Improvements (e.g. signal, shortened crossing)
- Moderate Improvements (e.g. countdown signals, curb-bulbs)
- No Improvements

S **New traffic signal**

* Crossing could be at Harrison - reversing function/designation of Harrison and Thomas Streets

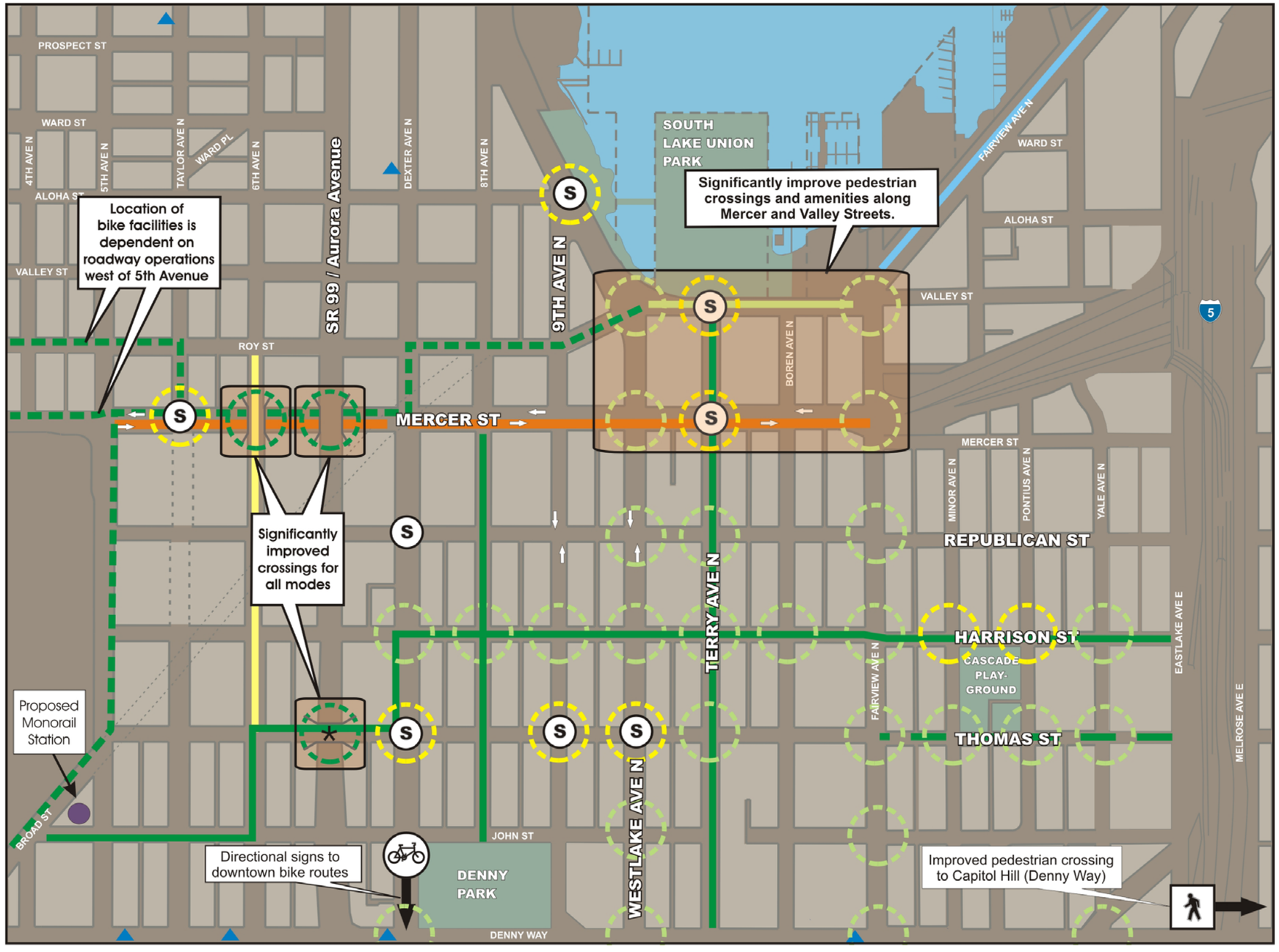


Figure 8.12: Proposed Non-Motorized Improvements

Green/Greenscape Street Extensions

Harrison and Thomas Streets (between Eastlake and Fairview Avenues) are currently designated Green Streets. The SLU Transportation Study recommends extending the Green Street designation of Harrison Street to Dexter Avenue N or Fifth Avenue N., the east edge of the Seattle Center campus. The Harrison Green Street design could include widened sidewalks/planting strip (from 11 to 13 feet), narrowed travel lanes (14 to 12 feet) and curb bulbs between Dexter and Eastlake Avenues. See Figure 8.13 for typical plan layout of Harrison Street.

The design of Thomas Street, between Fairview and Eastlake, should consider the potential for additional traffic due to the Thomas Street Overpass at Aurora Avenue N/SR 99. However, no additional vehicular capacity is recommended along this section of Thomas. While this study is not recommending the Green Street extension for Thomas Street, both Thomas and Harrison Streets will have a reduced emphasis on vehicular throughput between Fairview and Eastlake Avenues. It is important to note that the Thomas Street Overpass could be relocated to Harrison Street through the AWVSRP. If this is indeed the case, the above designations for Thomas and Harrison Streets should be switched.

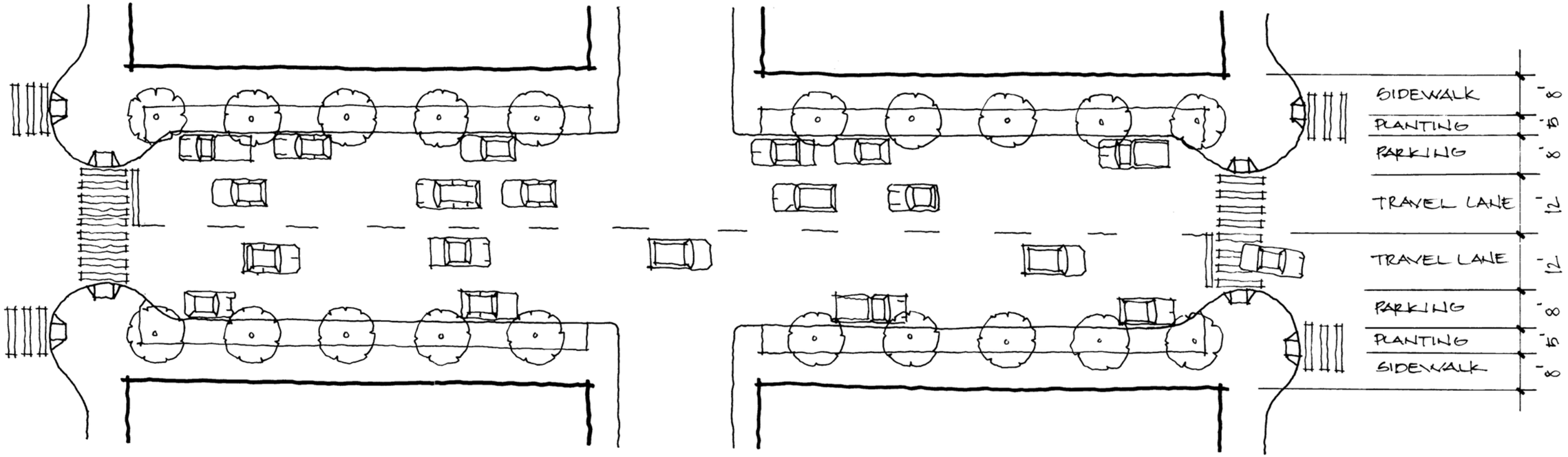
In addition to the above noted Green Street changes traffic control changes around Cascade Park were reviewed and considered. Consistent and appropriate signing and traffic control along Thomas and Harrison Streets and Minor, Pontius and Yale Avenues should be implemented based on the final decision for the AWVSRP's Thomas (or Harrison) Street Overcrossing.

Connections Across Aurora Avenue N/SR 99

The Recommended Scenario includes new connections across Aurora Avenue N/SR 99 via the widened Mercer Underpass and the Thomas Street Overpass, which are part of an alternative for the AWVSRP. While this improvement significantly advances the goal of connecting South Lake Union and Queen Anne, additional crossings should be considered. The ultimate scenario is a lower Aurora Avenue North, allowing east-west crossings from Thomas to Roy Street.

Denny Way Pedestrian Improvements

Pedestrian improvements in the Denny Way corridor include the addition of a sidewalk on the north side of the Denny Way crossing of I-5 and intersection improvements along Denny Way that include curb bulbs on the side streets and countdown signals for pedestrians crossing Denny Way (north-south).



Harrison Street Plan (Typical Condition)

Figure 8.13: Harrison Street Plan

Transportation Demand Management

The recommended physical improvements to South Lake Union's transportation infrastructure will help make South Lake Union an accessible neighborhood and a desirable place to live, work, shop and visit. However, without aggressive transportation demand management actions, growth in traffic will overcome even the best street and pedestrian network, and divert resources from productive space to automobile storage.

In the year 2000, 71% of workers commuting to South Lake Union drove alone. If this trend continues, accommodating planned growth will require about 11,500 new parking spaces (equivalent to about 13, eight-story garages) to accommodate the increased automobile use. Providing this quantity of parking would cost private developers approximately $286 million. This estimate doesn't include the cost to replace existing surface parking that may eventually be developed, so the cost of providing parking if 71 percent of people continue to drive alone would likely be much higher. In addition to parking costs, continued use of automobiles at current rates would also significantly worsen traffic congestion for travel to and through South Lake Union. Transportation demand management strategies have the potential to reduce these costs and impacts considerably.

Realizing South Lake Union's growth potential will require that the City of Seattle, transit providers, private developers, businesses, community organizations, and residents minimize the demands for automobile trips and maximize the use of other modes. Fortunately there are many strategies available to reduce dependency on private automobiles while providing equal or superior access and mobility.

As this study noted in the review of existing conditions, the ability to effectively manage transportation demand depends on availability of choices and a built environment that supports and reinforces TDM strategies.

- Providing on-street bicycle facilities -- such as bicycle lanes, and route signage will invite more bicycling to South Lake Union. These facilities can increase people-moving capacity of the transportation network at very low cost.
- Increasing transit service, making service adjustments to meet the needs of the South Lake Union market.
- Providing transit priority treatments to ensure the speed and reliability of bus service is necessary to make transit an attractive alternative to automobiles. Investing in roadway treatments that prioritize transit vehicle movements will keep transit moving at lower cost, with greater customer satisfaction.
- Enhancing pedestrian environments (with features such as improved crosswalks, new street crossings, and countdown signals) and designing streetscapes to 'green street' standards will promote walking trips, increase access to transit, and support parking management strategies.
- Encouraging a mix of uses to support residential and employee needs reduces the use of automobiles for everyday errands. A mix that includes restaurants, cleaners, pharmacies, etc. allows people living in the neighborhood to walk for more of their

trips. In addition, employees are less likely to feel that they need to have a car at work to get to lunch or run errands if everything they need is within walking distance.

Even with significant transportation system improvements in South Lake Union, maximizing the system's capacity to move people and goods will require public and private organizations to implement additional TDM programs. Successful TDM strategies maximize the value of transportation investments.

Some proven TDM strategies are presented below. These and other strategies can be used to supplement physical improvements to the South Lake Union transportation system.

Expand Choice

Strategies that expand trip choices do so by making alternatives to automobile trips easier to use (such as increased transit service, and physical infrastructure changes) or by removing barriers that make people reluctant to make different choices (such as providing means for mid day trips and emergency rides home).

Alternative Work Schedules

Encouraging employees to adopt non-standard work schedules such as (4/10 or 9/80) reduces the burden on the transportation system by pushing trips to the edges of peak commute times and eliminating up to 20% of an employee's commute trips for employees who regularly work four, ten-hour days per week.

Bicycle Improvements

In addition to providing bike lanes, routes, bicycle way finding, and paths, improvements to support bicycling include amenities at trip destinations such as secure bicycle parking for commuters, shower and locker facilities, short-term bicycle parking for non-work trips, and access to space for minor repairs. The comparatively easy grades in South Lake Union and its proximity to major bicycle paths and routes make bicycle improvements an especially important consideration.

