The Seattle Department of Transportation

Seattle Center City Connector Transit Study

Locally Preferred Alternative (LPA) Report (Volume I)

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SDOT
Seattle Department of Transportation

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Seattle Center City Connector Transit Study

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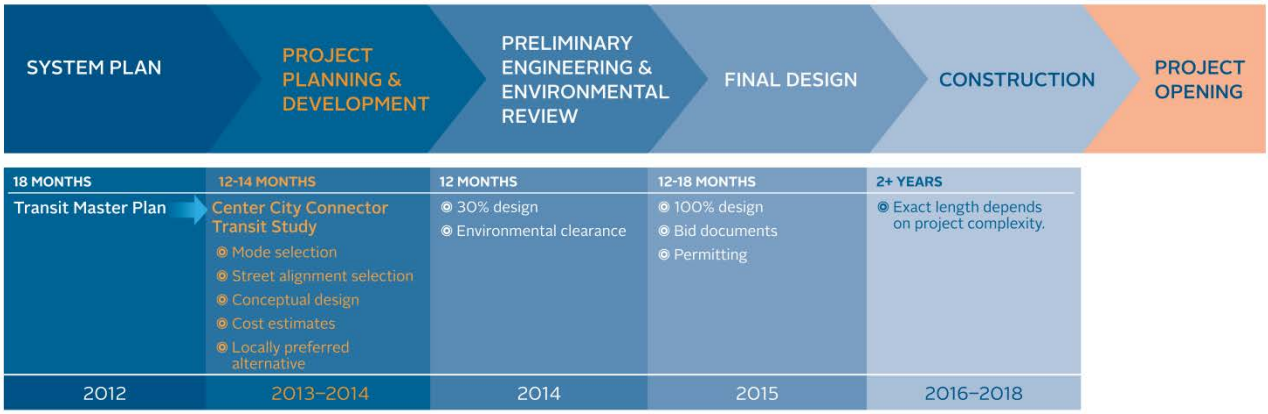
1 PROJECT OVERVIEW

Introduction

The City of Seattle's Transit Master Plan, adopted in 2012, identified four corridors with the highest ridership potential and the greatest need for higher capacity transit service. One of these corridors was the Center City Connector, which runs through downtown Seattle and connects the South Lake Union and First Hill Streetcar lines. The planning and project development timeline for the Connector is shown in Figure 1-1.

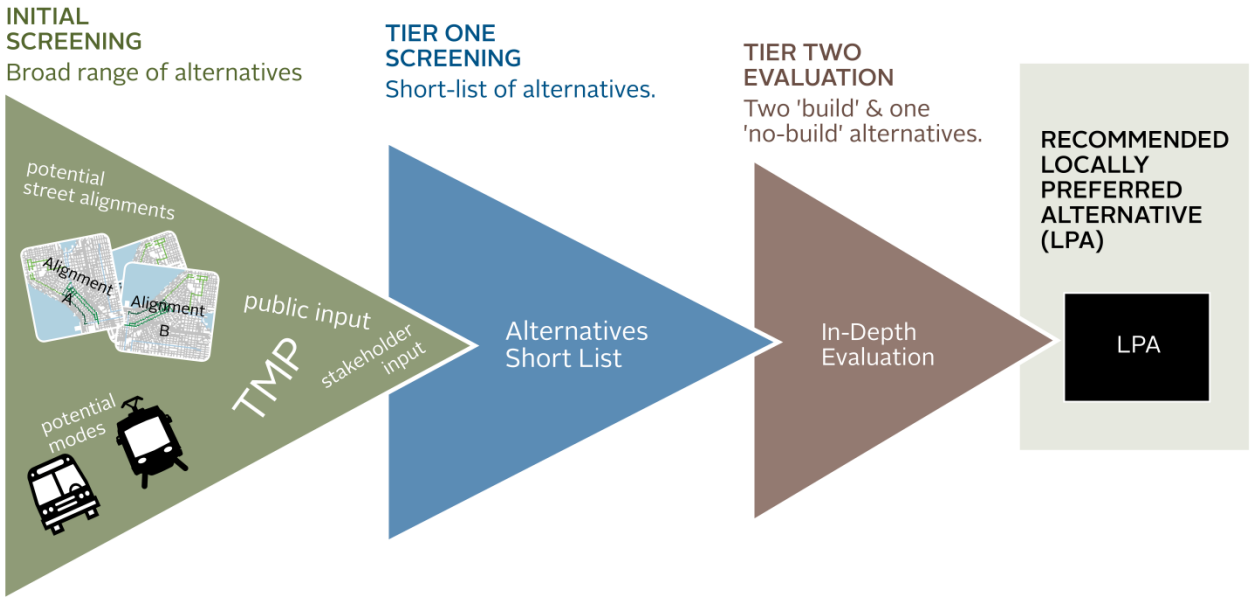
Figure 1-1 Project Development Timeline



The purpose of the Center City Connector Transit Study is to evaluate potential modes and alignments for the study corridor and select a Locally Preferred Alternative (LPA) with high community benefit, strong stakeholder support, and a viable financial strategy. Figure 1-2 illustrates the evaluation process that narrowed mode and alignment options and led to an LPA recommendation. The process included an initial screening of a broad range of alternatives, "Tier 1" screening of a short-list of alternatives, and "Tier 2" evaluation of two "build" alternatives.

The study was completed largely during 2013 and represents project planning and early development phases of the Project. This report describes the LPA and the technical and outreach steps taken to arrive at an LPA selection. The Center City Connector Transit Study Detailed Evaluation Report (Volume II) provides a more in-depth overview of the study, its technical evaluation, and the community outreach process.

Figure 1-2 Study Evaluation Process



Study Corridor Description

Seattle's Center City area encompasses 10 neighborhoods – Uptown, South Lake Union, Capitol Hill, Belltown, Denny Triangle, Pike/Pine, Downtown Commercial Core, First Hill, Pioneer Square, and the Chinatown/International District. Figure 1-3 provides a map of the Center City, including the study area. The core of Seattle's Center City resembles an hourglass where a limited set of north-south arterial corridors carry people and goods through the downtown core—the narrow neck of the hourglass. There is limited ability to enhance surface street capacity through the downtown core. Several of the north-south arterials (2nd, 3rd, 4th, and 5th Avenues), and the Downtown Seattle Transit Tunnel (DSTT) carry transit through downtown, but high utilization, limited expansion capacity, and increased future demand limit the ability of existing transit modes to provide access between key Center City employment centers, retail, attractions, and residential populations.

The Center City Connector Transit Study evaluated potential north-south transit alignments west of I-5 between the Lower Queen Anne, Uptown, and South Lake Union neighborhoods to the north, and the Chinatown- International District and South Downtown area including the King Street Intermodal Hub to the south. The study focused on leveraging existing City and regional partner investment in Center City streetcar lines by connecting existing termini at the north and south ends of downtown.

Figure 1-3 Center City Area Map

Policy Framework

High-quality, high-capacity transit connections between the downtown commercial core and other Center City neighborhoods provide residents, workers, and visitors access to goods, services, and cultural amenities. Further, sustainable transportation options will help Seattle's Center City continue to grow in a highly competitive global economy, while encouraging development that supports the human and environmental health of the region.

The transportation system in Seattle's Center City faces some of the most challenging geographic and topographic constraints of any city of its size in North America. To address these constraints, achieve City policy objectives, and allow for sustainable Center City growth, Seattle has developed a series of transportation planning and policy documents that help support sustained growth in the Center City. These documents include:

- Seattle Comprehensive Plan (2005)
- Transit Master Plan (2012) and Seattle Transit Plan (2005)
- Recommended Bicycle Master Plan (City Council to deliberate adoption in the 2nd quarter of 2014) and Bicycle Master Plan (2007)
- Pedestrian Master Plan (2009)
- Action Agenda (2012)
- Seattle Center City Circulation Study (2003)
- Seattle Center City Access Strategy (2004)
- Streetcar Network Plan (2008)
- Urban Mobility Plan (2008) (Alaskan Way Viaduct and Seawall Central Waterfront process)
- Central Waterfront Concept Design and Framework Plan (2012)
- Seattle Jobs Plan (2012)
- Climate Action Plan (2013)

In addition to the plans listed above, the City of Seattle is moving forward with planning and design of the proposed Broadway extension of the First Hill Streetcar, north of the First Hill line's planned terminus at Denny Way. Several other corridors recommended in the Transit Master Plan are currently funded for initial study, including the Madison Street Corridor Bus Rapid Transit, University District-South Lake Union-Downtown Corridor, and Ballard-to-Downtown Corridor[1].

Further detail on the plans and projects described in this section can be found in Appendix A, which contains the full Project Purpose and Need statement.

[1] The Ballard-to-Downtown High Capacity Transit study, a partnership between the City of Seattle and Sound Transit, examines potential high-capacity transit alignments and station locations in the Ballard to downtown Seattle corridor, and was coordinated with the Center City Connector study regarding transit connections in downtown Seattle.

Public Involvement

Public and stakeholder input was integral to decision making at each stage of the alternatives evaluation. Outreach strategies included a series of stakeholder interviews, three public open houses, comment cards, online materials and surveys, media events and briefings with community organizations. Interviews were conducted with 40 stakeholders over the course of more than two dozen meetings between November 28 and November 30, 2012. Stakeholders included representatives from numerous local and citywide bodies such as community councils, chambers of commerce, major institutions, human service and housing organizations, local business leaders, and other cultural and community organizations. City staff distributed project materials and information to residents and businesses within the core study area. Open house invitations were translated into multiple languages (Chinese, Vietnamese, and Spanish), and targeted distribution of these materials included drop-offs at social service agencies and affordable housing sites and offices throughout downtown.

Figure 1-4 Project Timeline

Project open houses were held in a range of locations to attract participation from a diverse array of stakeholders. Feedback from public involvement activities informed development of the initial screening alternatives and was considered as a criteria in the evaluation of each of the alternatives in the initial screening, Tier 1, and Tier 2 phases of analysis. SDOT briefed the Seattle City Council Transportation Committee on July 9, 2013 following the completion of the Tier 1 screening.

Open House #1: February 2013

The first open house for the Center City Connector Transit Study was held on February 6, 2013 at Seattle City Hall. The purpose of the first open house was to introduce the Project to the public; collect comments on the Project purpose, need, goals, objectives, and evaluation process; and gather input on initial alignment and mode alternatives. Table-top maps were provided and participants were encouraged to draw new alignments and to indicate their support for both newly drawn and previously identified alignments. A total of 101 people signed in to the meeting. Meeting participants received a handout that described the Project and provided an opportunity for specific

and open-ended comments. Participants could also comment by leaving post-it notes on the display boards and maps. In total, there were 75 comments placed directly on the project boards/maps and 30 completed comment cards.

Open House #2: June 2013

The second open house for the Center City Connector was held on June 6, 2013 at the South Lake Union Discovery Center. The Open House presented findings from the initial screening and Tier 1 screening and solicited input on Mixed-Traffic and Exclusive Streetcar alternatives on 1st Avenue and 4th/5th Avenues. A total of 61 people signed in to the meeting. Participants received a handout, which provided a summary of the Tier 1 screening results and provided an opportunity for participants to rank and comment on the four alternatives and to rank the importance of specific evaluation criteria in their preference (see Figure 1-8).

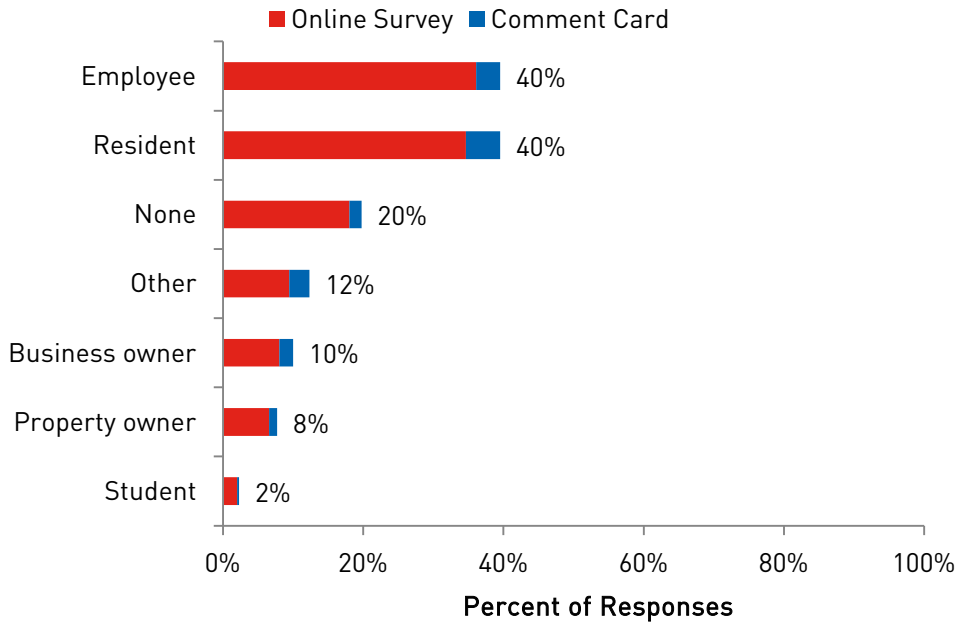
Figure 1-5 Open House #2 Participants

Open House #3: October 2013

The third Project open house was held on October 29, 2013 at Pike Place Market. This open house presented findings from the Tier 2 analysis and solicited feedback on the Mixed-Traffic and Exclusive Streetcar alternatives on 1st Avenue. A total of 89 people signed in to the meeting, and 40 attendees completed comment cards.

Participants self-identified as a mix of residents, employees, and business or property owners (Figure 1-6). The comment cards asked respondents to select their preferred alternative from the two mode and alignment alternatives evaluated in Tier 2 and rank the Tier 2 evaluation measures based on their importance to their preference. An online survey that asked similar questions to the comment card was made available for several weeks following the open house and received a total of 309 responses. Figure 1-9 provides sample graphics presented in the online survey.

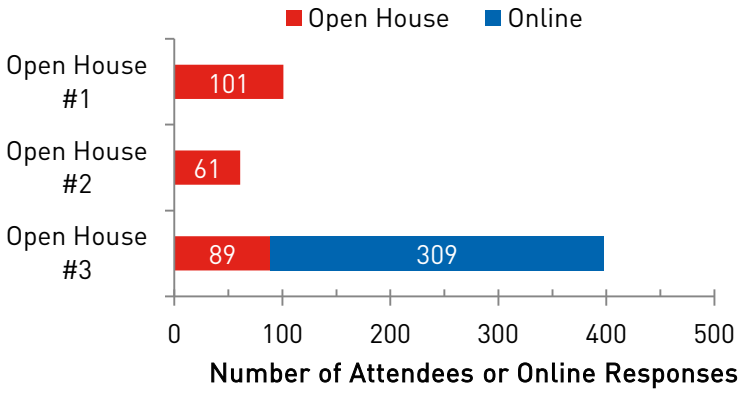
Figure 1-6 Open House #3 and Online Survey Participant Relationship to Center City Connector Study Area



Note: Respondents could select as many categories as applied; n=349

Figure 1-7 summarizes the number of open house attendees who signed in and the number of online survey responses submitted in the approximately four week period following the third open house, a total of 560 participants.