Bicycle/Transit Integration

Area transit providers provide access to take bicycles on or in transit vehicles as well as providing bicycle lockers at park and ride lots. Providing more secure parking at or immediately adjacent to transit at the work end of the trip can extend transit's reach to South Lake Union. Bikestation-type facilities, serving the north end of downtown and the Seattle Ferry Terminal can improve bicycle access to South Lake Union. These facilities provide secure bicycle parking, repair and maintenance services, changing rooms and other amenities for bicyclists.

Car Sharing

Car sharing organizations such as Flexcar provide access to an automobile on an hourly basis. Car sharing eliminates the need to drive (or maintain) a private vehicle for occasional short trips. It also provides a cost-effective alternative to maintaining fleet vehicles for many businesses. In mixed use environments the combination of daytime business and employee

personal use, and residential weekend and evening use, makes car sharing a very attractive TDM tool that uses parking resources very efficiently.

Guaranteed Ride Home
Programs that provide a ride home in the event of illness, emergency, or unexpected need to work late encourage ridesharing and transit use among people who might otherwise see a need to drive alone in the event of unforeseeable transportation needs.

Walking
Design and development of pedestrian-friendly environments will support the walk mode for non-work trips within the neighborhood. Creating pedestrian connections to residential neighborhoods adjacent to South Lake Union will increase walking as a commute option. Over the long term residential and mixed-use development will be essential to establishing walking as a major travel mode to and within the neighborhood.

Ridesharing/ Carpooling
Compared to adjacent neighborhoods, South Lake Union currently has low transit use and high drive-alone commute mode shares. Ridesharing both in the form of carpools and vanpools may provide a necessary transitional mode while more transit service develops. Providing priority access for HOVs will help to encourage ridesharing. Priority access may take the form of priority access to and from Interstate 5, as well as preferred parking access on neighborhood streets.

Shuttle Services
Shuttle services might be used in South Lake Union as a transition strategy to fill gaps in transit service as the neighborhood is built out. For example, in order to avoid constructing excess parking, developers might choose to use existing off-site parking with shuttle service until employment densities support additional transit service. Shuttle service can also extend the reach of existing transit service. This shuttle service could be publicly or privately operated.

Encourage Mode Shift

In addition to providing the means to make different choices and removing barriers to choice, TDM programs must also make people aware of the options that are available. Although the bulk of TDM efforts may focus on transit, it is important that TDM invite travel to and within SLU by a variety of means.

Bicycling Encouragement
Programs to encourage bicycling typically include information on commuting equipment, route selection and bicycle maps, and information on availability of and access to workplace amenities such as bicycle parking and shower and locker facilities. Bicycling encouragement can also include education and training programs to give cyclists the skills and confidence to ride safely in urban environments. Bicycling encouragement programs are often supported by local bicycling organizations such as the Cascade Bicycle Club and the Bicycle Alliance of Washington, both of which have professional staff. Existing businesses in South Lake

Union are strong supporters of bicycling and their efforts and experience might be leveraged to make the neighborhood a model for bicycle commuting in Seattle.

Commuter Financial Incentives
Financial incentives are often an effective means to encouraging commuters to try a different form of travel to work. They can also be effective in promoting mode shift where parking prices are low compared to the price of transit. Financial incentives to use transit are often provided in the form of discounted transit passes or transit tickets or rebates. Incentives are typically distributed and administered by employers.

Parking Pricing/ Parking Cash-Out
Free, employer-paid parking is a strong deterrent to transit and HOV use. Implementing parking charges for employees makes transit more attractive. In situations where employers pay for parking, offering a payment in lieu of free parking (parking cash-out) is a way to provide a financial incentive without eliminating an employee benefit. Instituting pricing for parking benefits or offering cash-out of parking paid for by employers may be important tools in South Lake Union. As redevelopment occurs providing free parking to employees will become increasingly costly for employers creating an opportunity to establish pricing and cash-out.

Transportation Cost Analysis
People tend to underestimate the costs of automobile transportation by not considering the full costs of automobile use, such as vehicle ownership. Simple analysis tools help people recognize how much time and money they are spending on transportation and the cost of alternatives. Transportation cost tools can be effective for both businesses and individuals.

Special Event Management
South Lake Union park will host an increasing number of events in the future and will continue to be impacted by professional sporting events, concerts, and festivals held at Seattle Center. Managing travel demand to events can reduce impacts to South Lake Union. Actions include promoting the use of transit, carpooling (3 person plus in the future) and bicycling to events; providing additional transit service timed for event attendance; and restricting general purpose traffic during events. Event traffic restrictions can ensure that transit vehicles and HOVs have easy event ingress and egress.

Marketing Programs
In order to be successful, TDM efforts must have sustained marketing programs to keep encouragement levels high. These marketing efforts serve to remind existing non-SOV commuters of the wisdom of their choices. They also target employees, businesses, and residents who are new to the neighborhood. It is critical to reach these individuals and organizations with effective marketing during transition times.

Manage Parking

Parking management is one of the most powerful tools available to manage transportation demand. Abundant commuter parking holds parking prices down, which encourages drive-alone trips that add to congestion and reduce overall mobility. Rather than promoting

parking development, TDM efforts should seek ways to minimize the amount of structured parking built as accessory to new SLU development. TDM efforts should also seek to use existing parking spaces in ways that maximize their economic growth potential.

Some parking management goals that support TDM are achievable through land use regulations:

- Reduce or eliminate minimum parking requirements (residential and non-residential uses)
- Adopt maximum parking space limits
- Bicycle Parking
    - Link bicycle parking requirements to land use (rather than a ratio of bicycle parking to automobile parking)
    - Develop requirements for short term and long-term bicycle parking.
    - Draft bicycle parking design guidelines (location, access, security, etc.)
- Limit on-site accessory parking and allow reduction in required off-site parking as transit service increases (to prevent over-development of structured parking).

Parking regulations that fit South Lake Union's current moderate transit service may not be appropriate for future conditions when transit service levels increase. With this in mind TDM programs should consider parking and land use regulations that support transition to a pedestrian-friendly, transit-oriented neighborhood. This may require tolerating and mitigating impacts of parking scarcity in the short-to-medium term rather than preventing parking scarcity.

Shared parking and *parking brokerage* are likely to be useful tools during South Lake Union's transition to a dense, mixed-use, urban neighborhood. Shared parking allows businesses with parking demands that occur at different times of the day to share a single facility. Similarly, parking brokerage can provide a way for owners of unused or under-used parking space to rent or trade space to other businesses or residents in the neighborhood.

On-street parking should also be regulated to prevent or discourage long-term, on-street, commuter parking.

Implementing TDM Programs:

Work with Businesses and Neighborhood Organizations to Build TDM Capacity and Advocacy within SLU.
TDM efforts only succeed when jurisdictions, businesses, developers and transit service providers work toward common interests and goals. This can be accomplished in a number of ways.

Commute Trip Reduction Networks
Existing business networks exist to promote TDM through Commute Trip Reduction (CTR) programs. Employers with 100 or more peak-period commuters at a single work site are required by law to implement CTR programs. The City of Seattle contracts with King County Metro Transit to facilitate CTR programs in SLU.

Business Associations
Because CTR programs are geared toward larger businesses the programs often do not reach small employers. Working through business associations is another way to reach more employers.

Neighborhood Organizations
In mixed-use neighborhoods, working with residential and community organizations can support TDM strategies such as shared parking, car sharing, and ride sharing.

Transportation Management Associations
Transportation Management Associations (TMAs) can provide a variety of parking management and TDM services to large and small businesses. Typical functions include ridesharing promotion and facilitation (ride matching and parking); bicycle promotion and bicycle parking programs; transit pass sales and distribution; and marketing to increase mode choice awareness.

New and expanded TDM programs should take advantage of existing networks and consider the development of new or expanded organizations or partnerships. For example, existing networks of commute trip reduction professionals already working in South Lake Union contain experience, knowledge, and creativity that might be effectively expanded to include smaller employers, or to provide services to non-traditional clients such as neighborhood organizations and residential buildings.

Regardless of the organizational model used, ongoing TDM efforts must be funded to be successful. Resources should be identified to provide staffing, space, administrative and program costs for a TDM service provider that can serve the entire neighborhood.

Consider Area-Wide Goals and Performance Monitoring
Existing requirements for transportation management programs typically focused on a single development or building. It may be appropriate to consider area-wide performance standards over building-based or employer-based standards in a high growth neighborhood. Area-wide goals and monitoring will require an organization, such as a TMA, to monitor performance and adjust programs. This approach is likely to reduce the costs of compliance with land use requirements.

Collect and Maintain Data
TDM programs will be more effective if they are based on good information and can be measured against objective and programmatic performance standards.

Mode Split Data
Over the long term, success in managing transportation demand can be gauged in large part by mode split data. Choosing baseline data and measuring mode split at regular intervals will show progress and reveal shortcomings. Possible data for this effort include King County Metro's Rider Non-rider survey, commute trip reduction surveys (as required by CTR) and TMP surveys (as required by transportation management programs)

Parking Supply and Use Data
Parking availability and price play a major role in mode choice. In order to effectively manage parking and implement TDM programs, SDOT should develop a comprehensive understanding of the existing parking supply, how it is used, anticipated changes to the parking supply, and the effects future development are likely to have on how future parking supply will be used. Periodic updates as redevelopment occurs should also be a priority.

Traffic Analysis of Recommended Improvements

Operational analyses were conducted to evaluate the traffic-related study recommendations with the projected growth in traffic volumes for the year 2030. The Synchro/SimTraffic analysis is not able to account for, or analyze, most non-motorized elements, but does include the effects of, and impacts on, additional pedestrians at new and existing intersections. The effects of the recommended transit and TDM elements on traffic volumes are also not incorporated into the traffic analysis forecasts. Therefore, the forecasted peak hour traffic volumes represent conservative traffic conditions, since potential reductions in SOV trips due to the TDM, transit, pedestrian and bicycle improvements are not fully captured. However, the Synchro/SimTraffic analysis does allow for a comparison of the relative differences between the Recommended Scenario and the Future Baseline (2030) network conditions.

Figures 8.14 and 8.15 graphically display the AM and PM peak-hour intersection turning movement volumes (respectively) for the Recommended Scenario. The LOS analysis results for the Future Baseline and Recommended Scenario are presented in Table 8.2.

In general, the analysis indicates that, compared to the Future Baseline case, a greater number of the study intersections are projected to experience some level of increased delay for the Recommended Scenario versus the number of intersections projected to experience a decrease in delay. Key locations where there is a notable increase in delay include the following:

- Broad/Valley Street and Westlake Avenue
- Mercer Street and 5th Avenue
- Mercer Street and Dexter Avenue (AM only)
- Roy Street and 5th Avenue
- Harrison Street and Dexter Avenue (AM only)

Delay increases at these intersections and other locations can be attributed to several factors ranging from reconfiguration of key arterials (lane geometry revisions) to changes in traffic patterns that take advantage of the enhanced street grid. The reconfiguration of Mercer Street and Westlake and Ninth Avenues from one-way to two-way operation would dramatically change the associated traffic patterns, volumes, signal timing characteristics, and progression quality for these streets. The two-way configuration would allow for easier, more direct access within and through the area, reducing travel distances and turning movements, but the improved access associated with the two-way configuration can result in increases in average delay at major intersections. With two-way operations, more complex signal timing patterns would be required to ensure reasonable one-way progression

particularly during heavy commute-period traffic conditions where a specific direction is emphasized (e.g. eastbound direction on Mercer Street during the PM peak).

The intersection of Mercer Street and Fifth Avenue would likely experience a higher delay with the Recommended Scenario. Level of Service at this intersection would degrade from B to E in the AM peak and from D to F in the PM peak. With the removal of Broad Street, this intersection will have westbound left turns conflicting with the eastbound movement on Mercer Street. The Thomas Street overpass at Aurora will accommodate some of the traffic that would otherwise use Broad Street, but a significant share is expected to use the new westbound route on Mercer. The Sixth Avenue connection over Mercer Street and a new connection at Mercer and Taylor will also help reduce traffic demand at Mercer and Fifth, and the full effect of these improvements may not be reflected in the forecasted volumes at this intersection. Additional crossing options on Aurora Avenue N. would also help relieve pressure at the Fifth and Mercer intersection.

In addition, the intersection of Broad Street at Fifth Avenue N. shows an increase in delay for the two-way Mercer scenario, likely due to the reconfiguration of the intersection and the signal connection to Fifth Avenue at Thomas Street. Both signals (Fifth/Broad and Fifth/Thomas) are assumed to operate on a single controller due to their close spacing. Additional analysis and design work in this area should continue with the AWV and Mercer Corridor Projects to help improve operations at this and the Mercer/Fifth intersections.

Two intersections that show a reduction in delay during the PM peak hour are Mercer Street at Dexter Avenue, and Harrison Street at Fairview Avenue. The intersection of Mercer Street at Dexter Avenue shows a reduction in overall delay primarily due to removal of the existing Aurora Avenue off-ramp approach (NW direction) and corresponding changes to the signal-phasing pattern. Delay reductions, at the intersection of Harrison Street and Fairview Avenue, result from removing the left-turn movement from Fairview Avenue onto Harrison Street, and the simplification of the signal operations as a result.

While more of the individual intersections analyzed for both the AM and PM peak hours are expected to experience some increase in delay with the Recommended Scenario in comparison to the Future Baseline Scenario, operational conditions system-wide (as indicated by the system average delay index) are expected to be relatively similar. The average system delay is an indicator of the average delay per vehicle traveling through the study area, incorporating the delays at the intersections listed in Table 8.2, as well as at other intersections. In the AM peak hour, the overall network average delay for the Recommended Scenario is slightly higher (7.2 minutes) than the Future Baseline Scenario (7.1 minutes), while in the PM peak hour, the overall network average delay for the Recommended Scenario is slightly lower (7.8 minutes) than the Future Baseline Scenario (8.0 minutes). Thus, while the average delays at some of the key intersections are projected to increase, the overall delay experienced within the study area is virtually unchanged between the Future Baseline and Recommended Scenarios.

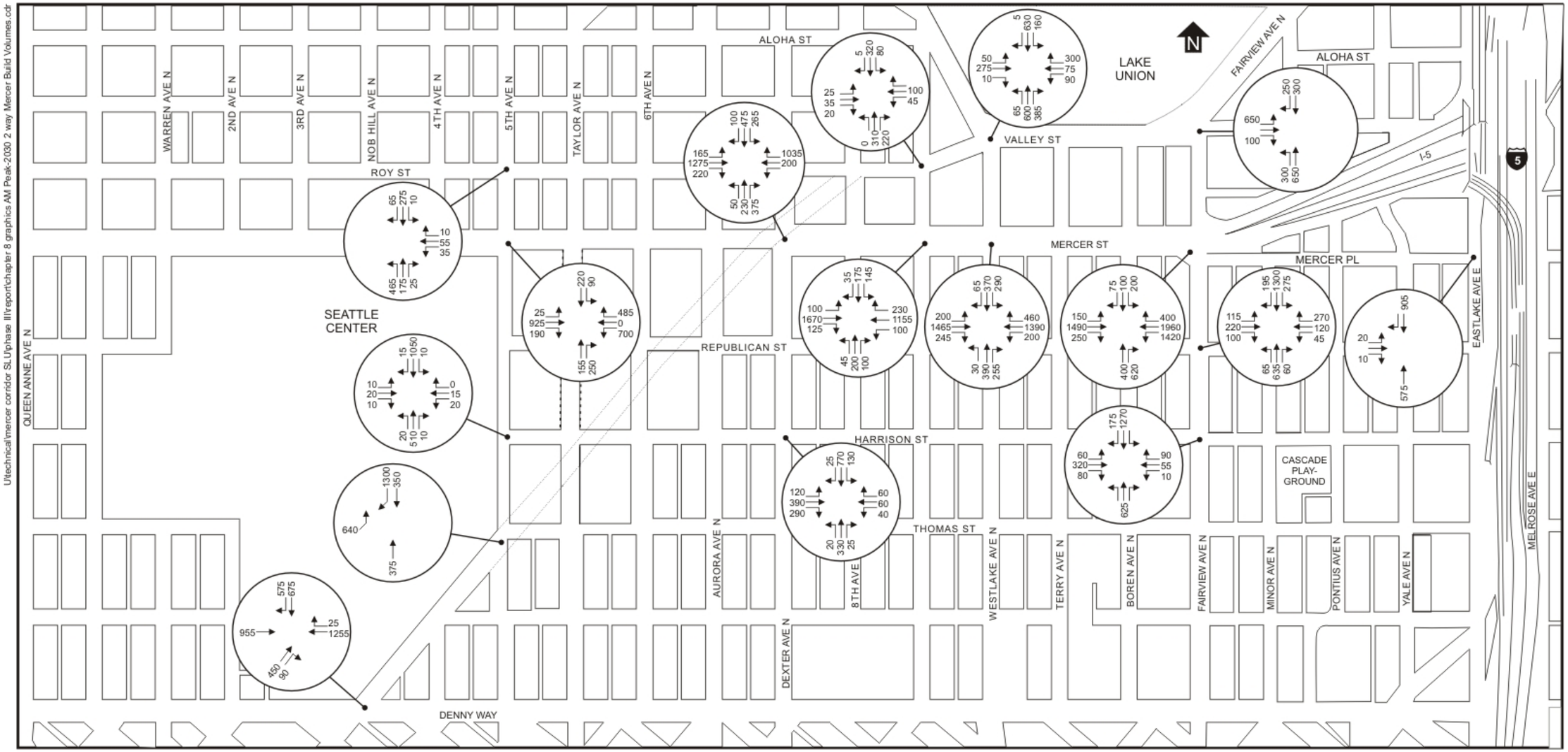


Figure 8.14: South Lake Union – 2030 Recommended Build Scenario AM Peak-Hour Intersection Volumes

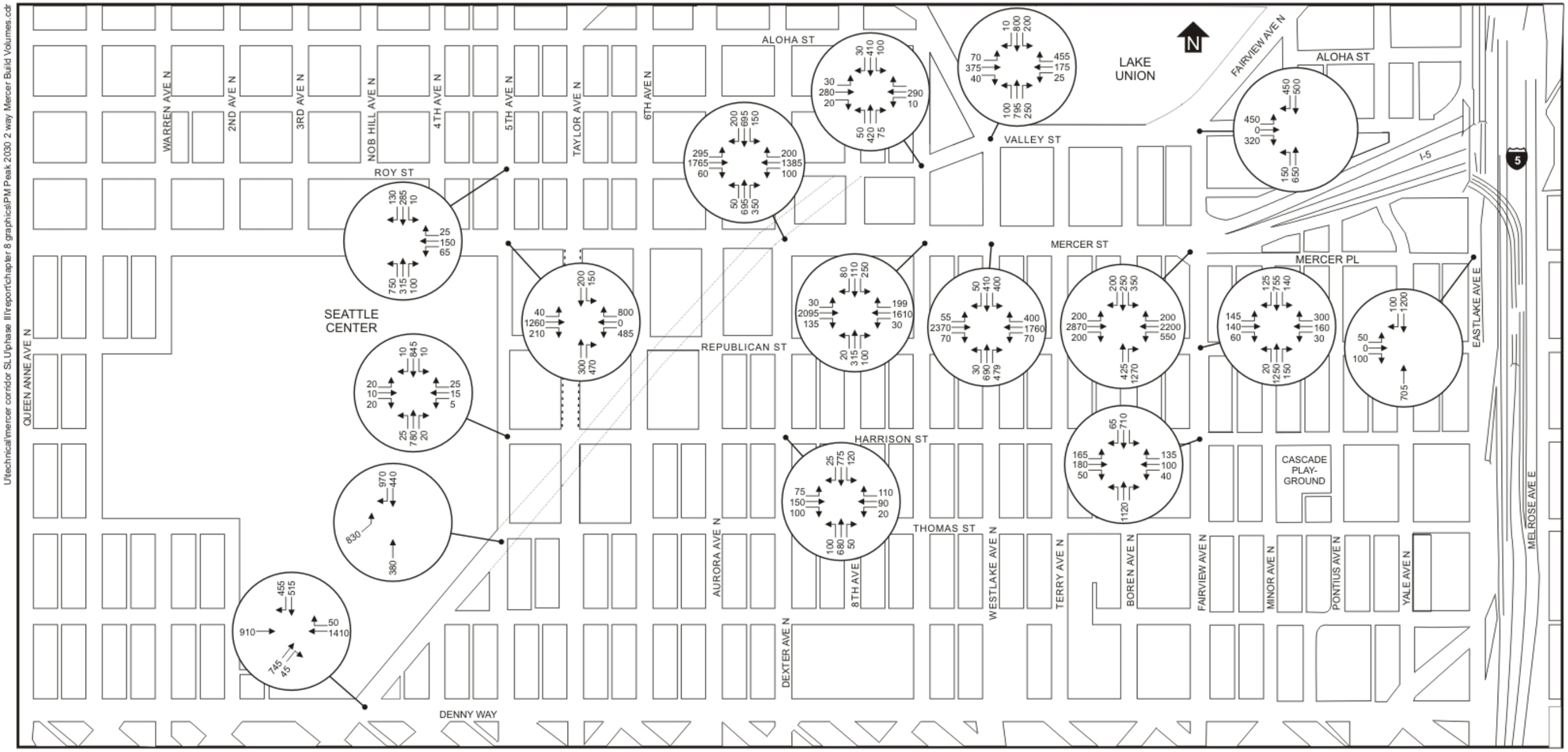


Figure 8.15: South Lake Union – 2030 Recommended Build Scenario PM Peak-Hour Intersection Volumes

Table 8.2: AM and PM Peak Hour 2030 Future Baseline and Recommended Scenario Delay and LOS Summary

ID	Cross Street 1	Cross Street 2	2030 Future Baseline				2030 Recommended Scenario			
			AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
9	Mercer Street	Westlake Avenue	33.4	C	37.6	D	34.0	C	52.6	D
10	Broad/Valley St	Westlake Avenue	12.2	B	25.6	C	57.5	E	62.7	E
14	Mercer Street	Fairview Avenue	57.9	E	53.8	D	50.3	D	58.0	E
17	Valley Street	Fairview Avenue	21.8	C	22.3	C	53.7	D	28.1	C
18	Fairview Avenue	I-5 Off-Ramp	6.6	A	10.2	B	---	---	---	---
27	Harrison Street	Fairview Avenue	13.3	B	52.6	D	13.6	B	74.8	E
28	5th Avenue	Broad Street	20.9	C	33.2	C	39.2	D	51.2	D
31	Roy Street	9th Avenue	39.3	D	43.7	D	59.8	E	60.0	E
32	Mercer Street	9th Avenue	26.7	C	29.1	C	42.4	D	44.8	D
36	Mercer Street	Dexter Avenue	59.0	E	>120	F	97.3	F	109.7	F
39	Harrison Street	Dexter Avenue	16.1	B	11.1	B	>100	F	18.6	B
57	Mercer Street	5th Avenue	26.1	C	44.3	D	63.6	E	83.6	F
58	Roy Street	5th Avenue	23.4	C	18.2	B	69.0	E	80.2	F
62	Harrison Street	5th Avenue	8.5	A	24.3	C	7.4	A	40.7	D
63	Harrison Street	Broad Street	7.6	A	11.0	B	---	---	---	---
65	Mercer Street	Eastlake Avenue	7.5	A	16.3	B	2.0	A	10.0	A
66	Denny Way	Broad Street	15.7	B	31.2	C	16.7	B	64.5	E
203	Republican Street	Fairview Avenue	29.8	C	59.1	E	30.0	C	66.6	E
Total Network Delay (sec/veh)			**424.6**		**478.5**		**433.4**		**469.5**	

Note: Total Network Average Delay is a weighted average delay per vehicle for all intersections in the study area (beyond those listed in the table). Delays reported from SimTraffic microsimulation analysis (Synchro/SimTraffic V5 Build 323)

Travel Time Summaries

Travel time estimates along a given route are another way of comparing the traffic operations performance of the Recommended Scenario to the Future Baseline Scenario. The travel time estimates incorporate the delays at each intersection along a given route, along with the distance traveled to provide a more comprehensive measurement of the travel experience, compared to looking at individual intersections. As described in this section, the Recommended Scenario is projected to result in improved travel times for two key routes – between I-5 and the north side of Seattle Center and between I-5 and the west side of Lake Union (Westlake and Aloha). Table 8.3 summarizes the Recommended Scenario AM and PM peak-hour travel times for key routes in the study area. In addition, Figures 8.16, 8.17, 8.18, and 8.19 show the actual travel paths and associated travel times for key routes in the study area as compared to the Future Baseline scenario.