Figure 1-7 Open House and Online Survey Participants and Comment Cards/Surveys



The Detailed Evaluation Report and its Appendices N, P, and Q provide more details on public and stakeholder input received.

Figure 1-8 Sample Handout from Open House #2

SEATTLE CENTER CITY CONNECTOR TRANSIT STUDY

OPEN HOUSE #2

JUNE 6, 2013

SDOT Seattle Department of Transportation

Please return this handout with your comments

We need your input to select alternatives for further study! The evaluation results presented tonight, along with your input, will be used to narrow the four "Tier 1" alternatives for the Center City Connector to the alternative(s) that will be studied in more detail in the "Tier 2" evaluation.

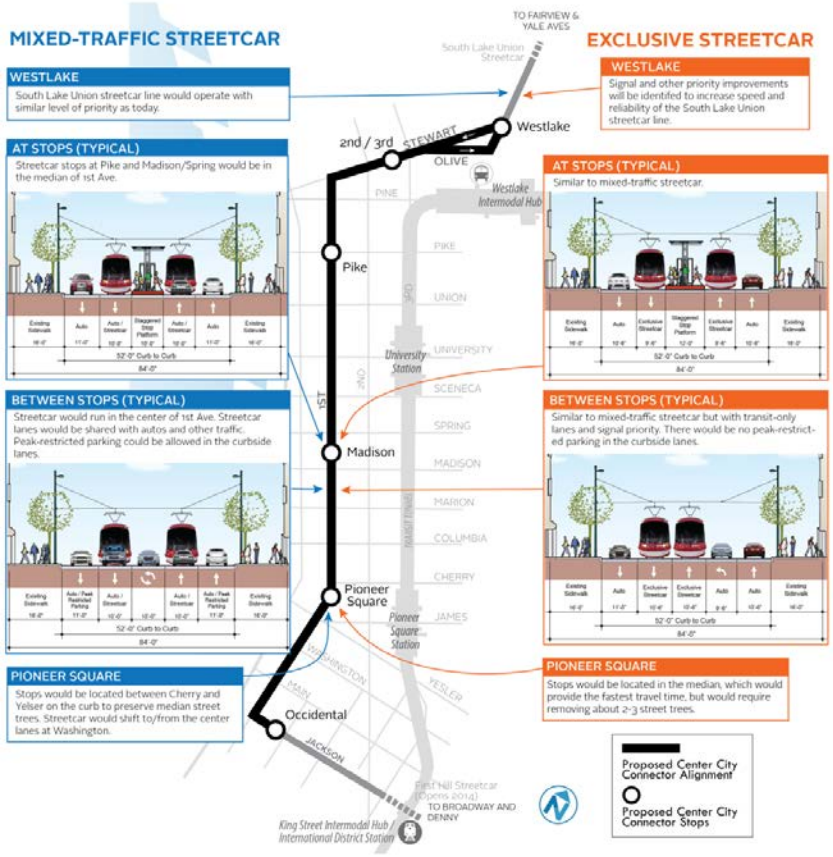
1. Please rank the alternatives from 1 (best) to 4 based on how well you think they meet the project purpose, goals, and objectives:

	4TH/5TH AVENUES		1ST AVENUE	
	Mixed-Traffic Streetcar	Exclusive Streetcar	Mixed-Traffic Streetcar	Exclusive Streetcar
Please rank from 1 to 4	☐	☐	☐	☐

2. Please check up to FIVE evaluation measures that were most influential in ranking the alternatives.

	Evaluation Measures	Check up to 5	Comments and/or Key Considerations
ENHANCE	Streetcar Travel Times	☐	
	Auto Travel Times / Relative Traffic Diversion Impacts	☐	
	Bus Travel Time and Reliability Impacts: Aggregate Bus and Bus Passenger Delay	☐	
CONNECT	Multimodal Conflicts (Bike, Pedestrian, Bus, and Freight)	☐	
	Ridership Potential	☐	
	Annual Operating & Maintenance Costs	☐	
	Capital Costs	☐	
DEVELOP	On-Street Parking Impacts	☐	
	Economic Development Opportunities	☐	
THRIVE	Access to Jobs	☐	
	Access for Vulnerable Residents and to Social Services and Affordable Housing	☐	
	Access to Tourist Destinations, Civic and Cultural Assets, and Open Spaces	☐	
	Public Support (based on first Open House) and Stakeholder Support	☐	
SUSTAIN	Urban Form and Placemaking Opportunities and Improvement Potential	☐	

Figure 1-9 Sample Graphics from Online Survey *(Conducted Following Open House #3)*



MIXED-TRAFFIC STREETCAR	EVALUATION MEASURES	EXCLUSIVE STREETCAR
11.5 minutes	**Streetcar Travel Time, PM Peak** (Jackson/Occidental - Stewart/Westlake, average north/southbound, including stops, 2018)	7.5 minutes
26%	**Streetcar Travel Time Reliability, PM Peak** (Variance between streetcar travel times, 2018)	12%
28,000 daily riders	**Forecasted Weekday Daily Riders** (Integrated CCC, First Hill, and SLU lines, 2018)	31,000 daily riders
$17.5 million/year	**Annual Operating & Maintenance Costs** (Integrated CCC, First Hill, and SLU lines, 2013 $)	$15.8 million/year
$110-$119 million	**Total Capital Costs** (Center City Connector, including vehicles, 2013 $)	$104-$111 million
6.5 minutes	**Auto Travel Time, PM Peak** (Jackson/Occidental - Stewart/Westlake, avg. north/southbound, 2018; "No-Build" travel time: 5.7 min)	8.0 minutes
Diversion: < 10% Avg. Delay Increase: 2 sec	**Traffic Delay from Diversion, PM Peak** (% diversion of vehicles from 1st Avenue and increase in average intersection delay on parallel streets, 2035)	Diversion: up to 50% Avg. Delay Increase: 3.5 sec
Peak-restricted: 80 All-day: 15 Loading: 45	**On-Street Parking and Loading Impacts** (Approx. number parking stalls and loading zone spaces retained. No-Build: about 145 peak-restricted, 25 all-day parking stalls; 80 general/passenger loading spaces)	Peak-restricted: 5 All-day: 20 Loading: 15

RATING SCALE — Highly Favorable — Greatest Impact

Note: Full-size versions of the above graphics are provided in Figure 4-7 and Figure 5-7.

2 PURPOSE AND NEED

This chapter states the Purpose and Need for the Center City Connector.

Project Purpose

The purpose of the Seattle Center City Transit Connector Project is to serve the growing demand for Center City circulation trips[2] with a mode and alignment that is highly legible, easy-to-use for a variety of trip purposes, and that provides continuity of travel between the downtown commercial core and Center City neighborhoods served by the South Lake Union Streetcar and the First Hill Streetcar. The Seattle Transit Master Plan (TMP) identified improved Center City transit as a top priority—increasing transit capacity, enhancing transit service quality and reliability, and improving transit options for residents, workers, and visitors traveling between and within Center City neighborhoods and attractions. Figure 2-1 illustrates potential Center City Connector street alignment options that were identified as part of the TMP.

Project Need

The need for the Center City Connector Project is based on:

- **Significant existing population and employment and projected growth in the Seattle Center City**. Seattle's Center City neighborhoods have a significant concentration of households and employment, and are forecast to see employment growth of 60% and residential population growth of 97% by 2030.
- **Growth in demand for Center City circulation trips.** Recent analysis found high demand for trips between Center City neighborhoods and for accommodating "last mile" connections for trips using existing and planned local and regional transit services.
- **Constraints on expansion of Center City transportation capacity.** There is a limited number of north-south through streets available for transit and existing and planned transit will utilize much of the available capacity.
- **Special mobility needs of tourists, visitors, and casual users in the Center City.** Approximately nine million annual tourists visit Seattle each year, many seeking to use public transit as their primary means of mobility.
- **Affordable transportation access to key social and human services located in the Center City.** A large concentration of social service agencies in the Center City relies on good transit connections.

[2] For the purposes of this study, Center City circulation trips include (1) trips between and/or within Center City neighborhoods, (2) trips connecting major attractions and destinations in the Center City, and (3) last-mile connections from other local and regional transit services to jobs, human/social service centers, etc.

- **Connections for low-income workers who live in the Center City to jobs in the Center City.** There is a growing concentration of affordable housing and low- and moderate-income jobs in the Center City.
- **Reduction in greenhouse gas (GhG) emissions from private vehicle travel and traffic congestion.** Seattle's Climate Action Plan to reduce GhG emissions relies on providing higher-capacity transit to support dense mixed-use neighborhoods in the Center City.

The full Purpose and Need statement, including background information, is provided in Appendix A of this document.

Figure 2-1 Center City Connector Initial Transit Corridor Alignment Options (Seattle TMP Concept)

Source: Map adapted from Seattle Transit Master Plan Summary Report, 2012, Figure 3-16

3 EVALUATION FRAMEWORK

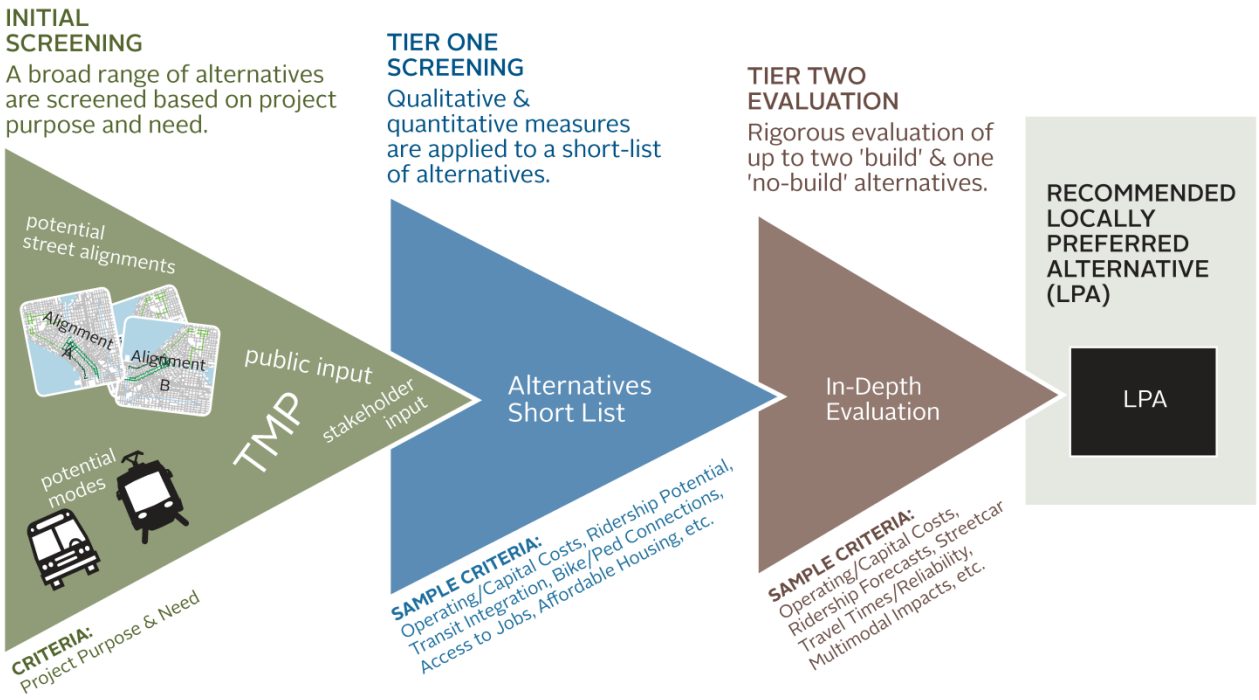
This chapter provides an overview of the evaluation process used to assess Project alternatives. In addition to technical analysis conducted in the Initial, Tier 1, and Tier 2 stages of evaluation, the evaluation process included extensive consultation and input from the public, stakeholders, and local, regional, and federal agencies.

The Detailed Evaluation Report describes the Project evaluation framework in more detail.

Evaluation Process

Figure 3-1 illustrates the evaluation process that was defined for studying and narrowing all reasonable alignment and mode options into a Locally Preferred Alternative, consistent with Federal Transit Administration (FTA) guidance.

Figure 3-1 Evaluation Process Overview



Note: In the initial evaluation process design, the use of the terms "screening" (Initial and Tier 1 screening) and "evaluation" (Tier 2 evaluation) was intended to differentiate the increasingly rigorous level of analysis planned at each stage of evaluation.

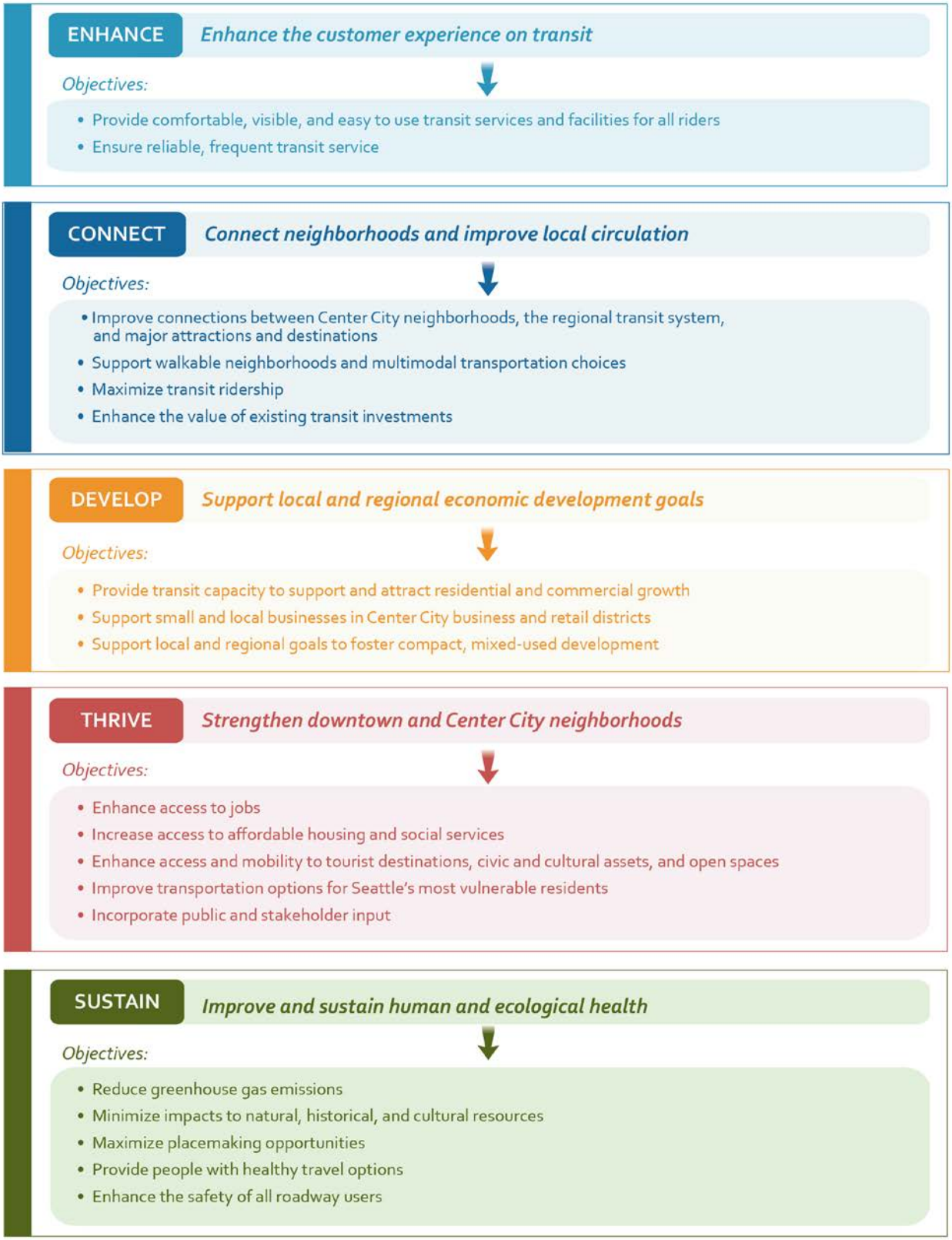
Goals and Objectives

The Project goals and objectives are shown in Figure 3-2. The screening and evaluation process builds on the Purpose and Need Statement and Goals and Objectives by focusing on the five themes and Project goals identified based on the Project Purpose and Need:

- **Enhance:** Enhance the customer experience on transit
- **Connect:** Enhance connections between and access to Center City neighborhoods
- **Develop:** Support local and regional economic development goals
- **Thrive:** Strengthen downtown and Center City neighborhoods
- **Sustain:** Improve and sustain human and ecological health

The Project Goal statement includes a series of objectives. Draft Tier 1 and Tier 2 criteria were developed to address each of the objectives. The criteria are intended to further define each objective and support evaluation of the alignments against the stated goals in a transparent and understandable manner.

Figure 3-2 Goals and Objectives



4 EVALUATION OF ALTERNATIVES

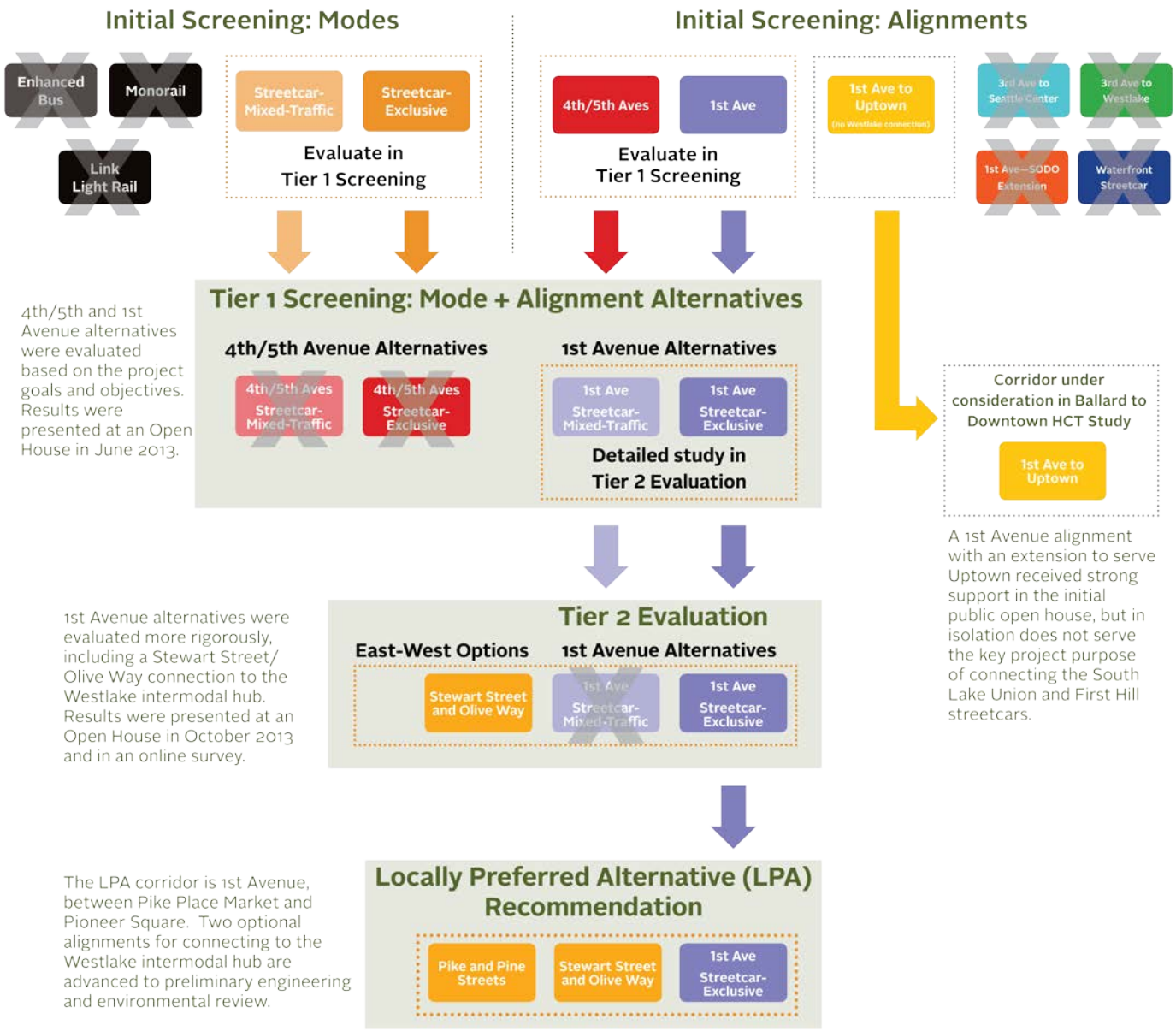
This chapter summarizes the screening process used to evaluate a range of potential modes and alignments to identify a Locally Preferred Alternative. Chapter 5 provides results and ratings for the evaluation measures.

The screening process was structured into three progressively more detailed phases of evaluation, as illustrated in Figure 3-1 (above). Each phase of evaluation was conducted concurrently with a set of public involvement strategies, including a public open house meeting at the outset of the initial screening to obtain public input on the wide range of options that should be considered in the study and open house meetings at the conclusion of both the Tier 1 screening and Tier 2 evaluation.

Figure 4-1 below summarizes the evaluation of alternatives at each stage. Each stage is described in more detail in the following sections.

The Detailed Evaluation Report and its appendices provide a more comprehensive discussion of each evaluation stage.

Figure 4-1 Center City Alternatives Screening Process and Outcomes



Modes

Initial Screening of Modes (Purpose and Need)

The Transit Master Plan proposed that both enhanced bus and streetcar (with a range of transit priority improvements) be considered for the Center City Connector. Based on input received at the February 6, 2013 open house and through stakeholder interviews, mixed-traffic and exclusive streetcar, enhanced bus, light rail (Sound Transit Link), and monorail modes were screened against the Project Purpose and Need (see Chapter 2). These modes are shown in Figure 4-2. The Mixed-Traffic and Exclusive Streetcar modes were differentiated primarily through the use of a shared or exclusive lane and the level of signal priority provided.

Figure 4-2 Modes Screened in Initial Screening Evaluation

The criteria used to evaluate each of these five modes in the initial screening process included the following:

- Consistent with local/regional plans
- Meets identified needs (mobility/connectivity)
- Level of public/stakeholder support
- Potential right-of-way impacts

Public and stakeholder comments emphasized the importance of selecting a mode that enables a seamless connection to both the South Lake Union Streetcar and First Hill Streetcar lines, which was stated in the Project purpose. Public input also emphasized the importance of speed and reliability in order to make the Center City Connector attractive and competitive with other modes. Although there was a small amount of support for an enhanced bus alternative due to the lower Project cost, the majority of respondents indicated that the benefits of modern streetcar outweigh potential downsides.

Based on public input and a screening of modes against the above criteria, the project team recommended that all modes other than streetcar be eliminated from further study and that both Mixed-Traffic and Exclusive streetcar modes be analyzed in the Tier 1 screening.

The Detailed Evaluation Report, Chapter 3 and Appendix M, provides an in-depth description of the initial screening.

Tier 1 and 2 Evaluation of Modes: Mixed-Traffic and Exclusive Streetcar

Mixed-Traffic and Exclusive Streetcar modes were carried through both the Tier 1 and Tier 2 stages of evaluation. Figure 4-3 identifies the distinctions between Mixed-Traffic and Exclusive Streetcar modes as defined for this Project.

Figure 4-3 Mixed-Traffic and Exclusive Streetcar Mode Characteristics

Feature	Mixed-Traffic Streetcar	Exclusive Streetcar
		
Right-of-way design	Operates primarily in mixed traffic	Operates primarily in transit-only or exclusive streetcar lanes
Signal priority	Limited signal priority	Extensive signal priority
Stop spacing	Shorter stop spacing	Longer stop spacing
Travel speeds	Slower travel speeds	Faster travel speeds due to transit priority features and longer stop spacing
Vehicle capacity	Typical modern streetcar vehicles, although higher capacity vehicles could be used	Higher passenger capacity if longer articulated or coupled vehicles are implemented
Station amenities	Lower volume shelters; typical amenities include real-time passenger information, level boarding, and off-board fare payment	Enhanced station amenities and access including high volume shelters, real-time passenger information, level boarding, and off-board fare payment

The evaluation of these modes in the Tier 1 screening was intended to illustrate the tradeoffs between potential travel time and capacity benefits for streetcar and impacts on other travel modes. These benefits and impacts were quantified through traffic analysis (Synchro) and other quantitative and qualitative analysis; these results are detailed in Chapter 5.

Both modes were carried into the Tier 2 evaluation, a detailed analysis of the Mixed-Traffic and Exclusive Streetcar alternatives including traffic analysis in Synchro and VISSIM. The Tier 2 evaluation considered seamless connections with existing and planned transit investments in the Center City area, passenger-carrying capacity needed to support projected ridership, and the ability to ensure competitive and reliable travel speeds impacts on other modes. The evaluation results are described in Chapter 5.

Chapter 4 and Appendix N of the Detailed Evaluation Report describe the Tier 1 screening; Chapters 6 to 9 describe the Tier 2 evaluation.

Alignments

Initial Screening of Alignments (Purpose and Need)

The Transit Master Plan proposed potential Center City Connector alignments on 1st and 4th/5th Avenues. The project team solicited public input on these and other potential alignments at the February 6, 2013 open house and additional alignments identified by the public were included in the range of alignments considered (described in the Detailed Evaluation Report). These alignments were screened against the Project Purpose and Need using the same set of evaluation criteria that was used to evaluate modes:

- Consistent with local/regional plans
- Meets identified needs (mobility/connectivity)
- Level of public/stakeholder support
- Potential right-of-way impacts

The alignments on 1st Avenue and on 4th/5th Avenues received the most support from the public in attendance at the open house. There was some public interest in alignments that could serve as extensions of the Center City corridor connecting the First Hill and South Lake Union Streetcars, but that do not directly meet the Purpose and Need for the Center City Connector. These include alignments south of the Jackson Street to SODO, the TMP-identified alignment extending north towards Uptown/Seattle Center, and a Waterfront alignment. Several other potential alignments received relatively weak support, including 3rd Avenue. Other participants noted particular drawbacks to two of these alignments, including the impacts of a 3rd Avenue alignment on existing transit and the distance and grade between a waterfront alignment to the downtown core, which impact this alignment's ability to meet the Project Purpose and Need.

Based on the public input and screening results, the project team recommended that the 4th/5th Avenue couplet (Jackson Street to Westlake Hub) and 1st Avenue (Jackson to Stewart Streets) alignments be analyzed in the Tier 1 screening. An extension of the 1st Avenue alignment to Uptown was initially deferred to the Tier 2 evaluation, but it was ultimately determined that this alignment did not meet the Purpose and Need for the Center City Connector Project. This uptown corridor is being evaluated for rapid streetcar and light rail modes in the Ballard-to-Downtown High Capacity Transit Study being jointly managed by Sound Transit and SDOT. The waterfront streetcar alignment was studied as part of the Central Waterfront Project concurrent with this study.

Chapter 3 and Appendix M of the Detailed Evaluation Report provide additional detail on the initial screening.

Tier 1 Evaluation of Alignments

The Tier 1 screening evaluated two alignments connecting the southern terminus of the South Lake Union Streetcar on Westlake with the First Hill Streetcar along Jackson Street, as illustrated in Figure 4-4:

- 4th/5th Avenues (couplet).
- 1st Avenue, including an east-west connection using Stewart Street and Olive Way between 1st Avenue and Westlake; a more detailed screening of east-west options was conducted following the completion of the Tier 1 process (see "East-West Connections Screening" on page 4-8).

The alignments were evaluated as part of both Mixed-Traffic and Exclusive Streetcar alternatives using criteria supporting each of the five goal themes: Enhance, Connect, Develop, Thrive, and Sustain. Both the Mixed-Traffic and Exclusive alternatives on 4th/5th Avenues fared poorly on measures of travel time and impacts to current bus service, as 4th Avenue is heavily used by regional transit routes and the street right-of-way would provide limited opportunity to expand exclusive transit operations, particularly given bike facilities identified in the City's Bike Master Plan. The 1st Avenue alignment had stronger stakeholder support, better served tourist and visitor mobility needs, and had lower impacts on other transportation modes including transit, bicyclists, and automobiles. The results of this evaluation, detailed further in Chapter 5, led the project team to recommend that 1st Avenue be carried forward into the Tier 2 evaluation.

The Tier 1 screening is described in greater depth in the Detailed Evaluation Report, Chapter 4. The Tier 1 Screening Report is included in Appendix N of the Detailed Evaluation Report.

Figure 4-4 Tier 1 Alignment Alternatives

Screening of East-West Connections

The study also screened several alignment alternatives for connecting from 1st Avenue to the South Lake Streetcar and the Westlake Transportation Hub. This screening took place in the initial stages of the Tier 2 evaluation. The five alignments evaluated are shown in Figure 4-5 and Figure 4-6. With the exception of 6th Avenue, these alignments were identified in the Transit Master Plan; input from the first Project open house that solicited input on potential alignments was also considered.