During the AM peak hour, the following travel routes experience a decrease in travel time:

- WB – I-5 to North Side Seattle Center
- EB – North Side Seattle Center to I-5
- WB – I-5 to Westlake (via Westlake)
- EB – Westlake to I-5 - via 9th
- SB – Fairview Avenue
- NB – Dexter Avenue

During the PM peak hour, the following travel routes experience a decrease in travel time:

- EB – North Side Seattle Center to Fairview Avenue north of Valley Street
- EB – North Side Seattle Center to I-5
- EB – Westlake to I-5 - via 9th
- NB – Fairview Avenue
- SB – Fairview Avenue
- WB – I-5 to North Side Seattle Center
- WB – Fairview Avenue north of Valley Street to North Side Seattle Center

Table 8.3: 2030 PM Peak Hour Travel Time Estimates for No Build and Build Scenarios

	Path ID	Travel Path	2030 No-Build AM	2030 No-Build PM	2030 Build AM	2030 Build PM
East-West Routes	1	WB - I-5 to North Side Seattle Center	7.9 min	8.2 min	6.2 min	6.6 min
	2	EB – North Side Seattle Center to I-5	8.0 min	11.7 min	7.8 min	11.7 min
	3	WB - I-5 to South Side Seattle Center	6.4 min	5.8 min	8.0 min	7.6 min
	4	EB – South Side Seattle Center to I-5	7.6 min	7.9 min	10.9 min	20.4 min
	5	WB – Eastlake to North Side Seattle Center	6.1 min	6.6 min	7.1 min	5.9 min
	6	EB – North Side Seattle Center to Eastlake	5.4 min	9.7 min	8.6 min	13.2 min
	7	WB - I-5 to Westlake - *via Westlake*	4.0 min	3.3 min	*Westlake* 3.2 min	*Westlake* 4.2 min
		via 9th	n/a	n/a	*9th* 5.3 min	*9th* 6.4 min
	8	EB – Westlake to I-5 - *via 9th*	7.8 min	11.8 min	*9th* 5.2 min	*9th* 5.5 min
		via Westlake	n/a	n/a	*Westlake* 4.3 min	*Westlake* 6.8 min

	Path ID	Travel Path	2030 No-Build AM	2030 No-Build PM	2030 Build AM	2030 Build PM
North-South Routes	1	NB – Fairview Avenue	3.9 min	8.5 min	5.1 min	8.8 min
	2	SB – Fairview Avenue	8.0 min	10.1 min	5.5 min	3.8 min
	3	NB – Westlake Avenue	5.3 min	6.8 min	6.3 min	12.0 min
	3a	SB – Westlake Avenue		n/a	8.7 min	9.8 min
	4	SB - 9th Avenue	7.6 min	11.9 min	8.7 min	11.6 min
	4a	NB - 9th Avenue		n/a	9.0 min	10.8 min
	5	NB - Dexter Avenue	4.8 min	3.2 min	4.5 min	4.8 min
	6	SB - Dexter Avenue	4.4 min	5.3 min	5.6 min	6.0 min
	7	WB – Eastlake to South Side Seattle Center	4.6 min	4.2 min	8.8 min	6.9 min
	8	EB – South Side Seattle Center to Eastlake	3.9 min	5.1 min	11.6 min	21.9 min

System-wide Average Delay per Vehicle	425 secs (7.1 min)	479 secs (8.0 min)	433 secs (7.2 min)	470 secs (7.8 min)

Ramp Queue Delay at I-5 & Fairview (WB)	100 secs (1.7 min)	83 secs (1.4 min)	69 secs (1.1 min)	86 secs (1.4 min)

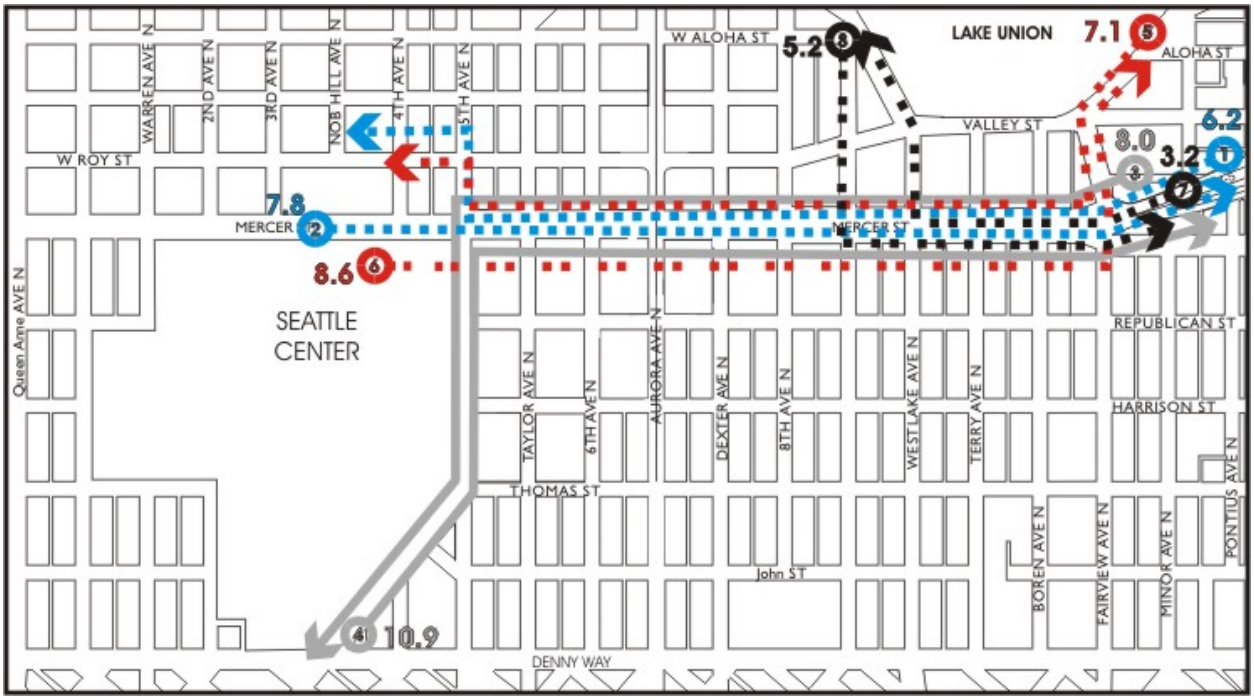


Figure 8.16: 2030 Recommended Improvement Scenario: East/West AM Peak-Hour Travel Times

Figure 8.17: 2030 Recommended Improvement Scenario: North/South AM Peak-Hour Travel Times

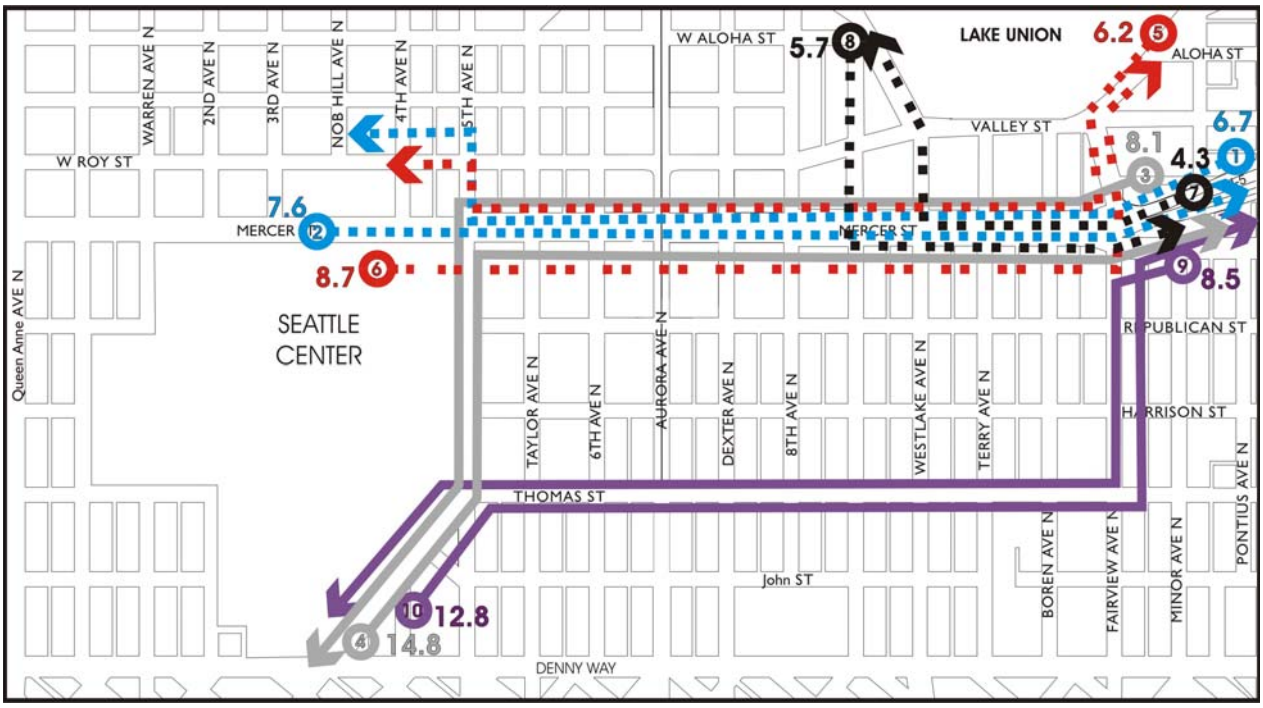


Figure 8.18: 2030 Recommended Improvement Scenario: East/West PM Peak Travel Time Path Summaries

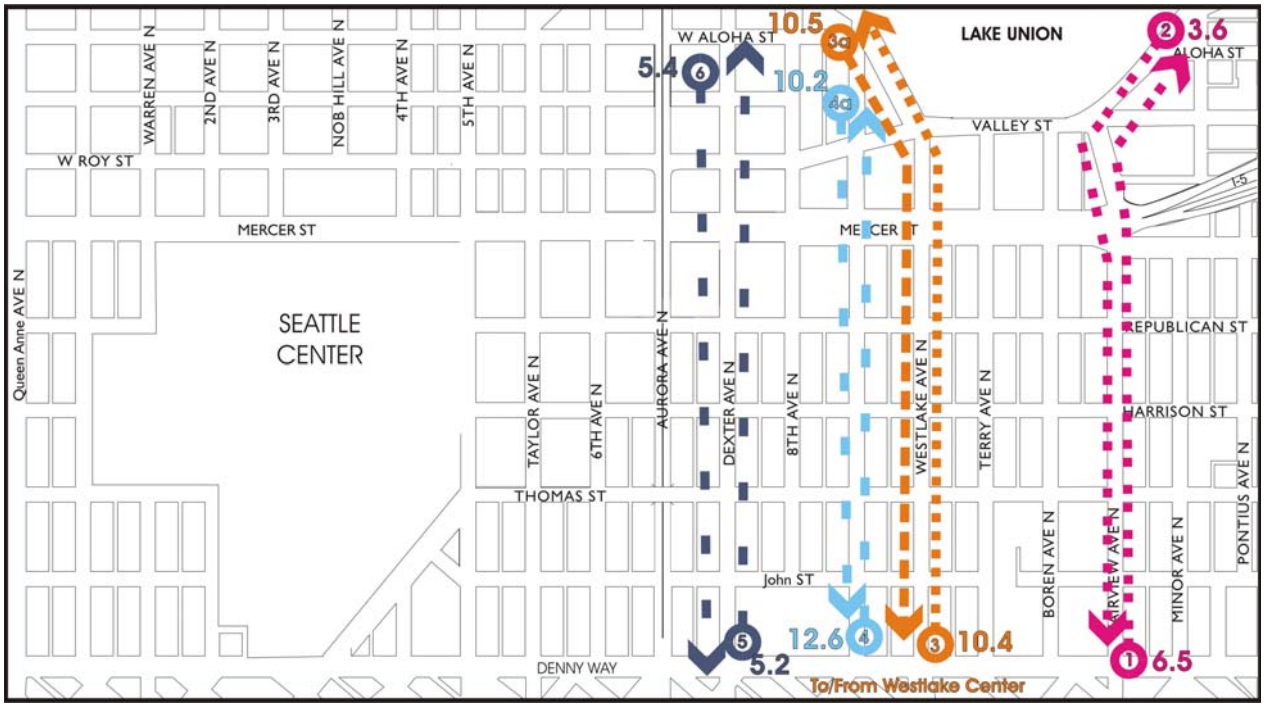


Figure 8.19: 2030 Recommended Improvement Scenario: North/South PM Peak Travel Time Path Summaries