Figure 4-5 East-West Alignments A, B, and C

Figure 4-6 East-West Alignments D and E

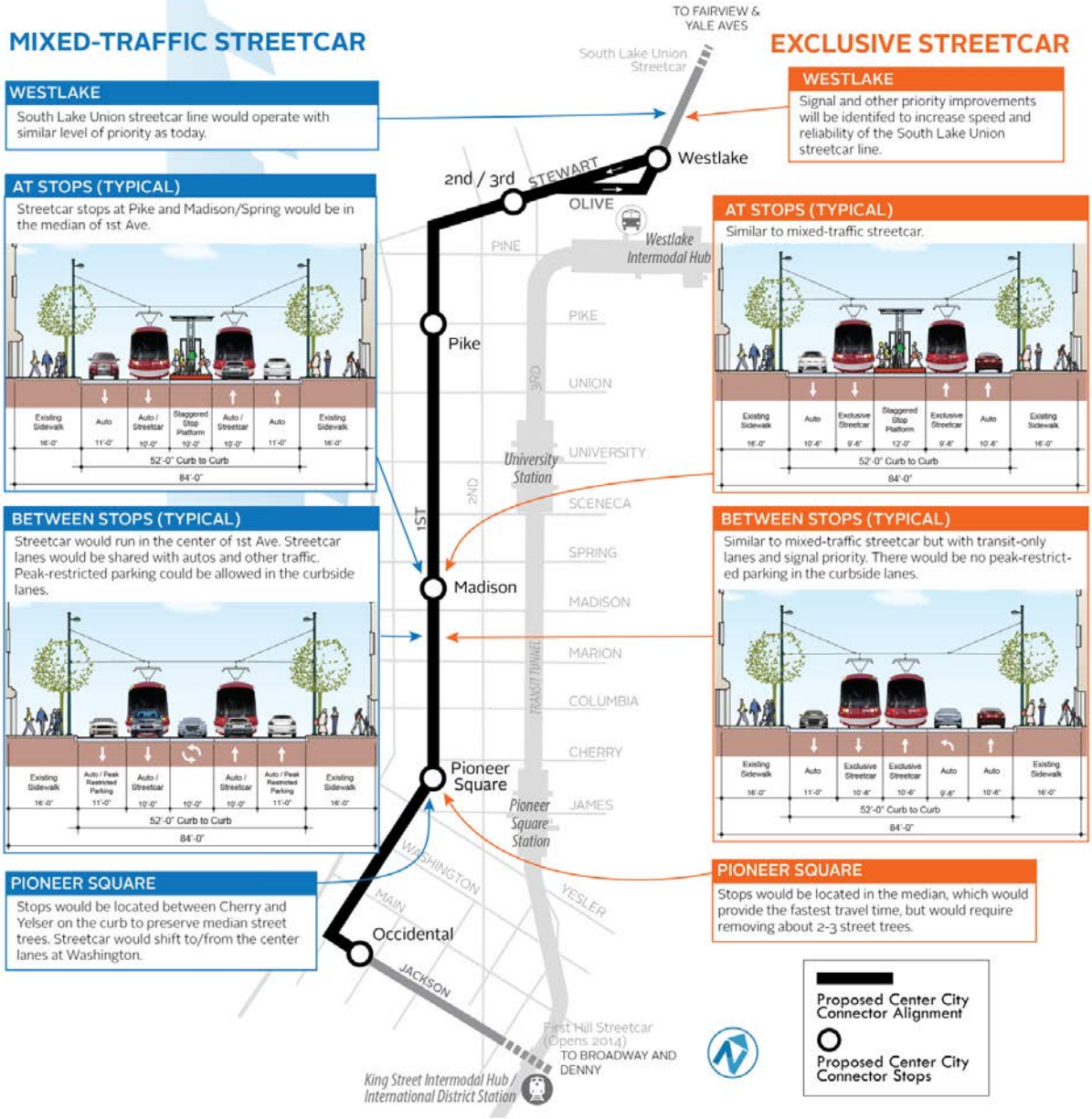
The east-west alignment options were evaluated using a simplified set of criteria including bike and pedestrian conflicts, transit conflicts, Westlake Hub operations, access to the Downtown Seattle Transit Tunnel (DSTT), traffic operations, parking and access impacts, design risks and feasibility, legibility, and stakeholder support. All of the alignment options except for Stewart/Olive fared poorly on the design risk and feasibility criteria for reasons including risk of impacting the DSTT waterproofing membrane and impacts to brick intersections along Pine. The Stewart/Olive alignment also had several drawbacks, including less direct connections to the Westlake Hub and potential conflicts with regional transit routes that use Stewart Street and Olive Way. However, Stewart/Olive scored highly on other metrics and had the lowest design risk. The Stewart/Olive alignment was evaluated in both the Tier 1 screening and Tier 2 evaluation, however the Pike/Pine alignment had strong stakeholder support and the best connections to Westlake Hub. Both the Stewart/Olive and Pike/Pine/4th/5th alignments (A and C in Figure 4-5) were recommended for inclusion in the LPA, and both will be evaluated in the subsequent environmental review process.

Additional detail on the screening of east-west connections is provided in the Detailed Evaluation report, Chapter 5 and Appendix O.

Tier 2 Alignments

The Tier 2 evaluation analyzed 1st Avenue with Mixed-Traffic and Exclusive Streetcar alternatives, as shown in Figure 4-7 including representative cross-sections. The analysis assumed an east-west connection using Stewart Street and Olive Way between 1st Avenue and Westlake as described on page 4-8. Although a northern extension of the 1st Avenue alignment to Uptown received strong public support, this segment did not meet the project Purpose and Need and is being analyzed as part of the Ballard-to-Downtown High Capacity Transit Study. The Tier 2 evaluation results are summarized in the next chapter.

Figure 4-7 Tier 2 Alternatives



5 SUMMARY OF TIER 1 SCREENING AND TIER 2 EVALUATION RESULTS AND PUBLIC INPUT

This chapter summarizes the Tier 1 screening and Tier 2 evaluation results in addition to stakeholder input received throughout the process. The Detailed Evaluation Report and Appendices present the evaluation results in more detail.

Summary of Tier 1 Screening Results and Input

Each Tier 1 alternative was evaluated based on a set of measures corresponding to the Project goals and objectives, and rated on a relative scale for each measure. Figure 5-1 and Figure 5-2 summarize the evaluation measures and qualitative ratings for the Tier 1 alternatives.

Figure 5-1 Tier 1 Screening Results

4TH/5TH AVENUES		EVALUATION MEASURES	1ST AVENUE	
MIXED-TRAFFIC STREETCAR	EXCLUSIVE STREETCAR		MIXED-TRAFFIC STREETCAR	EXCLUSIVE STREETCAR
12.8 minutes	8.9 minutes	**Streetcar Travel Time, PM Peak** Jackson - Westlake, average north/south-bound, including stops, 2030	11.6 minutes	6.1 minutes
4th: +60% 5th: +40%	4th: -25% 5th: +5%	**% Change in Aggregate Bus Passenger Delay, 5-6 PM** Daily Hours Compared to No-Build	N/A	N/A
13.2 minutes	12.9 minutes	**Auto Travel Time, PM Peak** Jackson - Westlake, avg. north/southbound, 2030; "No-Build": 4th/5th 11.6 min; 1st 9.0 min.	8.8 minutes	11.8 minutes
$12.3 million/year	$12.0 million/year	**Annual Operating & Maintenance Costs** Integrated CCC, First Hill, SLU lines, 2013$	$12.3 million/year	$11.2 million/year
$54-$66 million	$58-$71 million	**Total Capital Costs** Center City Connector, including vehicles (with end-to-end operating plan), 2013 $	$60-$73 million	$63-$77 million
100%	58%	**On-Street Parking Impacts** % of Block Faces that Retain On-Street Parking	71%	42%
	132,000	**Number of Employees, 2030** Within 1/8 mile	93,000	
	7,500	**Population, 2030** Within 1/8 mile	10,700	
	6,595	**Number of Hotel Rooms, 2012** Within 1/8 mile	4,260	
	1.3 million	**Number of Annual Visitors, 2011** Within 1/8 mile	12.6 million	

Figure 5-2 Tier 1 Screening Summary Matrix

	Evaluation Measures	4th/5th Avenues		1st Avenue	
		Mixed-Traffic	Exclusive	Mixed-Traffic	Exclusive
ENHANCE	Streetcar Travel Times	Fair	Good	Fair	Best
	Auto Travel Times / Relative Traffic Diversion Impacts	Fair	Fair	Best	Fair
	Bus Travel Time and Reliability Impacts: Aggregate Bus Delay	Poor	Fair	Best	Best
	Bus Travel Time and Reliability Impacts: Aggregate Bus Passenger Delay	Poor	Fair	Best	Best
CONNECT	Multimodal Conflicts (Bike, Pedestrian, Bus, and Freight)	Fair	Poor	Best	Best
	Ridership Potential	Good	Best	Good	Best
	Annual Operating & Maintenance Costs	Fair	Good	Fair	Best
	Capital Costs	Best	Good	Good	Fair
DEVELOP	On-Street Parking Impacts	Best	Fair	Good	Fair
	Economic Development Opportunities	Good	Good	Best	Best
THRIVE	Access to Jobs	Good	Good	Good	Good
	Access for Vulnerable Residents and to Social Services and Affordable Housing	Good	Good	Good	Good
	Access to Tourist Destinations, Civic and Cultural Assets, and Open Spaces	Good	Good	Best	Best
	Public Support (based on first Open House) and Stakeholder Support	Fair	Fair	Best	Best
SUSTAIN	Urban Form and Placemaking Opportunities and Improvement Potential	Good	Good	Best	Best

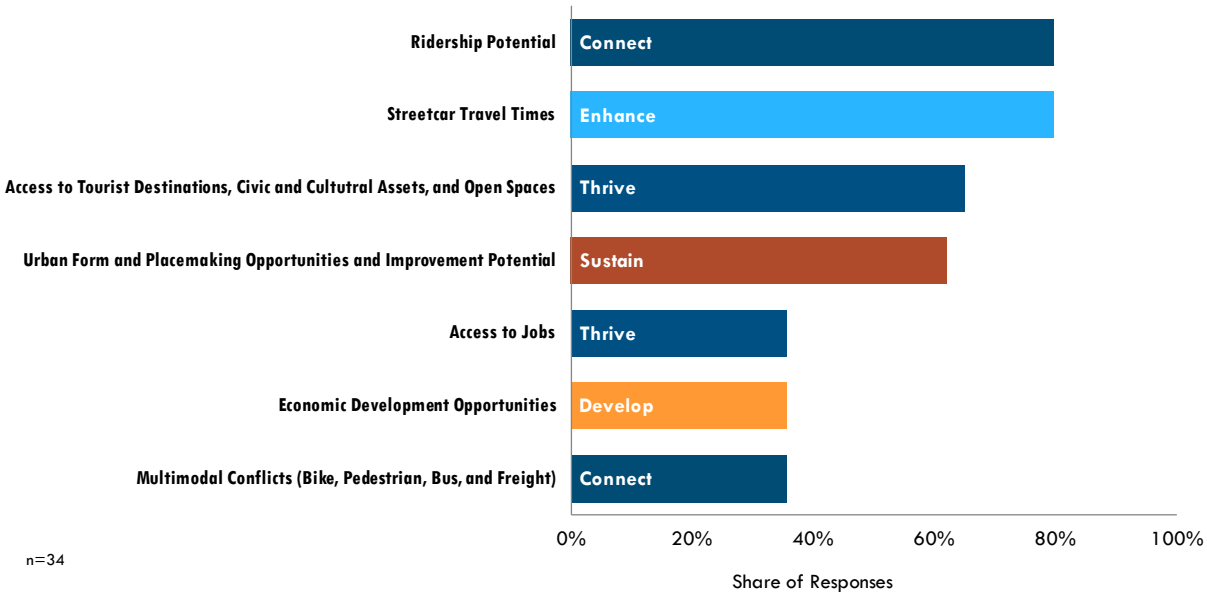
Overall, the 1st Avenue Exclusive Streetcar alternative rated "best" on the most evaluation measures compared to the other alternatives, including streetcar travel time. The 1st Avenue Mixed-Traffic Streetcar alternative rated "best" on the next highest number of evaluation measures, including the lowest impact to auto travel times. The 4th/5th Exclusive and Mixed-Traffic Streetcar alternatives scored "best" on fewer measures and "fair" or "poor" on more measures than the 1st Avenue alternatives.

Both of the Exclusive Streetcar alternatives (1st or 4th/5th Avenues) performed better than either Mixed-Traffic Streetcar alternative on measures of streetcar travel time, ridership potential, and annual operating and maintenance costs.

Figure 5-3 illustrates the most important of the criteria presented at the second open house as identified by open house participants. The evaluation measures identified by Open House participants as most important represent all five goal and objective themes (Enhance, Connect, Develop, Thrive, and Sustain). Related to these measures:

- High-level, peer-based ridership estimates for the Mixed-Traffic and Exclusive alternatives at this stage of evaluation indicated that ridership is comparable for the 4th/5th Avenue and 1st Avenue alignments, but that the faster and more reliable travel times in the Exclusive alternatives attract more riders. Detailed ridership estimates were prepared in the Tier 2 evaluation.
- Results for streetcar travel time, which participants identified as one of the most important criteria, are shown in Figure 5-4 and Figure 5-5 in relation to No-Build auto travel times. The 1st Avenue Exclusive Streetcar alternative had the fastest streetcar travel time.
- As shown in Figure 5-3 (above), the 1st Avenue corridor has higher annual visitation to major attractions and a higher residential population, while the 4th/5th Avenue corridor serves a greater employment and hotel room density.
- 1st Avenue presents greater placemaking/urban form improvement opportunities and greater economic development potential than 4th/5th Avenues. Stakeholders emphasized throughout the process that their preference was for streetcar to support economic success for small and local businesses in existing, established business districts rather than large-scale development or redevelopment.
- The 4th/5th Avenue alternatives rated "Fair" or "Poor" in terms of modal conflicts. Introduction of a streetcar increases peak-hour delay for passengers traveling on regional bus routes that use 4th or 5th Avenues. Cycle tracks are proposed for the 4th/5th Avenue corridor in the City's Bicycle Master Plan update, and with the one-way cycle tracks included in the high-level right-of-way design for each street, there were limited opportunities to provide exclusive streetcar right-of-way particularly on 5th Avenue. The intensity of streetcar, bus, bike, and pedestrian use increases modal conflicts on 4th/5th Avenues.

Figure 5-3 Ranking of Evaluation Measures by Importance, Open House #2



Note: Participants were asked to rate the five most influential criteria.

Figure 5-4 and Figure 5-5 provide a sample of the graphics used to present the data from the analysis.

Figure 5-4 Average One-Way Travel Time, 4th/5th Ave

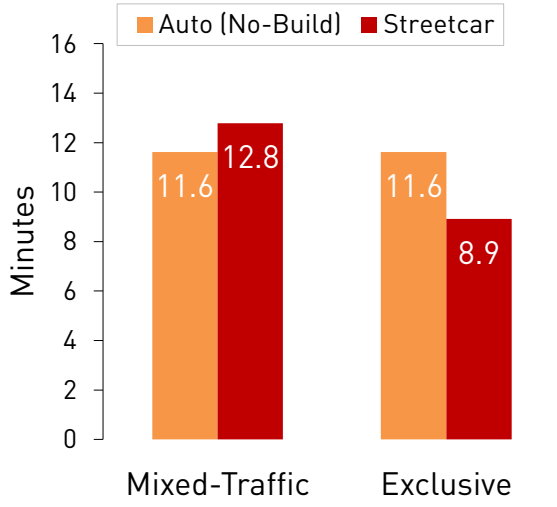
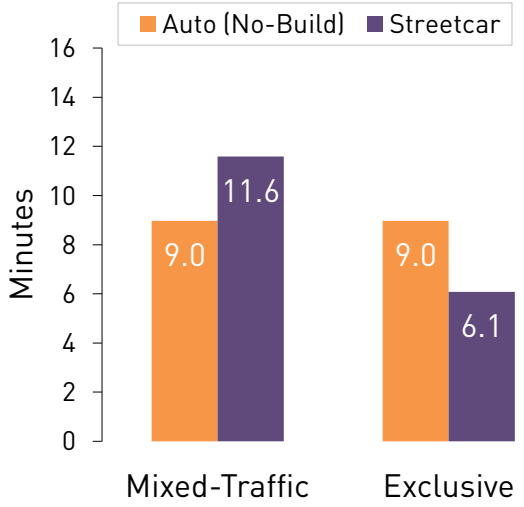


Figure 5-5 Average One-Way Travel Time, 1st Ave

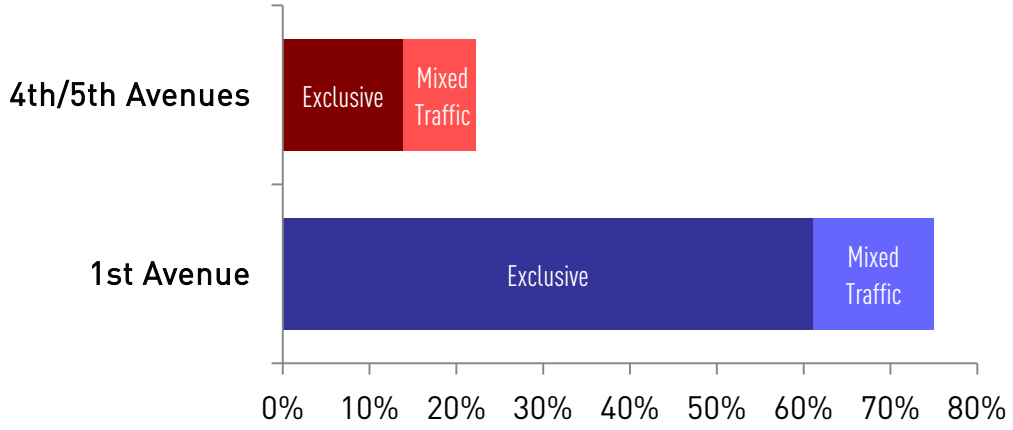


Note: Based on Synchro analysis for 2030 PM Peak period.

Summary of Public Input on Tier 1 Alternatives (Open House #2)

Open house attendees were asked to rank the four Tier 1 alignment alternatives according to preference. Figure 5-6 shows the outcome of the ranking exercise. The 1st Avenue Exclusive Streetcar alternative was by far the most popular alternative. The 1st Avenue Mixed-Traffic and 4th/5th Avenue Exclusive Streetcar alternatives received similar levels of support, while the 4th/5th Mixed-Traffic alternative received very little support. Additional feedback from the open house indicated that for those who preferred the 1st Avenue Exclusive Streetcar alternative, streetcar speed and reliability were the most important evaluation criteria.

Figure 5-6 Public Support for Tier 1 Alternatives



Tier 1 Recommendation

Based on the technical evaluation and strong stakeholder and public support in favor of 1st Avenue, the project team recommended to City Council that both the 1st Avenue Exclusive and 1st Avenue Mixed-Traffic Streetcar alternatives be advanced for more detailed study in the Tier 2 evaluation. This recommendation was presented to the Seattle City Council Transportation Committee at an informational briefing on July 9, 2013. Council comments were supportive. No action was taken.

Appendix N of the Detailed Evaluation Report includes the full Tier 1 Screening Report.

Summary of Tier 2 Evaluation Results and Input

Similar to Tier 1, the Tier 2 alternatives (1st Avenue Mixed-Traffic Streetcar and 1st Avenue Exclusive Streetcar) were evaluated based on measures corresponding to the Project goals and objectives, and rated on a relative scale for each measure. Figure 5-7 and Figure 5-8 summarize the evaluation measures and qualitative ratings for the Tier 2 alternatives.

Figure 5-7 Tier 2 Evaluation Results

MIXED-TRAFFIC STREETCAR	EVALUATION MEASURES	EXCLUSIVE STREETCAR
11.5 minutes	**Streetcar Travel Time, PM Peak** (Jackson/Occidental - Stewart/Westlake, average north/southbound, including stops, 2018)	**7.5 minutes**
26%	**Streetcar Travel Time Reliability, PM Peak** (Variance between streetcar travel times, 2018)	**12%**
20,000 - 27,000 daily riders	**Forecasted Weekday Daily Riders** (Integrated CCC, First Hill, and SLU lines, 2018)	**23,000 - 30,000 daily riders**
$16.5 million/year	**Annual Operating & Maintenance Costs** (Integrated CCC, First Hill, and SLU lines, 2018 $)	**$15.0 million/year**
$110-$119 million	**Total Capital Costs** (Center City Connector, including vehicles, 2013 $)	**$104-$111 million**
6.5 minutes	**Auto Travel Time, PM Peak** (Jackson/Occidental - Stewart/Westlake, avg. north/southbound, 2018; "No-Build" travel time: 5.7 min)	8.0 minutes
Diversion: < 10% Avg. Delay Increase: 2 sec	**Traffic Delay from Diversion, PM Peak** (% diversion of vehicles from 1st Avenue and increase in average intersection delay on parallel streets, 2035)	Diversion: up to 50% Avg. Delay Increase: 3.5 sec
Peak-restricted: 80 All-day: 15 Loading: 45	**On-Street Parking and Loading Impacts** (Approx. number parking stalls and loading zone spaces retained. No-Build: about 145 peak-restricted, 25 all-day parking stalls; 80 general/passenger loading spaces)	Peak-restricted: 5 All-day: 20 Loading: 15

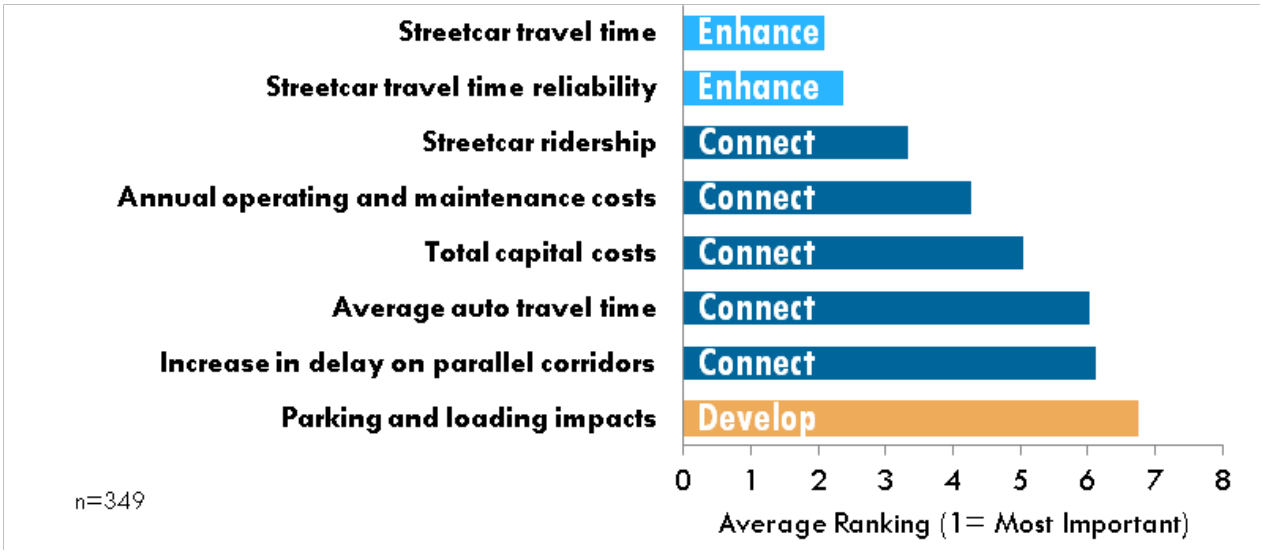
Figure 5-8 Tier 2 Evaluation Summary Matrix

	Evaluation Measures	1st Avenue	
		Mixed-Traffic Streetcar	Exclusive Streetcar
ENHANCE	Streetcar Travel Time	Fair	Best
ENHANCE	Streetcar Travel Time Reliability	Fair	Good
ENHANCE	Bus Travel Time and Reliability Impacts: Aggregate Bus Delay	Fair	Best
CONNECT	Auto Travel Time	Good	Fair
CONNECT	Traffic Diversion Impacts	Good	Fair
CONNECT	Projected Ridership	Good	Best
CONNECT	Annual Operating & Maintenance Costs	Good	Best
CONNECT	Capital Costs	Good	Best
DEVELOP	On-Street Parking and Loading Impacts	Fair	Poor
DEVELOP	Economic Development Opportunities (from Tier 1 Evaluation)	Best	Best
THRIVE	Public Support (Open House and Online Survey Feedback) and Stakeholder Support	Fair	Best
THRIVE	Access to Jobs (from Tier 1 Evaluation)	Good	Good
THRIVE	Access to Social Services and Affordable Housing (from Tier 1 Evaluation)	Good	Good
THRIVE	Access to Tourist Destinations, Civic and Cultural Assets, and Open Spaces (from Tier 1 Evaluation)	Best	Best

The Exclusive Streetcar alternative rates better than the Mixed-Traffic alternative on the streetcar travel time and reliability criteria. As a result, the Exclusive alternative is less expensive to operate, since fewer service hours are required to provide the same level of service. Capital costs are also lower in this alternative since vehicles travel through the corridor faster and more reliably, allowing peak operations with fewer vehicles (vehicles are included in Project capital costs). The Exclusive Streetcar alternative also has higher projected ridership. However, this requires converting lanes currently used for parking and in some cases for general purpose traffic to transit-only lanes. The Mixed-Traffic Streetcar alternative has less impact on auto travel times on 1st Avenue and traffic diversion to other streets. On-street parking impacts, while still rated "Fair," are less significant in the Mixed-Traffic Streetcar alternative compared to the Exclusive Streetcar alternative.

Figure 5-9 identifies the relative importance of the eight evaluation criteria presented in Figure 5-7, as ranked by online survey respondents and open house participants. Evaluation measures were ranked from 1 (most important) to 8 (least important).

Figure 5-9 Ranking of Evaluation Measures by Importance, Open House #3 and Online Survey

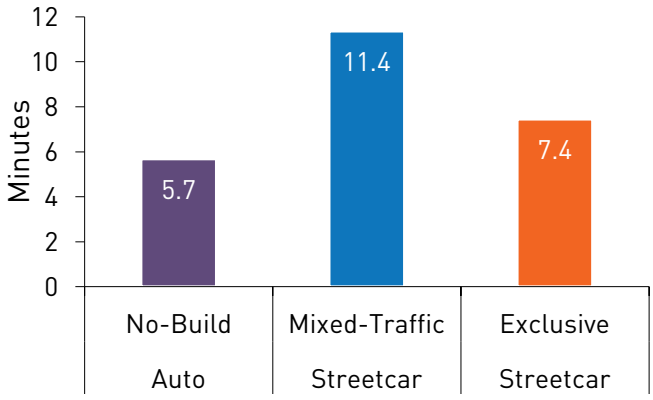


The following graphics present analysis results supporting the measures identified by open house participants and online survey respondents as the most important:

Streetcar Travel Time

- The Exclusive Streetcar alternative has faster travel times (by four minutes in the PM peak) and is more reliable than a Mixed-Traffic Streetcar alternative. Streetcar travel times for 2018 are shown in Figure 5-10.

Figure 5-10 Average One-Way Travel Times, Streetcar vs. No-Build Auto, 2018, PM Peak



Notes: The Tier 2 travel time results were developed for a 2018 opening year using the VISSIM traffic simulation software to model traffic signal operations, streetcar operating conditions, and multimodal traffic flows. These results are not directly comparable to the Tier 1 travel time results (page 5-4), which were developed for a 2030 horizon year using the Synchro traffic analysis software.

Streetcar Ridership

- Weekday daily ridership (Figure 5-11) was projected for No-Build (South Lake Union and First Hill Streetcars), Mixed-Traffic, and Exclusive Streetcar alternatives using the FTA STOPS ridership model.
- Approximately 23,000 to 30,000 weekday daily boardings are projected for the integrated streetcar system with the Center City Connector Exclusive Streetcar alternative, an increase of about 14,500 to 23,000 boardings above the No-Build alternative.
- In part due to higher average speed and better reliability, the Exclusive Streetcar alternative is projected to have approximately 3,000 more daily boardings than the Mixed-Traffic Streetcar alternative.
- Figure 5-12 shows projected linked streetcar trips utilizing the Center City Connector stations and/or segment, including through trips traveling between stations along the South Lake Union and First Hill Streetcar lines.

Figure 5-11 Projected Weekday Daily Streetcar Boardings, 2018

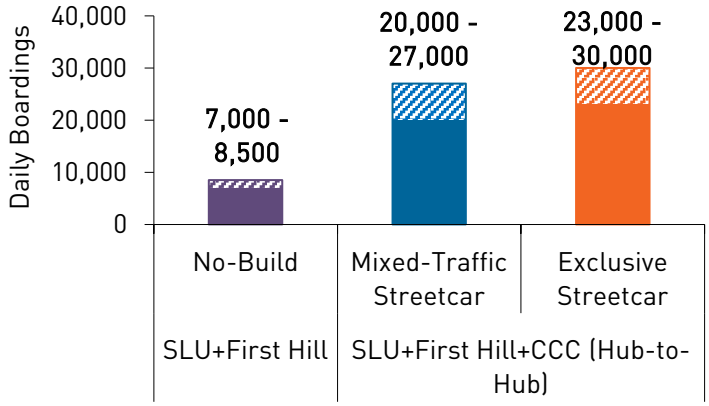
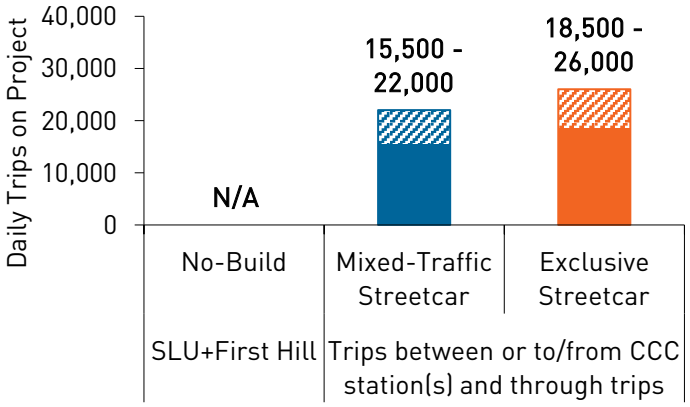


Figure 5-12 Projected Weekday Daily Trips on Project, 2018

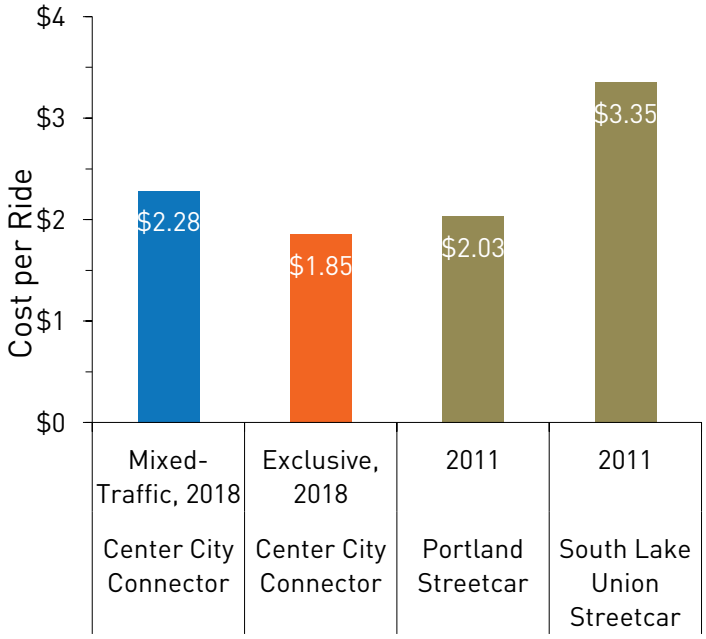


Note: The low-end of each range is based on a STOPS model run calibrated to current characteristics of the South Lake Union Streetcar, which do not fully reflect anticipated use of the Center City Connector by visitors and for non-work purposes. Although STOPS is not designed to fully capture such trips, the high-end STOPS model projection is intended to more fully account for these new ridership markets. For example, a separate analysis indicated that 3,500 daily visitors (mid-range estimate) would utilize the streetcar system with the Center City Connector in place. Additional investigation of these new markets is needed to further refine the estimate of their ridership potential. Appendices A and B of the Detailed Evaluation Report provide additional detail on the ridership analysis.