Compared to the Future Baseline scenario during the AM peak hour, the following travel routes experience an increase in travel time:

- EB – North Side Seattle Center to Fairview Avenue north of Valley Street
- NB – Fairview Avenue
- WB – Fairview Avenue north of Valley Street to North Side Seattle Center
- EB – South side Seattle Center to Fairview Avenue north of Valley Street
- EB – South side Seattle Center to I-5
- NB – Westlake Avenue
- SB – 9th Avenue
- SB – Dexter Avenue
- WB – Fairview Avenue north of Valley Street to South side Seattle Center
- WB – I-5 to south side Seattle Center

Compared to the Future Baseline scenario, the following travel routes experience an increase in travel time during the PM peak hour:

- EB – South side Seattle Center to Fairview Avenue north of Valley Street
- EB – South side Seattle Center to I-5
- NB – Dexter Avenue
- NB – Westlake Avenue
- SB – 9th Avenue
- SB – Dexter Avenue
- WB – Fairview Avenue north of Valley Street to South side Seattle Center
- WB – I-5 to South side Seattle Center
- WB – I-5 to Westlake Avenue (via Westlake Avenue)

Overall, east/west travel times between the north side of Seattle Center and either I-5 or the Eastlake community are moderately reduced with the Recommended Scenario, due to the provision of a direct westbound route and an emphasis on eastbound traffic flow in the signal coordination. Optimization of the eastbound direction was performed to maximize the capacity of the heaviest traffic stream on Mercer Street during the PM peak-hour period. However, travel times to and from the south side of Seattle Center increase considerably, most likely due to the elimination of the Broad Street diagonal route which today provides a more direct path to/from the Eastlake community and Mercer Street via the intersection of Fairview and Valley.

Travel time on Fairview Avenue decreases primarily due to the reconfiguration of lane striping in the northbound direction to provide a more conventional NB through lane at Mercer Street (as opposed to a through pocket in the No-Action scenario) as well as retiming of the Fairview Avenue signals to utilize the more efficient lane geometry. Also, removal of parking in the SB direction increased capacity from Mercer Street to Thomas Street.

Eastbound travel times from Westlake Avenue at Aloha Street to I-5 via either Ninth Avenue or Westlake Avenue also decrease considerably due to the dilution of southbound to eastbound left turn movements to two routes (Ninth Avenue and Westlake Avenue) vs. concentrating all movements to Ninth Avenue only and the removal of conflicting traffic

from Broad Street. This approach effectively minimized the amount of green time needed for traffic entering Mercer Street due to the "split" in left turn volume.

Summary of Traffic Operations

The Recommended Scenario provides a number of traffic operational benefits for the SLU area while basically maintaining a comparable level-of-service for overall traffic movements. A two-way Mercer Street will provide better access within SLU as well as a more direct connection (particularly westbound) across Aurora Avenue N. to the north side of Seattle Center and the Queen Anne neighborhood, improving way-finding and street legibility. The conversion of Westlake Avenue N. and Ninth Avenue N. from one-way to two-way streets, likewise, is expected to improve local access and circulation within SLU, without compromising operations for through traffic. Overall, the major east-west and north-south routes are expected to experience similar or better travel times, except for the routes that previously would have used Broad Street (i.e., routes from the south side of the Seattle Center to either the Eastlake community or I-5 at Mercer Street).

Traffic operations is only one way of measuring the performance of the transportation system. This study also focused on a number of other transportation objectives such as improving the pedestrian and bicycle connections, improving transit mobility and accessibility, and facilitating access to open space. An overarching objective of this study was to develop a system that would successfully facilitate the improvement of these alternate modes of travel, while maintaining automobile traffic operations. The design of the roadway system needs to be balanced with these other objectives; in fact, most of the recommendations for the arterial street system are necessary to achieve these objectives.

Benefits of the Recommended Improvement Scenario

The Recommended Scenario for the SLU area was developed through many months of technical analyses as well as interaction with and feedback from the area stakeholders. This report documents this process, and in so doing outlines many of the anticipated benefits of the recommendations. The primary benefits of the Recommended Scenario for the SLU area can be summarized as follows:

- Provides better access and mobility for people and goods throughout South Lake Union with easier, more direct connections via the two-way street grid
- Improves safety and mobility for pedestrians and bicyclists in the Mercer Corridor
- Provides new and improved connection for all modes between SLU and Queen Anne, Downtown, and Capitol Hill
- Represents an overall improvement to regional access for all modes
- Provides direct east-west and north-south freight connections within and through South Lake Union
- Enhances SLU neighborhood livability and economic vitality

While the existing system is focused on pushing as many vehicles through the neighborhood as quickly as possible, the Recommended Scenario maintains or improves these inter-neighborhood connections while also better serving the South Lake Union neighborhood.

Conceptual Cost Estimates

The conceptual cost estimates for the South Lake Union Transportation Study improvement alternatives were assembled on an individual pay item basis in accordance with the written description of the alternative. Because the improvement alternatives are currently at a conceptual design level, the estimates utilize a range of contingencies with the understanding that these monies are likely required for each project, but as the level of design becomes more specific, individual project allocations will change based on better project understanding and more detailed design.

Once pay items were identified, a limited number of sources were used to assign costs. These sources were: WSDOT UBA (Unit Bid Analysis), COS UBP (Unit Bid Price) PB Civil Group Cost resources, PB Traffic Group cost resources, the Alaskan Way Viaduct and Seawall Replacement Project (AWVSRP) estimates, and R.S. Means Heavy Construction Cost Data 2003. In addition, pay items for which our sources yielded a variety of figures, were reviewed by the study team and assigned a reasonable cost.

Mobilization was the only pay item within the raw cost or "above the line" estimate that used a percentage of the total and was 10 percent for all estimates. Mobilization covers contractor setup costs such as hiring of sub-contractors and preparation of the site. After identifying the raw cost, one of four multipliers was used to cover taxes, engineering, and general contingency. A smaller multiplier was used for smaller projects and a larger multiplier was used for larger or more complex projects. This was because smaller projects typically had a higher level of design at the time of the estimate, compared with larger projects for which the same level of necessary raw cost pay items had not yet been identified. All costs were calculated in year 2004 dollars.

In two cases conceptual cost estimates were developed that deviated from the described methodology. This was in the case of the Two-Way Mercer Street/Narrow Valley Street, Roy Street Underpass/Fairview Avenue N. and Valley Street realignment estimates. The Two-Way Mercer Street/Narrow Valley Street estimates were developed as part of the South Lake Union Phase II work and were developed in accordance with cost estimating procedures used for the AWVSRP. Costs for the Two-Way Mercer/Narrow Valley Street estimate were completed with a high and a low range and are shown in Table 8.4.

Costs for the Roy Underpass and the Fairview Avenue/Valley Street realignment were estimated and documented previously in the South Lake Union Transportation Improvements Project Final Report, July 2002. These two estimates were analyzed for reasonableness and given a 3 percent annual escalation over two years to bring the raw costs up to year 2004 costs prior to the application of a multiplier.

Finally, conceptual cost estimates for AWVSRP concepts were received directly from the AWVSRP team. Cost estimates for the AWVSRP items are in year 2002 dollars (as noted) and include contingencies, however, they do not include costs associated with the implementation of a flexible transportation program (unlike other AWVSRP cost estimates) and are more representative of a stand alone project.

Table 8.4 details the conceptual cost estimates developed for the proposed elements of the recommended improvement scenario. The low and high range in Table 8.4 applies only to the Two-Way Mercer/Narrow Valley concepts. All other improvements have a single cost estimate. Appendix B contains the build-up for raw cost estimates, associated unit costs and source data.

As developed, the total conceptual cost estimate for the Recommended Improvement Scenario is approximately $245 to $258 million for the entire study area. Of that total, $131 to $144 million is for projects within South Lake Union. The remaining cost is divided among the following: connections across Aurora (AWVSRP), building the street grid west of Aurora Avenue/SR 99, pedestrian and bicycle connection on the eastern edge of the study area, and a share of the streetcar and new trolley route in adjacent areas served by those routes (Denny Triangle for the Streetcar; Uptown and North Capitol Hill for the trolley route).

Table 8.4: Conceptual Cost Estimates for Recommended Improvement Scenario

AUTO TRAFFIC CONCEPTS	COST COMMENTS	CONCEPTUAL COST ESTIMATE (2004 dollars)
Two-Way Mercer/Narrow Valley		
Mercer from Fairview to Dexter Avenue - 2-Way (currently eastbound only with westbound traffic using Valley/Broad), 6 lanes plus median & left-turn lanes; 4th eastbound lane between Boren and Fairview Avenues (approach to I-5). Phase II cost estimates were completed as a range (low and high), the SLU Transportation Study chose to use the high range.	Cost estimates completed as part of the previous SLU Transp. Study Phase II work.	$65,000,000 - $74,000,000
Mercer from Dexter to 5th Avenue - 2-Way (currently eastbound only with westbound traffic using Broad), 6 lanes plus median & left-turn lanes (includes widened Mercer Street underpass)	AWVSRP (2002 dollars) Modify Mercer Street (and underpass) from Dexter to 5th to include 6 lanes, a median, left-turn lanes, and pedestrian/bike facilities (city owned property/right-of-way is needed for the widening, no costs have been included for this).	$23,000,000
Valley St From Fairview to Westlake - 2-lane w/ left turn lanes and bike lanes. Phase II cost estimates were completed as a range (low and high), the SLU Transportation Study chose to use the high range.	Cost estimates completed as part of the previous SLU Transp. Study Phase II work.	$17,000,000 - $21,000,000
Roy Street from Westlake to Dexter - rebuild as 2-way (currenly wb only), 2 lanes plus left-turn lanes and bike lanes (continuity with Valley Street east of Westlake) & 8th Ave between Mercer and Roy - new street	Rebuild Roy after Broad Street removal to accommodate one 11' lane in each direction, two 8' parking lanes, an 11' turn-lane, 20' LTB Trail/sidewalk, two 5' bike lanes and one 10' sidewalk and rebuild 8th (one 12' lane in each direction and one 8' parking lane in each direction and 16' sidewalks) between Mercer and Roy Streets.	$2,420,000
Broad St from 5th Ave to 9th Ave - Remove and fill to re-create street grid east and west of Aurora Avenue	AWVSRP (2002 dollars) Demolition of existing structure at Broad and remove existing bridge over Broad Street, fill in Broad from 5th to 8th St, resurfacing of affected portion of Mercer Street, connect Harrison from Taylor to 6th at grade two lanes, connect Taylor from Thomas to Harrison, and connect Thomas from 5th to 6th Avenues.	$30,000,000
Dexter Avenue and Republican Street - Signal	Addition of a signal and associated striping.	$250,000
Mercer/Fairview/I-5 Ramps		
Fairview Avenue NB approach to I-5 - add NB left-turn pocket at Mercer Street (with 2-way Mercer) and NB right-turn lane (approx. 1/2 way between Harrison & Republican), and improve signage on NB Fairview Avenue approach to I-5 on ramps.		$430,000
Reconfigure on-ramp approach to accommodate all four lanes of traffic from Mercer (part of Two-way Mercer project)	Included with 2-Way Mercer	
New Connections Across Aurora		
Thomas Street from Sixth to Dexter - Overpass of SR-99 (Optional: Harrison instead of Thomas)	AWVSRP (2002 dollars) Cost estimate is for a 40' structure, estimated by AWVSRP. The SLU Study Team recommends increasing the structure width to 50' in order to include bike lanes. The conceptual cost estimate is likely to accommodate the increase, but selection of Thomas or Harrison Street is not yet clear and additional clarification/design is required (does not include right-of-way costs).	$21,000,000
Thomas St from Fairview to 5th Ave - Add center left-turn lane (Optional: Harrison instead of Thomas)	Re-stripe 2400' from 2 lanes to 2 thru lanes with left-turn pockets and arrows and 3 new signals	$750,000
Mercer - Widen underpass across Aurora (part of Mercer Dexter to 5th)	Included with Widen Mercer	