Operating and Maintenance and Capital Costs

- Operating and capital costs are lower for the Exclusive Streetcar alternative due to efficiency enabled by faster and more reliable travel times; the same frequency is provided with fewer vehicles and shorter operating trip times. Figure 5-13 illustrates the estimated operating and maintenance cost per passenger trip for the integrated streetcar system compared to the existing South Lake Union Streetcar and the Portland Streetcar.

Figure 5-13 Estimated Operating and Maintenance Costs per Passenger Trip

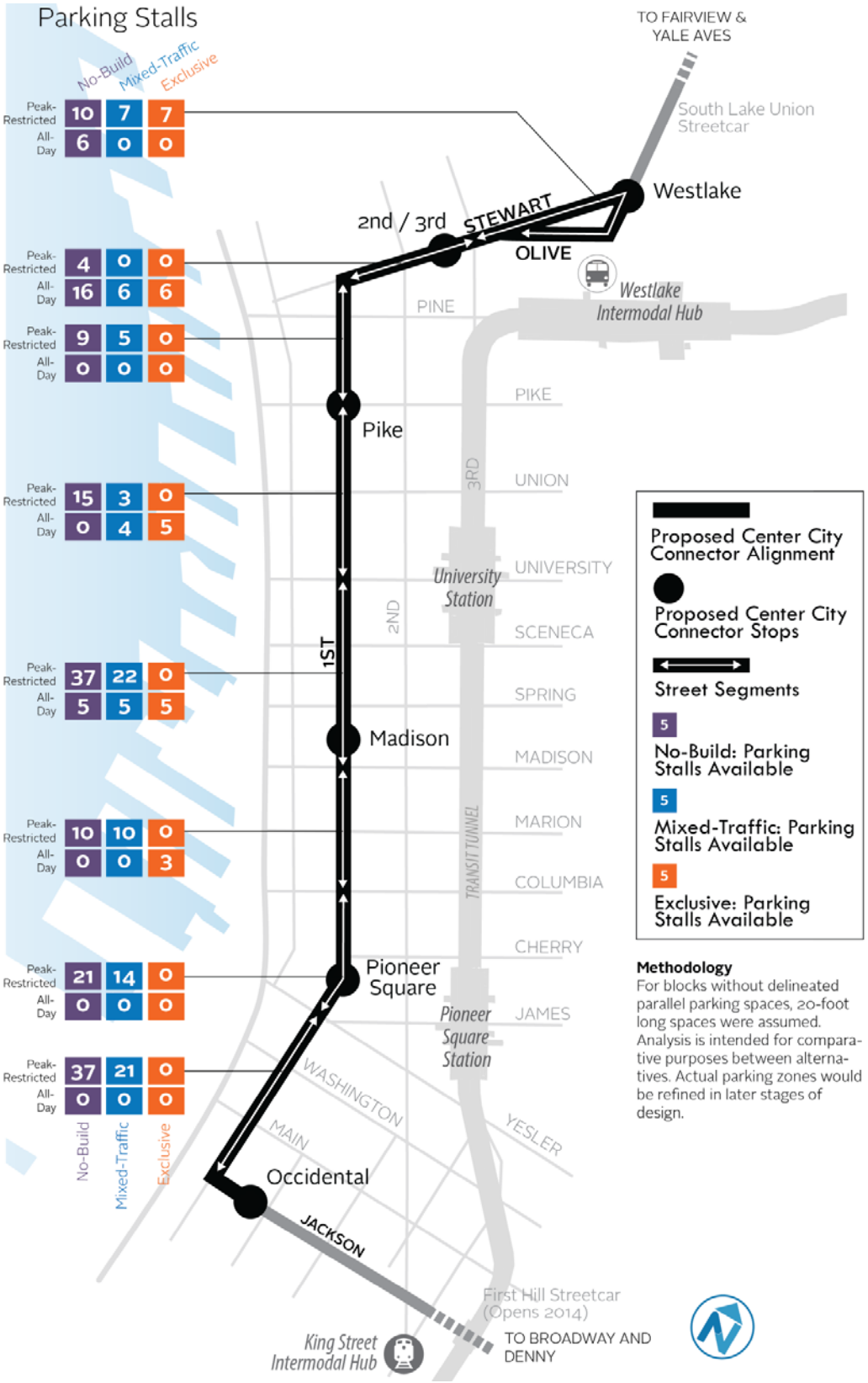


Note: Based on average of low and high ridership projections for each alternative. Center City Connector ridership and operating and maintenance (O&M) costs are for 2018 in 2018$. Portland Streetcar and South Lake Union Streetcar ridership and O&M costs are for 2011 in 2011$.

On-Street Parking Impacts

- On-street parking impacts are more severe in the Exclusive Streetcar Alternative compared to the Mixed-Traffic Streetcar alternative.
- Figure 5-14 illustrates these impacts for peak-restricted and all-day on-street parking stalls by segment of the alignment. The Exclusive Streetcar alternative also has higher impacts on auto travel times on 1st Avenue and on parallel streets.

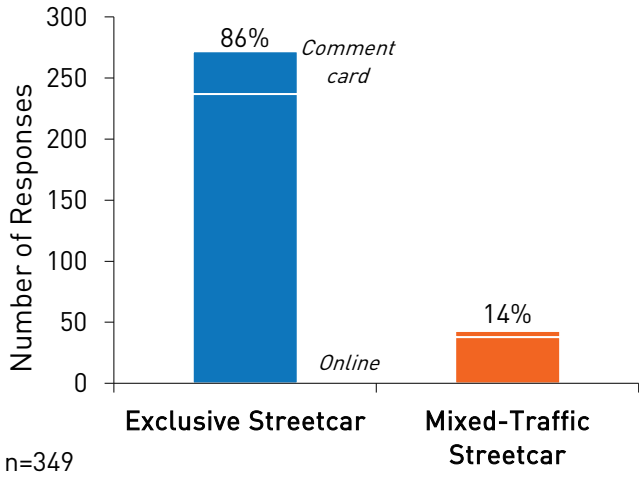
Figure 5-14 On-Street Parking Impacts (Comparative Analysis)



Summary of Public Input on Tier 2 Alternatives (Open House #3) and Online Survey

In addition to the elements of the technical evaluation described above, stakeholder input strongly favored the Exclusive Streetcar alternative. Figure 5-12 shows stakeholder input on the Tier 2 alternatives based on completed comment cards at the third Project open house and online survey responses. In total, 86% of respondents favored the Exclusive Streetcar alternative compared to 14% who favored the Mixed-Traffic Streetcar alternative. Respondents who favored the Exclusive Streetcar alternative cited better performance in terms of speed, reliability, ridership, and costs as important factors in their evaluation. Those who supported a Mixed-Traffic Streetcar alternative cited the reduction of parking and loading zones, impacts to automobile travel on 1st Avenue, and the removal of several median street trees in the Pioneer Square neighborhood as concerns.

Figure 5-15 Public Support for Tier 2 Alternatives



Tier 2 Recommendation

Based on stronger performance against the Project evaluation criteria and the level of public support, the project team recommended 1st Avenue Exclusive Streetcar as the Locally Preferred Alternative. Both Stewart/Olive and Pike/Pine/4th/5th east-west connections between 1st Avenue and the South Lake Union Streetcar were recommended for inclusion in the LPA.

The Detailed Evaluation Report, Chapters 6 to 9, provides additional detail on the Tier 2 evaluation.

6 RECOMMENDED LOCALLY PREFERRED ALTERNATIVE

LPA Decision Process

The Center City Connector Transit Study is a local planning process, supported in part by Federal Transit Administration grant funds, to evaluate mode and street alignment alternatives for connecting the South Lake Union and First Hill Streetcar lines and enhance transit mobility in Seattle's Center City. At the commencement of the planning process, a management decision-making body was established within the Seattle Department of Transportation (SDOT) to advance key Project decisions within the agency. This Steering Committee was comprised of the Department Director, the Deputy Director, Lead City Council Liaison, and directors of SDOT Policy and Planning, Traffic Management, Major Projects, and Capital Projects and Roadway Structures divisions. The Steering Committee was responsible for approving key decisions, such as screening out mode and alignment options, and endorsing the final draft Locally Preferred Alternative (LPA) recommendation. In addition, key SDOT technical staff provided input and consultation throughout the planning process.

Approval of the LPA by the Mayor and Seattle City Council is required to advance the Project. Following review and approval by the Office of the Mayor and the City Council Transportation Committee, a resolution describing the LPA was advanced to the full City Council for adoption. The LPA was approved by the full City Council on July 21, 2014.[3]

The Center City Connector Transit Study also involved key agency partners including King County Metro Transit, Sound Transit, and Community Transit. In addition to staff-level coordination, which occurred throughout the study process, the SDOT Director convened a High Capacity Transit Executive Working Group (including Sound Transit, City of Seattle and King County Metro) that met twice during the process and allowed agency partners to exchange information on progress of major City and regional transit initiatives.

LPA Project Description

The LPA is a key policy document that provides a description of the Center City Connector Project that the City of the Seattle is planning to construct and operate. This section describes the roadway and transit capital improvements and operating characteristics of the recommended LPA.

The following pages describe key elements of the recommended LPA for the Center City Connector.

[3] Resolution number 31526

Figure 6-1 LPA Alignment Detail

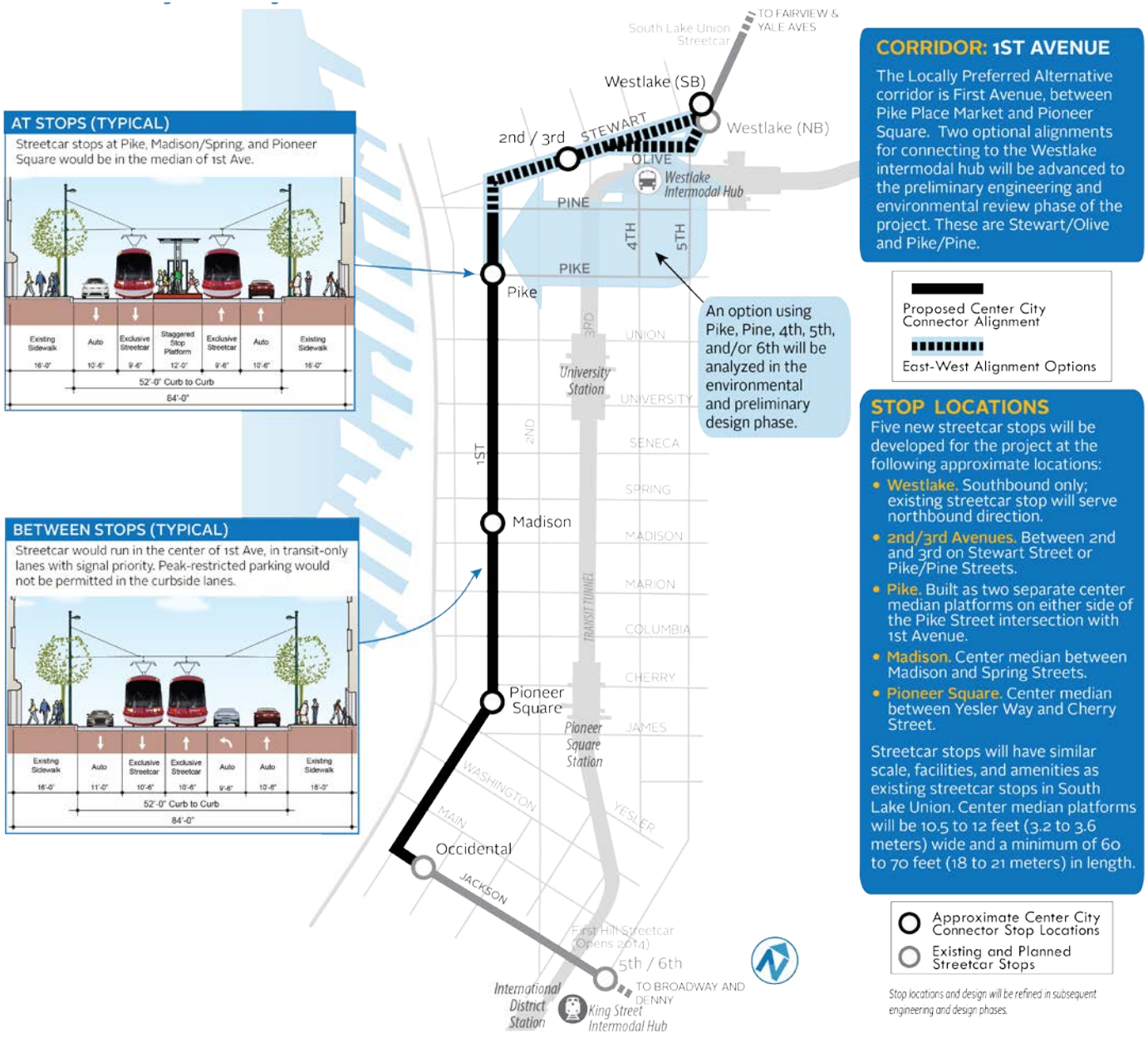
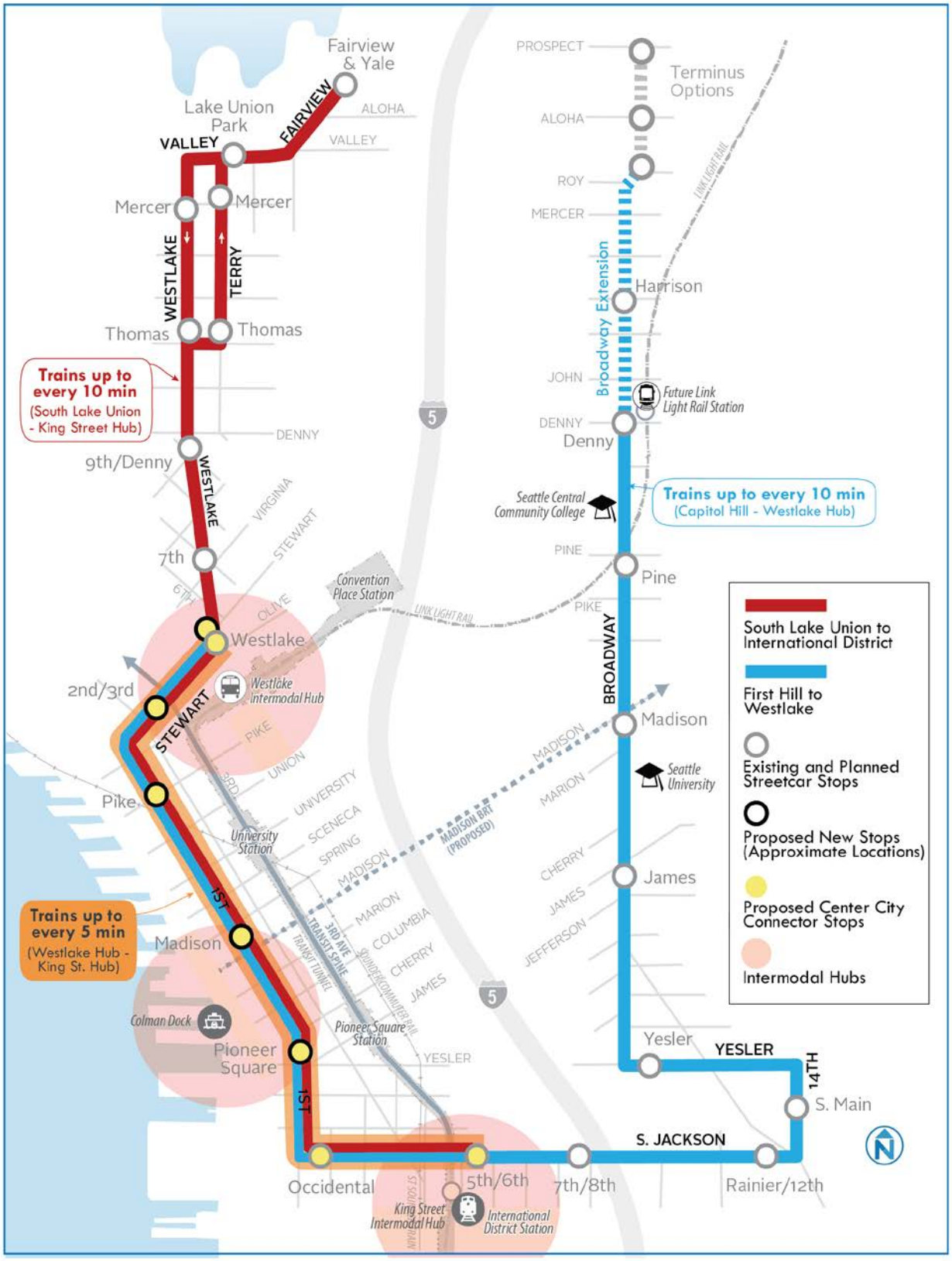


Figure 6-2 LPA Preferred Operating Scenario



Mode and Vehicles

The Center City Connector will operate modern streetcar vehicles compatible with operations on the South Lake Union and First Hill Streetcar lines.

The LPA includes the purchase of nine modern streetcar vehicles for the City of Seattle's streetcar fleet. Three of the new vehicles will replace vehicles in the existing South Lake Union fleet with vehicles that have the capacity to run off-wire as will be required on the First Hill portion of the alignment. These nine vehicles will supplement the seven off-wire capable vehicles currently owned or on-order. The total streetcar fleet will include 16 modern streetcar vehicles that will be able to operate on all segments of the combined streetcar lines.

MODE: MODERN STREETCAR

Modern streetcar vehicles[1]

[1] *Modern streetcar vehicles are known as double-ended trams or light rail vehicles and are commonly used in European Cities; 2.46 meter width, operating at 750V dc.*

Projected revenue from the sale of the three used streetcar vehicles is subtracted from the vehicle element of the Project capital cost.

Alignment

The LPA corridor is 1st Avenue between Pike Place Market and the planned terminus of the First Hill Streetcar at S. Jackson Street and Occidental Avenue S. Two optional alignments for connecting to the Westlake intermodal hub will be advanced to the preliminary engineering and environmental review phase of the Project. These are Stewart Street/Olive Way and Pike Street/Pine Street/4th Avenue/5th Avenue Streets.

Transit Priority

The Center City Connector Project will feature exclusive streetcar lanes (may be shared with bus transit in certain segments). Exclusive transit running way is a core component of the Project providing a high level of operational reliability and a transit travel time through the Downtown area that is highly competitive with auto travel and other modes of travel.

In addition to running in exclusive transit lanes for the full length of the Project, the Center City Connector will employ transit signal priority (TSP) treatments at all signalized corridor intersections. Signal priority will be used to hold lights green for approaching streetcars and shorten red times for streetcars stopped at intersections. Separate

TRANSIT PRIORITY

EXCLUSIVE TRANSIT RUNNING WAY

Streetcar would operate in exclusive streetcar lanes (or shared with bus) throughout the Center City Connector alignment.

TRANSIT SIGNAL PRIORITY

The Center City Connector will run in exclusive transit lanes for the full length of the project and employ transit signal priority treatments (TSP) at corridor intersections. Signal priority will be used to hold lights green for approaching streetcars and shorten red times for streetcars stopped at intersections. Separate streetcar signal phases will be employed where streetcars will need to operate across general purpose travel lanes. Details of signal design will be developed as the design is advanced.

streetcar signal phases will be employed where streetcars will need to operate across general purpose travel lanes.

Operation and Service Characteristics

The Center City Connector will allow Seattle's streetcar investments to operate as a system, increasing the mobility value provided by previous investments as well as providing service to the densest neighborhoods in the city. The Connector allows the Seattle Streetcar network to operate as two independent, overlapping lines. These two lines will provide overlapping service between Westlake Intermodal Hub and King Street Intermodal Hub, with a stop near the City's third intermodal hub at Colman Dock. This overlapping portion of the line will have five minute headways between 7 AM and 7 PM on weekdays and Saturdays and between 8 AM and 7 PM on Sundays. The two operating lines illustrated in Figure 6-2 (page 6-3) are:

- **SLU-King Street ("Red"):** one line between South Lake Union (Fairview & Yale Aves) and King Street intermodal hub
- **Capitol Hill-Westlake ("Blue"):** one line between Capitol Hill (Broadway & Denny Way) and Westlake Intermodal Hub

Daily span of service proposed for each of the two lines is:

- Monday through Saturday up to 20 hours (5 AM to 1 AM)
- Sundays/Holidays up to 17 hours (6 AM to 11 PM)

Proposed headways for the two lines are:

- Every 10 minutes between 7 AM and 7 PM on weekdays and Saturdays and between 8 AM and 7 PM on Sundays
- Every 15 minutes to 20 minutes during all other hours of operation

The LPA does not require (or anticipate) service changes to any local bus routes operated by King County Metro or bus services that other regional transit providers operate in the downtown.

Stops

Five new streetcar stops will be built for the Project at the following approximate locations:

- **Westlake (Southbound only)**: the existing streetcar stop in McGraw Square will serve northbound direction
- **2nd /3 rd Avenues:** between 2nd and 3rd on Stewart Street or Pike/Pine Streets
- **Pike**: built as two separate center median platforms on either side of the Pike Street intersection with 1st Avenue
- **Madison**: center median between Madison and Spring Streets
- **Pioneer Square:** center median between Yesler Way and Cherry Street

Streetcar stops will have similar scale, facilities, and amenities as South Lake Union and First Hill Streetcar stops. Center median platforms will be 10.5 to 12 feet (3.2 to 3.6 meters) wide and a minimum of 60 to 70 feet (18 to 21 meters) in length.

Connectivity

The Center City Connector will link over a dozen Seattle neighborhoods with a Seattle Streetcar system that stretches from Capitol Hill and First Hill, to the International District and South Downtown, and north to the Denny Triangle and South Lake Union, passing through the heart of downtown. By linking existing streetcar investments, the Connector will provide a streetcar system that is highly legible, easy-to-use for a variety of trip purposes, and that serves areas where the City is experiencing intense urban development.

The Center City Connector will serve the City of Seattle's three Intermodal Hub Areas including, Westlake Intermodal Hub, Colman Dock Intermodal Hub, and King Street Intermodal Hub. The Connector will provide convenient transfers to the 3rd Avenue Transit Spine at both ends of Downtown, to Link Light Rail via multiple Downtown Seattle Transit Tunnel station entries, and to Sounder Commuter Rail at King Street Station. Future transit investments such as the proposed Madison Street Bus Rapid Transit would bisect the Center City Connector.

The Center City Connector will be highly accessible to pedestrians using Seattle's well developed downtown sidewalk system. The Pike Street stop will be accessible from all points of the intersection via the current "all-walk" intersection design. All streetcar platforms will be accessed at signalized intersections or marked mid-block crossings and will be ADA accessible.

Typical Cross Section

On the 1st Avenue segments of the Center City Connector alignment, the streetcar will operate in parallel 10.5-foot transit-only lanes located in the center of the roadway. Streetcar stops in this segment of the alignment will be center median located and will range in width from 10 to 12 feet. Platforms in Pioneer Square and between Madison and Marion will provide boarding for both directions of streetcar travel. At Pike Street, a split station will be developed with passenger boarding on the far side of the intersection. The split platform will increase passenger capacity in the relatively narrow 1st Avenue right-of-way and will allow pedestrians to enter the platforms from all points on the intersection as Pike and 1st Avenue operates as an all-walk intersection. Figure 6-1 (page 6-2) provides cross sectional illustrations of the typical street design at mid-block locations with and without a platform.

Right-of-way design and track placement for the east-west portion of the line will be further refined during the environmental phase of the Project.

Operations and Maintenance Facilities

The Center City Connector will require storage capacity for six additional streetcar vehicles. The City of Seattle owns streetcar operations and maintenance bases in South Lake Union (right) and in the Chinatown/International District.

Source: Nelson\Nygaard

The Center City Connector will provide all vehicles on both lines access to either O&M facility. Expansion of both sites was assessed as part of this study. It was determined that there is existing capacity for two additional vehicles between both sites and that it is feasible to expand either or both sites to accommodate the remaining four additional vehicles required for the Center City Connector. Maintenance activities could be handled by the existing investments. New costs are primarily for the development of additional vehicle storage capacity. Costs for land purchase, design, and construction are included in the overall Project capital cost. The specific site will be selected in the next phase of Project development.

Fare Collection

FARE COLLECTION

Seattle Streetcar system will be fully integrated with ORCA, the regional transit fare system. ORCA card readers will be installed at stop platforms and on trains. Other fare media will be available for purchase at each streetcar stop.

Source: Nelson\Nygaard

The LPA assumes that by the time of Project opening, the Seattle streetcar system will be fully integrated into the regional transit fare collection system. Central Puget Sound Transit agencies have developed a coordinated fare payment system. This partnership led to the 2009 launch of the ORCA ("One Regional Card for All") card, which is a contactless, stored value smart card used for payment of public transport fares for eight separate transit providers in the Puget Sound area. Seattle Streetcar is not currently integrated with the regional system; however, ORCA cardholders can show their cards to ticket inspectors as proof of payment on the streetcar.

ORCA uses modern RDFI technology to store value on personal cards that function as an E-purse. ORCA-equipped stations and vehicles use an RDFI card reader on board or at the stop/station to track personal trips. Fare revenues are allocated using card data to the respective agencies providing recorded trips.

Further exploration of the fare payment options will be conducted during Project development and will be a key element of the operations finance plan development.

Roadway Operational Changes

The Exclusive Streetcar alternative included new restrictions on left turns at several intersections along 1st Avenue as identified in Figure 6-3. Northbound and southbound left-turns are currently restricted at Madison, but northbound left-turns will be allowed in the Exclusive Streetcar alternative.

Figure 6-3 Changes in Intersection Treatments from No-Build Condition

Through Street	Cross Street	Lefts on 1st Allowed?	
		No-Build	Exclusive Streetcar
1st Ave	Stewart St	Northbound Allowed	Restricted
1st Ave	Pike St	Northbound Allowed	Restricted
1st Ave	Union St	Northbound Allowed	Restricted
1st Ave	Madison St	Northbound & Southbound Restricted	Northbound Allowed; Southbound Restricted
1st Ave	Marion St	Southbound Allowed	Restricted
1st Ave	Columbia St	Northbound Allowed	Restricted
1st Ave	Jackson St	Northbound & Southbound Allowed	Northbound Restricted; Southbound Allowed

Additional detail is provided in the Detailed Evaluation Report, Appendix G.

LPA Capital Improvement Summary

Figure 6-4 provides a summary of transit capital improvements for the No-Build and Locally Preferred Alternatives. The No-Build Alternative includes the existing South Lake Union and funded First Hill Streetcar lines. The unfunded Broadway Extension of the First Hill Streetcar line is not included in the No-Build Alternative.

Figure 6-4 Transit Capital Improvements

Attribute	No-Build		LPA
	South Lake Union	First Hill	
Trackway			
Streetcar Track Miles (one way)	2.6	5.0	1.2
Storage Tracks / Turnbacks	2	2	2 [a]
Fleet			
Modern Streetcar Vehicles (no off-wire capability)	3		
Modern Streetcar Vehicles (hybrid)	1	6	9 [b]
Stops			
Independent Platforms/Stops	11	10	6 [c]
Operating and Maintenance Facilities			
Facilities (number of facilities)	1	1	0
Existing Vehicle Storage Capacity	6	8	-
New Vehicle Storage Capacity (number of revenue vehicles)	-	-	4

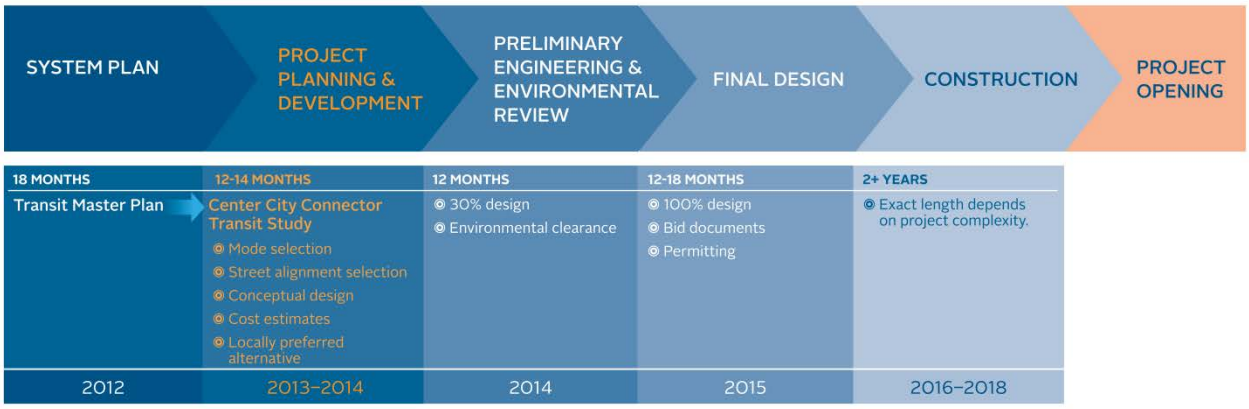
Notes: (a) Assumed to be north of the Westlake stop and east of the 10th/Jackson stop. (b) Vehicles include replacement of three existing South Lake Union vehicles without off-wire capabilities, bringing total streetcar fleet to 16 vehicles. Up to 14 of these vehicles would be in service and two would be spares. (c) Includes a new southbound platform at Westlake and modifications to the Occidental/Jackson stop.