Table 8.4 (continued)
Conceptual Cost Estimates for Recommended Improvement Scenario

AUTO TRAFFIC CONCEPTS	COST COMMENTS	CONCEPTUAL COST ESTIMATE (2004 dollars)
Build Street Grid West of Aurora - Part of Alaskan Way Viaduct Project		
6th Ave from Roy to Harrison - overpass of Mercer St to provide new N-S arterial connection from Queen Anne to Denny Way.	Structure is assumed to be 52' (two 12' travel lanes, two 8' sidewalks, two 4' bike lanes and 2' of retaining-wall/structure) wide and 550' long. Surface street is 1 lane in each direction (12' wide), an 8' parking lane in each direction, and 10' sidewalks in each direction and 500' long.	$13,500,000
Taylor Ave - Signal at Mercer and extend Taylor Ave from Mercer to Harrison St.	66' cross-section (SB 8' sidewalk, 8' pkg, 5' bike, 12' travel, NB 12' travel, 5' bike 8' pkg, 8' sidewalk) for 1100'	$1,700,000
Republican from Aurora to 5th Ave N - new 2-lane street	60' cross-section (EB 10' sidewalk, 8' pkg, 12' travel, WB 12' travel, 8' pkg, 10' sidewalk) for 850'	$1,020,000
Two-way traffic on 9th and Westlake		
Westlake Ave (4-5 lanes) and 9th Ave (3-lanes) from Aloha St to Denny - Two-way from Aloha to Denny (currently 4 lanes nb on Westlake and 3 lanes sb on 9th)		$835,000
Eastlake Avenue		
Eastlake near Denny - add SB U-turn for access to northbound I-5 express lanes.	Signal and 4 lane stripes over 150 feet.	$250,000
Eastlake & Thomas - Signal		$250,000
Eastlake & Republican - Signal		$250,000

BICYCLE CONCEPTS	COMMENTS	CONCEPTUAL COST ESTIMATE (2004 dollars)
Improve Around-the-Lake Bike Facilities		
Fairview between Eastlake Ave and Valley St - add bike lanes by rerstriping from 4/5 to 3 lanes (includes signal at Yale Ave).	Restripe Fairview from a 5 to a 3 lane roadway with bike lanes in each direction for 12,000'	$275,000
Fairview and Fairview (near Eastlake) - modify intersection for bike/ped access and safety	Modify intersection striping, lane channelization and signage	$1,200,000
Bike Routes		
Sign Lakeview Boulevard (across I-5) as a Bicycle Route	Install 5 bike route signs (2'x2' wood on 4"x4" post)	$1,000
Sign bike route on Eastlake Avenue E (E Garfield to Denny) for bicycle commuters.	Install 10 bike route signs (2'x2' wood on 4"x4" post)	$2,000
Sign bike-routes on streets noted as "commonly used" in the SDOT Bicycle Guide Map	Install 30 2'x2' signs	$6,000
Maintain/Improve Dexter as a north/south bicycle corridor		
Sign bike route from Dexter bike lanes to 2nd Avenue bike lanes and proposed bike lanes on 4th Avenue (Center City Circulation Report) via Blanchard & Bell	11 city blocks on 2 different streets (Battery and Bell) for a total of approximately 10 signs	$2,000
Improve bicycle connections across SR 99/Aurora		
Incorporate Lake-to-Bay Trail concepts into the Mercer Corridor Project (costs include trail facilities from Dexter & Mercer to 5th & Thomas. Other costs included with Two-Way Mercer/Narrow Valley).	Construct Lake-to-Bay Trail from Mercer & Dexter to 5th & Thomas as part of the proposed AWV Widen Mercer Underpass Option.	$760,000

Table 8.4 (continued)
Conceptual Cost Estimates for Recommended Improvement Scenario

PEDESTRIAN CONCEPTS	COMMENTS	CONCEPTUAL COST ESTIMATE (2004 dollars)
Terry Avenue N Design - Pedestrian improvements (sidewalk on west side, curbless pedestrian space on east side), remove railroad tracks.	As frontage improvements with development	N/A
Eighth Avenue - Pedestrian street	As frontage improvements with development	N/A
Cascade Neighborhood Pedestrian Improvements		
Repair and improve sidewalks throughout South Lake Union.	Assumed included in existing SDOT sidewalk maint. & repair budget	
Thomas & Harrison between Fairview and Eastlake - Address uncontrolled intersections and traffic to provide consistent traffic control and improved pedestrian crossings (up to 16 stop signs)	Assume up to 16 stop signs at $300/sign and associated striping	$8,000
Harrison, Minor & Pontius around Cascade Park - widen sidewalks	Widen 2 block faces at 400' and 1 block face at 300' by 2' of sidewalk.	$140,000
Harrison Street - Wider sidewalks and curb bulbs	Incl. In "Sidewalks and Curb Bulbs" (below)	
Thomas Street - curb bulbs	Incl. In "Sidewalks and Curb Bulbs" (below)	
Sidewalks and Curb Bulbs		
Harrison Street, between Yale and Dexter - widen sidewalks	Widen north & south sidewalks by 2 feet -- reducing travel lanes from 14' to 12'.	$1,910,000
Harrison between Yale and Dexter Avenues - curb bulbs on all 4 corners	A total of 35 full curb bulbs and 5 half bulbs.	$1,300,000
Thomas between Yale and Dexter Avenues - curb bulbs on all 4 corners	A total of 17 full curb bulbs and 9 half bulbs.	$810,000
John at Fairview & Westlake - curb bulbs on all 4 corners	A total of 4 full curb bulbs and 4 half bulbs.	$240,000
Republican at Fairview, Terry, Westlake & Dexter - curb bulbs on all 4 corners	A total of 7 full curb bulbs and 8 half bulbs.	$450,000
Eastlake at Aloha - curb bulb on Eastlake Avenue E at Aloha Street (possible crosswalk striping)	A total of 2 half bulbs	$54,000
Improve Denny Way Pedestrian Environment and Crossing of I-5		
Denny Way I-5 crossing - add 10' sidewalk		$2,750,000
Denny between Stewart and Dexter Avenue - Add curb bulb-outs and countdown signals at signalized intersections	Install countdown signals on Denny and curb bulbs on five side-street crossings.	$580,000

Table 8.4 (continued)
Conceptual Cost Estimates for Recommended Improvement Scenario

TRANSIT CONCEPTS	COMMENTS	CONCEPTUAL COST ESTIMATE (2004 dollars)
Transit emphasis/transit priority street on Fairview Ave N		
Fairview Avenue at Denny Way - add NB & SB Transit Signal Priority (TSP).	TSP hardware for NB & SB operations	$110,000
Fairview Avenue at Harrison Street - NB queue jump and SB TSP	TSP hardware for NB & SB operations	$110,000
Fairview Avenue at Mercer Street - NB and SB TSP.	TSP hardware for NB & SB operations	$110,000
Fairview Avenue at Valley Street - NB and SB TSP	TSP hardware for NB & SB operations	$110,000
SLU Streetcar (Westlake Center to FHCRC (Yale Ave) on Westlake via Westlake/Valley/Terry.)	Streetcar Study	$45,000,000
New Bus Route (Trolley or Other Electric Technology) Uptown to N. Capitol Hill via Mercer or Republican	Trolley wire and infrastructure for New route from Queen Anne & Mercer to Broadway/10th & Belmont via Republican & Lakeway. Does not include O&M costs	$11,700,000
Bus Shelters		
Install transit bus shelters along bus routes in study area (9)	Install a total of 9 shelters at approximately $18,000/shelter	$165,000
Include appropriate lighting at shelters	Assume 2 lights at $2,000 each (includes material and labor)	$70,000
Total Cost - Capital (rounded to nearest $100K)		**$245,518,000 - $258,518,000**
Area / Project Allocation		
Alaskan Way Viaduct Project Total (Mercer: Dexter-Fifth, Thomas Over, Broad)		**$74,000,000**
West Total (Street Grid West of Aurora, 35% of Uptown-N Capitol Hill Trolley)		**$20,315,000**
East Total (Fairview/Fairview Bike/Ped, Denny Sidewalk over I-5, 25% of Uptonw-N Capitol Hill Trolley)		**$6,875,000**
South/Denny Triangle (30% of Streetcar)		**$13,500,000**
South Lake Union Total		**$130,578,000 - $143,828,000**

Because many of the recommendations provide benefits to more than one mode, the SLU project team determined the modal breakdown cost for each proposed project element. Modal breakdown costs were developed by determining the approximate amount of the total cost that is related to pedestrian, bicycle or traffic uses (e.g. sidewalks count towards pedestrian use, bike lanes count towards bicycle use, and parking or travel lanes count towards auto traffic use). The specific pedestrian, bicycle and transit project elements generally counted only towards those modes, except in the case of the Lake-to-Bay Trail, which was counted half towards pedestrian use and half to bicycle use. Table 8.5 details the modal breakdown of each project element of the Recommended Improvement Scenario.

Approximately one-half (or $125 million) of the conceptual infrastructure costs are for auto-related improvements; approximately 25 percent of the total cost (or $64 million) are related to pedestrian uses; roughly 22 percent of the conceptual cost is estimated to be for transit infrastructure; and approximately 5 percent (or $12 million) of the conceptual cost estimate is related to bicycle infrastructure.

Table 8.5: Modal Cost Breakdown by Project Element

AUTO TRAFFIC CONCEPTS	PEDESTRIAN	BICYCLE	TRAFFIC	TRANSIT
Two-Way Mercer/Narrow Valley				
Mercer from Fairview to Dexter Avenue - 2-Way (currently eastbound only with westbound traffic using Valley/Broad), 6 lanes plus median & left-turn lanes; 4th eastbound lane between Boren and Fairview Avenues (approach to I-5). Phase II cost estimates were completed as a range (low and high), the SLU Transportation Study chose to use the high range.	$ 21,300,000		$ 52,700,000	
Mercer from Dexter to 5th Avenue - 2-Way (currently eastbound only with westbound traffic using Broad), 6 lanes plus median & left-turn lanes (includes widened Mercer Street underpass)	$ 6,670,000		$ 16,330,000	
Valley St From Fairview to Westlake - 2-lane w/ left turn lanes and bike lanes. Phase II cost estimates were completed as a range (low and high), the SLU Transportation Study chose to use the high range.	$ 7,770,000	$ 2,520,000	$ 10,710,000	
Roy Street from Westlake to Dexter - rebuild as 2-way (currenly wb only), 2 lanes plus left-turn lanes and bike lanes (continuity with Valley Street east of Westlake) & 8th Ave between Mercer and Roy - new street	$ 726,000	$ 363,000	$ 1,331,000	
Broad St from 5th Ave to 9th Ave - Remove and fill to re-create street grid east and west of Aurora Avenue	$ 8,600,000		$ 21,400,000	
Dexter Avenue and Republican Street - Signal			$ 250,000	
Mercer/Fairview/I-5 Ramps				
Fairview Avenue NB approach to I-5 - add NB left-turn pocket at Mercer Street (with 2-way Mercer) and NB right-turn lane (approx. 1/2 way between Harrison & Republican), and improve signage on NB Fairview Avenue approach to I-5 on ramps.			$ 430,000	
Reconfigure on-ramp approach to accommodate all four lanes of traffic from Mercer (part of Two-way Mercer project)				
New Connections Across Aurora				
Thomas Street from Sixth to Dexter - Overpass of SR-99 (Optional: Harrison instead of Thomas)	$ 6,300,000	$ 4,200,000	$ 10,500,000	
Thomas St from Fairview to 5th Ave - Add center left-turn lane (Optional: Harrison instead of Thomas)			$ 750,000	
Mercer - Widen underpass across Aurora (part of Mercer Dexter to 5th)				

Table 8.5 (continued)
Modal Cost Breakdown by Project Element

AUTO TRAFFIC CONCEPTS	PEDESTRIAN	BICYCLE	TRAFFIC	TRANSIT
Build Street Grid West of Aurora - Part of Alaskan Way Viaduct Project				
6th Ave from Roy to Harrison - overpass of Mercer St to provide new N-S arterial connection from Queen Anne to Denny Way.	$ 4,050,000	$ 2,700,000	$ 6,750,000	
Taylor Ave - Signal at Mercer and extend Taylor Ave from Mercer to Harrison St.	$ 408,000	$ 255,000	$ 1,037,000	
Republican from Aurora to 5th Ave N - new 2-lane street	$ 340,000		$ 680,000	
Two-way traffic on 9th and Westlake				
Westlake Ave (4-5 lanes) and 9th Ave (3-lanes) from Aloha St to Denny - Two-way from Aloha to Denny (currently 4 lanes nb on Westlake and 3 lanes sb on 9th)			$ 835,000	
Eastlake Avenue				
Eastlake near Denny - add SB U-turn for access to northbound I-5 express lanes.			$ 250,000	
Eastlake & Thomas - Signal			$ 250,000	
Eastlake & Republican - Signal			$ 250,000	

BICYCLE CONCEPTS	PEDESTRIAN	BICYCLE	TRAFFIC	TRANSIT
Improve Around-the-Lake Bike Facilities				
Fairview between Eastlake Ave and Valley St - add bike lanes by rerstriping from 4/5 to 3 lanes (includes signal at Yale Ave).		$ 275,000		
Fairview and Fairview (near Eastlake) - modify intersection for bike/ped access and safety		$ 1,200,000		
Bike Routes		$ -		
Sign Lakeview Boulevard (across I-5) as a Bicycle Route		$ 1,000		
Sign bike route on Eastlake Avenue E (E Garfield to Denny) for bicycle commuters.		$ 2,000		
Sign bike-routes on streets noted as "commonly used" in the SDOT Bicycle Guide Map		$ 6,000		
Maintain/Improve Dexter as a north/south bicycle corridor		$ -		
Sign bike route from Dexter bike lanes to 2nd Avenue bike lanes and proposed bike lanes on 4th Avenue (Center City Circulation Report) via Blanchard & Bell		$ 2,000		
Improve bicycle connections across SR 99/Aurora				
Incorporate Lake-to-Bay Trail concepts into the Mercer Corridor Project (costs include trail facilities from Dexter & Mercer to 5th & Thomas. Other costs included with Two-Way Mercer/Narrow Valley).	$ -	$ 760,000		

Table 8.5 (continued)
Modal Cost Breakdown by Project Element

PEDESTRIAN CONCEPTS	PEDESTRIAN	BICYCLE	TRAFFIC	TRANSIT
Terry Avenue N Design - Pedestrian improvements (sidewalk on west side, curbless pedestrian space on east side), remove railroad tracks.				
Eighth Avenue - Pedestrian street				
Cascade Neighborhood Pedestrian Improvements				
Repair and improve sidewalks throughout South Lake Union.				
Thomas & Harrison between Fairview and Eastlake - Address uncontrolled intersections and traffic to provide consistent traffic control and improved pedestrian crossings (up to 16 stop signs)	$ 8,000			
Harrison, Minor & Pontius around Cascade Park - widen sidewalks	$ 140,000			
Harrison Street - Wider sidewalks and curb bulbs				
Thomas Street - curb bulbs				
Sidewalks and Curb Bulbs				
Harrison Street, between Yale and Dexter - widen sidewalks	$ 1,910,000			
Harrison between Yale and Dexter Avenues - curb bulbs on all 4 corners	$ 1,300,000			
Thomas between Yale and Dexter Avenues - curb bulbs on all 4 corners	$ 810,000			
John at Fairview & Westlake - curb bulbs on all 4 corners	$ 240,000			
Republican at Fairview, Terry, Westlake & Dexter - curb bulbs on all 4 corners	$ 450,000			
Eastlake at Aloha - curb bulb on Eastlake Avenue E at Aloha Street (possible crosswalk striping)	$ 54,000			
Improve Denny Way Pedestrian Environment and Crossing of I-5				
Denny Way I-5 crossing - add 10' sidewalk	$ 2,750,000			
Denny between Stewart and Dexter Avenue - Add curb bulb-outs and countdown signals at signalized intersections	$ 580,000			

TRANSIT CONCEPTS	PEDESTRIAN	BICYCLE	TRAFFIC	TRANSIT
Transit emphasis/transit priority street on Fairview Ave N				
Fairview Avenue at Denny Way - add NB & SB Transit Signal Priority (TSP).				$ 110,000
Fairview Avenue at Harrison Street - NB queue jump and SB TSP				$ 110,000
Fairview Avenue at Mercer Street - NB and SB TSP.				$ 110,000
Fairview Avenue at Valley Street - NB and SB TSP				$ 110,000
SLU Streetcar (Westlake Center to FHCRC (Yale Ave) on Westlake via Westlake/Valley/Terry.)				$ 45,000,000
New Bus Route (Trolley or Other Electric Technology) Uptown to N. Capitol Hill via Mercer or Republican				$ 11,700,000
Bus Shelters				
Install transit bus shelters along bus routes in study area (9)				$ 165,000
Include appropriate lighting at shelters				$ 70,000
Total Cost - Capital (rounded to nearest $100K)	**$64,400,000**	**$12,300,000**	**$124,500,000**	**$57,400,000**

Operating Costs for New or Enhanced Transit Routes

Working in conjunction with King County Metro, the SLU Transportation Study team developed annual bus and operating cost estimates for the proposed transit service improvements. Table 8.6 details the new transit route and service improvements recommended by the SLU Transportation Study.

Approximately 29 new buses would be required to provide the proposed service improvements recommended by the SLU Transportation Study. Annual bus costs were developed using an assumed 12 year life per transit coach at an assumed total cost of $530,000 per coach. Capital costs for the streetcar are included in Table 8.4 and are not repeated here. To estimate annual bus operating costs service hours were estimated using the following assumptions:

- 1 hour per round trip
- Peak hours - 4 hours/day, 15 minute headways
- Off peak hours - 15 hours/day, 30 minute headways
- Weekends – 1 trip every hour (60 minute headways)

The proposed improvements are grouped into near-term, mid-term and long-term strategies, since service improvements would be implemented over time as growth occurs in SLU, the Denny Triangle and adjacent neighborhoods. Implementation of transit service will be phased and coordinated with King County Metro. Specific service recommendations, especially in out years, could vary, but the table provides a general estimate of the likely costs over time.

The near-term service improvements include the SLU Streetcar, direct service from Northgate, increased frequency on the Route 8, and consolidating SLU-destined routes on downtown Streets. The estimated annual bus and operating cost for these service improvements is $3,020,000.

Mid-term service improvements include new service between North Capitol Hill and Uptown via Mercer or Republican and increased frequency on the SLU Streetcar and the Route 70. Note that frequency on the route 70 might not be increased if the streetcar is extended to the University District. The estimated annual bus and operating cost for the mid-term improvements would be an additional $4,550,000.

Long-term service improvements are represented here by direct service from three suburban park and ride lots. The total annual bus and operating cost for these routes would be $1,470,000, for a total of $9,040,000 for all service improvements in Table 8.6.

Table 8.6: Annual Bus Operating Costs

	Annual Bus Cost	Annual Service Hour Cost	Annual Operating Costs
Near-Term			**$ 3,020,000**
SLU Streetcar 15 minute headways*	$ -	$ 1,400,000	$ 1,400,000
Northgate park and ride direct service	$ 192,214	$ 408,000	$ 600,000
Re-route Downtown/SLU service	$ -	$ 240,000	$ 240,000
Increase frequency on Route 8	$ 96,106	$ 688,000	$ 780,000
Mid-Term (includes near-term)			**$ 7,570,000**
Increase SLU Streetcar frequency to 10 minute headways	$ -	$ 700,000	$ 700,000
Uptown-Capitol Hill Route	$ 384,426	$ 1,770,640	$ 2,160,000
Increase frequency on Route 70	$ 384,426	$ 1,304,000	$ 1,690,000
Long-Term (includes near and mid-term)			**$ 9,040,000**
Service to/from Star Lake park and ride	$ 192,214	$ 456,000	$ 650,000
Service to/from Burien park and ride	$ 192,214	$ 416,000	$ 610,000
Service to/from Issaquah and Eastgate park and ride	$ 48,054	$ 162,560	$ 210,000

*Streetcar capital costs are included in Table 8.4

Operating Costs for Travel Demand Management Programs

In addition to the recommended physical improvement and transit service costs, recommended TDM programs will require ongoing funding to make the most effective use of the improvements. Transportation demand management costs typically include staffing, office space, administrative costs and promotions for a small organization dedicated to TDM efforts. These organizations are typically financed through district wide assessments and seek additional financial support through grants. Total annual cost for an optimal TDM program in SLU is estimated to be $419,500.

Implementation Strategy

Table 8.7 outlines suggested implementation priorities for each of the individual improvement projects contained in the overall Recommended Scenario package. The priorities are listed as either immediate action, near-term, mid-term, or long-term. Funding availability could change the time-frame associated with specific projects.

Immediate action priorities are those that would provide positive benefits and have a high potential to be implemented with existing resources because of their low costs, or implemented as part of existing programs.

Near-term priority improvements are considered to be those that could be implemented within the next one to three years and exhibit the following characteristics:

- They are relatively low-cost;
- They have independent and immediate benefits; and
- They require some time to be programmed into the City's TIP process

Mid-term priority improvements are those that would be implemented within a three- to ten-year time frame and exhibit the following characteristics:

- They are either of moderate cost and would provide reasonable benefit, or;
- They are high-cost but address critical needs and provide significant benefit

Long-term priority improvements are those that would be implemented within a ten- to twenty-year time frame. These projects typically exhibit the following characteristics:

- They are relatively high-cost and address needs that are considered to be lower priority than those addressed by the mid-term projects; or
- They are of low to moderate cost, but are dependent upon other long-term projects being implemented before they would be considered feasible.

Note that some of the individual projects in the Recommended Scenario can be broken up into logical phases. In some cases, as shown in Table 8.7, the initial phase of a project can be considered a near-term priority while later phases more appropriately fall into the mid-or long-term priority categories.

Table 8.7: Recommended Scenario Implementation Priorities

AUTO TRAFFIC CONCEPTS	Immediate Action	Near-Term	Mid-Term	Long-Term	Implementation Comment:
Two-Way Mercer/Narrow Valley					
Mercer from Fairview to Dexter Avenue - 2-Way (currently eastbound only with westbound traffic using Valley/Broad), 6 lanes plus median & left-turn lanes; 4th eastbound lane between Boren and Fairview Avenues (approach to I-5). Phase II cost estimates were completed as a range (low and high), the SLU Transportation Study chose to use the high range.			✓		High cost but critical to overall SLU area improvements. Should be completed prior to development between Mercer and Valley Streets.
Mercer from Dexter to 5th Avenue - 2-Way (currently eastbound only with westbound traffic using Broad), 6 lanes plus median & left-turn lanes (includes widened Mercer Street underpass)			✓	✓	High cost and dependent on AWV Project improvements. Proposed early phase of AWV.
Valley St From Fairview to Westlake - 2-lane w/ left turn lanes and bike lanes. Phase II cost estimates were completed as a range (low and high), the SLU Transportation Study chose to use the high range.			✓		High cost but critical to overall SLU area improvements. Should be completed prior to development between Mercer and Valley Streets.
Roy Street from Westlake to Dexter - rebuild as 2-way (currenly wb only), 2 lanes plus left-turn lanes and bike lanes (continuity with Valley Street east of Westlake) & 8th Ave between Mercer and Roy - new street				✓	Follows removal/filling of Broad Street.
Broad St from 5th Ave to 9th Ave - Remove and fill to re-create street grid east and west of Aurora Avenue				✓	High cost and dependent on AWV Project improvements.
Dexter Avenue and Republican Street - Signal			✓	✓	Locically goes with widened Mercer underpass to encourage use of Republican from SR 99.
Mercer/Fairview/I-5 Ramps					
Fairview Avenue NB approach to I-5 - add NB left-turn pocket at Mercer Street (with 2-way Mercer) and NB right-turn lane (approx. 1/2 way between Harrison & Republican), and improve signage on NB Fairview Avenue approach to I-5 on ramps.			✓		NB LT goes with 2-way Mercer Street improvements - added RT lane can be implemented at any time
Reconfigure on-ramp approach to accommodate all four lanes of traffic from Mercer (part of Two-way Mercer project)					Part of 2-way Mercer
New Connections Across Aurora					
Thomas Street from Sixth to Dexter - Overpass of SR-99 (Optional: Harrison instead of Thomas)			✓	✓	Decision regarding Harrison vs Thomas to be made through AWVSRP in coordination with Seattle Center and others.
Thomas St from Fairview to 5th Ave - Add center left-turn lane (Optional: Harrison instead of Thomas)		✓	✓		Logically follows completion of Thomas overpass. However, could provide congestion relief benefits for Mercer Street between Dexter & Fairview/Eastlake prior to the construction of the proposed Thomas Street overpass.
Mercer - Widen underpass across Aurora (part of Mercer Dexter to 5th)					

Table 8.7 (continued) Recommended Scenario Implementation Priorities

AUTO TRAFFIC CONCEPTS	Immediate Action	Near-Term	Mid-Term	Long-Term	Implementation Comment:
Build Street Grid West of Aurora - Part of Alaskan Way Viaduct Project					
6th Ave from Roy to Harrison - overpass of Mercer St to provide new N-S arterial connection from Queen Anne to Denny Way.				✓	High cost, but substantial benefit to 5th/Mercer. Requires removal of Broad Street. Subject to/Coordination with any changes to Seattle Center parking lot.
Taylor Ave - Signal at Mercer and extend Taylor Ave from Mercer to Harrison St.				✓	Subject to/Coordination with any changes to Seattle Center parking lot. Requires removal of Broad Street.
Republican from Aurora to 5th Ave N - new 2-lane street				✓	Subject to/Coordinate with any changes to Seattle Center Parking lot. Requires removal of Broad St
Two-way traffic on 9th and Westlake					
Westlake Ave (4-5 lanes) and 9th Ave (3-lanes) from Aloha St to Denny - Two-way from Aloha to Denny (currently 4 lanes nb on Westlake and 3 lanes sb on 9th)		✓			May include bike lanes in place instead of center lane or one lane of parking on 9th. Independent of other improvements
Eastlake Avenue					
Eastlake near Denny - add SB U-turn for access to northbound I-5 express lanes.		✓			Further review in coordination with Center City Access (Transit impacts, etc.)
Eastlake & Thomas - Signal		✓	✓		Logically follows completion of Thomas overpass & Thomas St improvements. However, if the Thomas Street improvements were implemented prior to the overpass a signal at this location could be implemented as well.
Eastlake & Republican - Signal			✓		Primarily needed to facilitate use of Republic as alternate to Mercerr and new E/W transit route using Republican, but improves access to Eastlake Ave as well.

BICYCLE CONCEPTS	Immediate Action	Near-Term	Mid-Term	Long-Term	Implementation Comment:
Improve Around-the-Lake Bike Facilities					
Fairview between Eastlake Ave and Valley St - add bike lanes by rerstriping from 4/5 to 3 lanes (includes signal at Yale Ave).			✓		Relatively low cost but will likely be most useful once Valley St has been reconfigured and bike lanes are installed.
Fairview and Fairview (near Eastlake) - modify intersection for bike/ped access and safety	✓		✓		Immediate action - paint/channelization; mid-term action - curb and gutter, etc.
Bike Routes					
Sign Lakeview Boulevard (across I-5) as a Bicycle Route	✓				
Sign bike route on Eastlake Avenue E (E Garfield to Denny) for bicycle commuters.	✓				
Sign bike-routes on streets noted as "commonly used" in the SDOT Bicycle Guide Map	✓				
Maintain/Improve Dexter as a north/south bicycle corridor					
Sign bike route from Dexter bike lanes to 2nd Avenue bike lanes and proposed bike lanes on 4th Avenue (Center City Circulation Report) via Blanchard & Bell	✓	✓			Signing route to 2nd Ave bike lanes could happen immediately.
Improve bicycle connections across SR 99/Aurora					
Incorporate Lake-to-Bay Trail concepts into the Mercer Corridor Project (costs include trail facilities from Dexter & Mercer to 5th & Thomas. Other costs included with Two-Way Mercer/Narrow Valley).			✓	✓	Completed as part of the Mercer Street and AWVSRP improvements.

Table 8.7 (continued) Recommended Scenario Implementation Priorities

PEDESTRIAN CONCEPTS	Immediate Action	Near-Term	Mid-Term	Long-Term	Implementation Comment:
Terry Avenue N Design - Pedestrian improvements (sidewalk on west side, curbless pedestrian space on east side), remove railroad tracks.		✓	✓		To be implemented as frontage improvements with new development
Eighth Avenue - Pedestrian street		✓	✓		To be implemented as frontage improvements with new development
Cascade Neighborhood Pedestrian Improvements					
Repair and improve sidewalks throughout South Lake Union.	✓	✓	✓		Could be implemented in phases with existing sidewalk maintenance and repair and as other roadway improvements are made and/or as parcels throughout SLU develop
Thomas & Harrison between Fairview and Eastlake - Address uncontrolled intersections and traffic to provide consistent traffic control and improved pedestrian crossings (up to 16 stop signs)	✓	✓			Can be phased--some immediate and some near-term
Harrison, Minor & Pontius around Cascade Park - widen sidewalks		✓			
Harrison Street - Wider sidewalks and curb bulbs		✓			
Thomas Street - curb bulbs		✓			
Sidewalks and Curb Bulbs					
Harrison Street, between Yale and Dexter - widen sidewalks		✓	✓		Could be implemented in phases as part of current development/construction and as other roadway improvements are made and/or as parcels throughout SLU develop.
Harrison between Yale and Dexter Avenues - curb bulbs on all 4 corners	✓	✓	✓		Could be implemented in phases. Section east of Fairview could be implemented first, while sections west of Fairview could be tied to overall sidewalk widening improvements.
Thomas between Yale and Dexter Avenues - curb bulbs on all 4 corners	✓	✓	✓		Could be implemented in phases. Section east of Fairview could be implemented first, while sections west of Fairview could be tied to overall sidewalk widening improvements.
John at Fairview & Westlake - curb bulbs on all 4 corners	✓	✓			Could be implemented in phases as part of current development/construction and as other roadway improvements are made and/or as parcels throughout SLU develop.
Republican at Fairview, Terry, Westlake & Dexter - curb bulbs on all 4 corners	✓	✓			Could be implemented in phases as part of current development/construction and as other roadway improvements are made and/or as parcels throughout SLU develop.
Eastlake at Aloha - curb bulb on Eastlake Avenue E at Aloha Street (possible crosswalk striping)	✓				Could be implemented relatively quickly, as it is a spot location.
Improve Denny Way Pedestrian Environment and Crossing of I-5					
Denny Way I-5 crossing - add 10' sidewalk			✓		
Denny between Stewart and Dexter Avenue - Add curb bulb-outs and countdown signals at signalized intersections	✓	✓	✓		Could be implemented in phases as part of current development/construction and as other roadway improvements are made and/or as parcels throughout SLU develop. Independent of other improvements.

Table 8.7 (continued) Recommended Scenario Implementation Priorities

TRANSIT CONCEPTS	Immediate Action	Near-Term	Mid-Term	Long-Term	Implementation Comment:
Transit emphasis/transit priority street on Fairview Ave N					
Fairview Avenue at Denny Way - add NB & SB Transit Signal Priority (TSP).		✓			
Fairview Avenue at Harrison Street - NB queue jump and SB TSP		✓			
Fairview Avenue at Mercer Street - NB and SB TSP.		✓			
Fairview Avenue at Valley Street - NB and SB TSP		✓			
SLU Streetcar (Westlake Center to FHCRC (Yale Ave) on Westlake via Westlake/Valley/Terry.)		✓			Analysis and design and analysis in progress
New Bus Route (Trolley or Other Electric Technology) Uptown to N. Capitol Hill via Mercer or Republican			✓		Steep grades on Lakeview/Belmont require trolley or other electric technology. Stops on Belmont may be limited due to grade and narrow cross-section.
Bus Shelters					
Install transit bus shelters along bus routes in study area (9)		✓			
Include appropriate lighting at shelters		✓			

Funding

Funding for the recommendations will come from a range of local, state and federal funding sources, and may include:

- State and Federal grants and appropriations
- Regional sources, such as the proposed Regional Transportation Investment District (RTID)
- City funds
- Bay Freeway Property proceeds (In 2002, the City of Seattle sold transportation properties that were purchased in the 1960's and 70's for the Bay Freeway project in South Lake Union. A portion of the property proceeds is designated for transportation improvements in South Lake Union.)
- Local Improvement District (LID)
- Mitigation from development
- Street frontage improvements with new development

Table 8.8 summarizes the estimated funding distribution between City and other funding sources for the major projects and other projects proposed in the Recommended Scenario by area.

Table 8.8: Estimated Funding Allocation

Project/Area	City Funds	Other Funds
Mercer/Valley from Fairview to Dexter	$9 M	$73 - $86 M
AWVSRP – Widen Mercer Option	$12 M	$62 M
South Lake Union Streetcar	$2.5M*	$42.5 M
South Lake Union (other)	$8.5 M	$8.6 M
West of Aurora	$10.1 M	$10.2 M
East Connections	$3.3 M	$3.4 M
Total	$45.4 M	$199.7 - $212.7 M

*City share of the LID

An explanation of the assumptions on non-City funding for the first three projects noted in Table 8.8 follows.

Mercer Corridor Project (Mercer/Valley from Fairview to Dexter)

The widening of Mercer Street between Fairview and Dexter Avenues, along with the re-building of Valley Street, is an SDOT priority for the RTID or similar funding sources. Other potential sources include State and federal funds and developer mitigation funds.

Alaskan Way Viaduct and Seawall Replacement Project – Widen Mercer Option

The widening of Mercer Street between Dexter and Fifth Avenues, the Thomas overpass, and removal of Broad Street would be funded through the AWVSRP project. The AWVSRP project has identified a range of anticipated revenues from State, federal, regional and City sources. The AWVSRP assumes that 8 to 12 percent of the entire AWVSRP would be paid by City funds. Table 8.8 shows a higher share for the Widen Mercer Option.

South Lake Union Streetcar

A local improvement district would fund over half ($25 million) of the total cost of the streetcar. This includes an estimated $2.5 million for the City's share of the LID. The streetcar has secured $8.5 million in additional funding from State and federal sources and has other grant applications pending.

South Lake Union and Adjacent Areas

To estimate the City share of the remaining projects, SDOT reviewed other typical projects in the City's Capital Improvement Program (CIP). In general, the City share of projects in the CIP is up to 50 percent. Non-City funds would come from State and federal grants and appropriations, as well as developer mitigation funds.

APPENDICES

Appendix A Public Involvement Meetings and Workshops (see attached CD)

- Two Postcards used to announce the open houses
- Detailed summaries of the two stakeholder work sessions
- Public Involvement Plan and schedule of briefings to SLUFAN, Cascade Neighborhood Council, Queen Anne Community Council Transportation Committee, Queen Anne Chamber of Commerce, Uptown Alliance, Lake Union District Council, SLUNET, BINMIC, North Seattle Industrial Association
- Business interview summary
- Summary of a meeting with members of the freight community held in January 2004

Appendix B Alternatives, Engineering and Cost Estimates (see attached CD)

- List of project alternatives considered but rejected
- Conceptual plan view for Fairview Avenue N
- Conceptual typical section for Fairview Avenue N
- Conceptual cost estimate documents and information