7 NEXT STEPS

The adoption by the Seattle City Council of a Locally Preferred Alternative is a critical step for the Center City Connector Project and represents completion of an important local planning phase. Throughout the Center City Connector Transit Study process, the City of Seattle has coordinated closely with the Federal Transit Administration (FTA). The City submitted a project development letter to the FTA on March 11, 2014, formally requesting to enter the Project into the Project Development stage, and submitted a revised letter on May 15, 2014 based on initial FTA feedback. City Council adoption of the LPA and the FTA's approval to enter Project Development will enable the City to commence preliminary engineering and required environmental analyses.

Figure 7-1 illustrates the progression of the Project from identification in the Transit Master Plan to construction and completion. The current identified year of opening is 2018.

Figure 7-1 Center City Connector Project Development Timeline



The City of Seattle has budgeted funds to continue Project development and design in 2014 and 2015. Funding has been identified to complete the preliminary engineering and environmental review and final design phases of the Project.

The following are key next steps in advancement of the Center City Connector Project.

- **FTA Project Development Status.** Once the FTA approves the City's request to advance into Project Development, the project sponsor has two years to complete the National Environmental Policy Act (NEPA) process and submit sufficient information on the cost, financial commitments, and project rating to qualify for a Project Construction Grant Agreement (PCGA). The FTA approved the City's request on July 21, 2014.
- **City Council Adoption of the LPA.** The Seattle City Council approved the LPA on July 21, 2014.
- **Finalize alignment decision for east to west connection between 1st Avenue and Westlake Intermodal Hub/McGraw Square.** Two alignment sub-alternatives are carried forward in the LPA: (1) Olive and Stewart and (2) Pike and Pine connecting to McGraw Square and the South Lake Union alignment via some combination of 4th, 5th, and 6th

Avenues. Further technical analysis and stakeholder outreach is required to confirm this alignment and will be completed concurrent with the Project's environmental analysis.

- **Conduct an evaluation of the Project against Small Starts project evaluation criteria**, which were recently updated as part of MAP-21. The FTA has requested that the City of Seattle submit sufficient information related to Project ranking against Small Starts criteria by August 2014 to allow them to include the Project in their New Starts Report to Congress and be in a position to recommend funding in the President's FY2016 Budget. Fifty percent of the Project rating is based on the strength of the City's capacity to finance and deliver the Project, the remaining 50% is based on an assessment against the following six criteria (each valued equally).
  - **Land Use.** Criterion includes existing density and zoned development capacity.
  - **Economic Development.** Criterion includes the potential for economic development to occur as part of the transit development. Project sponsors are allowed to submit economic development scenarios that project specific development for a mode investment like streetcar.
  - **Cost Effectiveness.** The criterion for cost effectiveness for Small Starts projects is the cost/ride for the federal share of the Project. To achieve a high rating, the cost per ride must be below $1.00.
  - **Mobility Benefits.** Mobility benefits are determined by the number of people served or benefitted by the investment.
  - **Environmental Benefits**. Environmental benefits are determined by the use of the mode and the effectiveness in reducing environmental impacts. The benefits of the development are not included in this criterion which is limited to evaluating the mode being utilized.
  - **Congestion Relief**. No rules or guidelines have been established as this criterion was added in MAP-21 late in the process and were not included in preliminary notice of the rule making. FTA intends to issue special guidance on this criterion.
- **Conduct NEPA/SEPA analysis and documentation of Project impacts**. An initial step in this process will be formal agreement with FTA regarding the class of action or type of NEPA evaluation required. Based on conversations with the FTA, the City expects that an Environmental Assessment level of NEPA documentation will be appropriate for this project and that a full EIS will not be required. Once that formal decision has been made and documented, the Project will advance through required environmental analysis, documentation and public findings, and assuming all impacts can be mitigated, develop the documentation of a Finding of No Significant Impact (FONSI).
- **Develop finance plan**. FTA evaluates projects on the local capacity to finance and build the Project and the level of commitment for the local sources of funding. The project sponsor's financial commitment to the Project includes capital and operations. Formal financial commitments are not necessary to advance into Project Development. During Project Development, the project sponsor must produce formal commitments of the local capital

funds and funding for 20 years of operation for the system. The local sponsors commit to operate the Project for 20 years as part of the PCGA. Concurrent with environmental documentation and preliminary engineering and final design, the City will develop capital and operating plans that commit local funds to match federal capital grant funds and support service operations.

The City has begun to evaluate local capital and operating funding options. Capital financing scenarios assume that a portion of the Project cost will be funded through an FTA Small Starts grant, which provides grants up to $75 million for transit projects with a total project cost not exceeding $250 million. A number of local, regional, and state sources are being evaluated to provide local match. FTA's Section 5309 funding program, which includes Small Starts, allows for federal grants covering up to 80% of the project cost (not to exceed $75 million).

- **Commence Preliminary Engineering and Final Design.** Once the Center City Connector Project has been advanced by the FTA to project development status, the City of Seattle will begin work on preliminary engineering and final design.
- **Develop urban design guidelines for guideway and overhead catenary systems, stations and adjacent pedestrian areas, streets, landscaping, lighting, and security.** The Center City Connector alignment travels through Seattle's oldest and most historically significant neighborhood. The LPA also includes streetcar/transit only lanes on streets that have traditionally operated general purpose traffic lanes. Operating transit vehicles at street grade and in lanes where travelers are accustomed to driving will require proper demarcation of these new facilities to ensure safe travel for all road users. The City plans to develop urban design guidance to ensure capital elements of the Project (guideway, stations, etc.) are responsive to localized urban design conditions and enhance street and neighborhood quality. The urban design guidelines will also inform and direct operational functionality of the right-of-way as it relates to loading zones, event management and pedestrian access, wayfinding, lighting, and security.
- **Develop a construction phasing plan.** Private development and a number of large public infrastructure projects (i.e., Seawall Replacement, Alaskan Way Viaduct Replacement, Central Waterfront Project) and a number of other planned street projects are underway or to be completed in the next 5 to 10 years. It will be critical to understand how the Center City Connector construction can be phased and implemented to limit impacts on downtown travelers and downtown businesses and to limit conflicts with other construction projects.

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Seattle Center City Connector Transit Study

Locally Preferred Alternative (LPA) Report (Volume I) Appendix A

September 2014

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Seattle Center City Connector Transit Study

Executive Summary

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2. Purpose and Need
3. Evaluation Framework
4. Evaluation of Alternatives
5. Summary of Tier 1 Screening and Tier 2 Evaluation Results and Public Input
6. Recommended Locally Preferred Alternative
7. Next Steps

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Cover image from SDOT

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APPENDIX A STATEMENT OF PURPOSE AND NEED FOR THE SEATTLE CENTER CITY CONNECTOR PROJECT

Project Purpose

A top priority identified in the Seattle Transit Master Plan (TMP) is to improve Center City transit services—increasing transit capacity, enhancing transit service quality and reliability, and improving transit options for residents, workers, and visitors traveling between and within Center City neighborhoods and attractions. The purpose of the Seattle Center City Transit Connector project is to serve the growing demand for Center City circulation trips,[1] with a mode and alignment that is highly legible, easy-to-use for a variety of trip purposes, and that provides continuity of travel between the downtown commercial core and adjacent Center City neighborhoods served by the South Lake Union Streetcar and the First Hill Streetcar. Figure A-1 illustrates potential Center City Connector street alignment options that were identified as part of the TMP.

Project Need

The need for the Center City Connector project is based on:

- **Significant existing population and employment and projected growth in the Seattle Center City**. Seattle's Center City neighborhoods have a significant concentration of households and employment, and are forecast to see employment growth of 60% and residential population growth of 97% by 2030.
- **Growth in demand for Center City circulation trips.** Recent analysis found high demand for trips between Center City neighborhoods and for accommodating "last mile" connections for trips using existing and planned local and regional transit services.
- **Constraints on expansion of Center City transportation capacity.** There is a limited number of north-south through streets available for transit and existing and planned transit will utilize much of the available capacity.

[1] For the purposes of this study, Center City circulation trips include (1) trips between and/or within Center City neighborhoods, (2) trips connecting major attractions and destinations in the Center City, and (3) last-mile connections from other local and regional transit services to jobs, human/social service centers, etc.

- **Special mobility needs of tourists, visitors, and casual users in the Center City.** Approximately nine million annual tourists visit Seattle each year and many rely on transparent and easily understood transit connections.
- **Affordable transportation access to key social and human services located in the Center City.** A large concentration of social service agencies in the Center City relies on good transit connections.
- **Connections for low-income workers who live in the Center City to jobs in the Center City.** There is a growing concentration of affordable housing and low- and moderate-income jobs in the Center City.
- **Reduction in greenhouse gas (GhG) emissions from private vehicle travel and traffic congestion.** Seattle's Climate Action Plan to reduce GhG emissions relies on providing higher-capacity transit to support dense mixed-use neighborhoods in the Center City.

Figure A-1 Center City Connector Transit Corridor Alignment Options (based on the Seattle Transit Master Plan)

Source: Map adapted from Seattle Transit Master Plan Summary Report, 2012, Figure 3-16

Introduction

The Seattle Center City Connector Transit Study will evaluate a range of transit improvements in Seattle's Center City. It specifically focuses on connecting north and south downtown and the existing South Lake Union Streetcar and planned First Hill Streetcar (currently under construction). This document describes the purpose and need for the project. The study, formally known as an alternatives analysis (AA), is planned to take approximately 14 months and will result in the recommendation and selection of a locally preferred alternative (LPA). The process will include extensive input from the public, stakeholders, and local, regional, state, and federal agencies. Public input on the proposed statement of purpose and need provided in this document was gathered at the first public open house in February 2013. This input was incorporated into the project purpose and need and will inform the evaluation criteria used in the analysis of corridor alternatives.

Study Corridor Description

Seattle's Center City area encompasses 10 neighborhoods – Uptown, South Lake Union, Capitol Hill, Belltown, Denny Triangle, Pike/Pine, Downtown Commercial Core, First Hill, Pioneer Square, and the Chinatown/International District. Figure A-2 provides an overview map of the Center City, including the study area. The core of Seattle's Center City resembles an hourglass where a limited set of north-south arterial corridors carry people and goods through the downtown core, the narrow neck of the hourglass. There is limited ability to enhance surface street capacity through the downtown core. Several of the north-south arterials (2nd, 3rd, 4th, and 5th Avenues), and the Downtown Seattle Transit Tunnel (DSTT) carry transit through downtown, but high utilization, limited expansion capacity, and increased future demand limit the ability of existing transit modes to provide access between key employment centers, retail, attractions, and residential populations.

The Center City Connector Transit Study will evaluate potential north-south transit alignments west of I-5 between the Lower Queen Anne, Uptown, and South Lake Union neighborhoods to the north, and the Chinatown/International District and South Downtown area including the King Street Station Multimodal Hub to the south. As mentioned above, the study will focus on leveraging existing City and regional partner investment in Center City streetcar lines by connecting existing termini at the north and south ends of downtown. The study may also identify transit opportunities or investments supporting future implementation of the Transit Master Plan or the Seattle Streetcar Network, which may be phased in through this project or as a part of future projects.

Figure A-2 Center City Area Map

Policy Background and Framework

High quality, high capacity connections between the downtown commercial core and other Center City neighborhoods are essential for Seattle to maintain a high quality of life for all of its citizens and visitors, succeed in a highly competitive global economy, and encourage development that supports the human and environmental health of the region. A strong Center City represents smart growth at its best, building a sustainable economy and vibrant, walkable urban neighborhoods. A strong multimodal transportation system is critical for economic growth and vitality in downtown Seattle and the region.

As described above, the transportation system in Seattle's Center City faces some of the most challenging geography and access constraints of any city of its size in North America. To address these constraints and allow for Center City growth, Seattle has developed a series of transportation planning documents that help support sustained growth in the Center City. These plans include:

- **Seattle Comprehensive Plan**. The Seattle Comprehensive Plan (2005) identifies an Urban Village Strategy to promote job and housing growth in concentrated centers that can be efficiently accessed and connected by a multimodal transportation system, including high-quality, frequent transit. A major update to the Seattle Comprehensive Plan is underway and elements of the Plan will be updated incrementally through 2015. A new "Transit Communities" subsection of the plan calls for the City to "leverage local and regional transit investments by aligning and coordinating land use policies and public investment to foster the development of strong residential and business communities oriented around transit."
- **Transit Master Plan (2012) and Seattle Transit Plan (2005).** The Transit Master Plan (TMP) recommended high-capacity transit and bus priority corridors citywide and for the Center City. The TMP identified the Center City Connector project as one of the top priorities for transit investment. The 2012 TMP supplanted the 2005 Seattle Transit Plan, which was developed to support the creation of transit connections between urban villages. This concept, referred to as the Urban Village Transit Network (UVTN), stated that high quality transit service and future development should be concentrated along travel corridors that meet criteria including high ridership and productivity potential.
- **Action Agenda.** SDOT's 2012 Action Agenda outlines policies and actions oriented around five core principles: (1) Keeping it Safe, (2) Focusing on the Basics, (3) Building Healthy Communities, (4) Supporting a Thriving Economy, and (5) Providing Great Service. Of particular relevance to the Center City Connector Transit Study, the Action Agenda includes policies to:
  - Maximize the environmental benefits of the transportation system
  - Increase mobility and access for everyone

- Make transit the efficient, affordable choice for a variety of trips
- Increase efficient and affordable access to jobs and education
- Support Center City and neighborhood business district access

- **Seattle Center City Circulation Study.** The Center City Circulation Study, completed in 2003, considered several independent transportation projects that affect the Center City, including light rail, bus, monorail, streetcar, ferry terminal, Alaskan Way Viaduct and Seawall (AWVS) Replacement, and bicycle and pedestrian projects. A central recommendation of the study was to create a fast, frequent, reliable and legible transit network that connects the city's Urban Centers and Urban Villages to each other and the Center City, as well as upgraded connections that facilitate connectivity and circulation within the Center City itself.
- **Seattle Center City Access Strategy:** The Center City Access Strategy, initiated in 2004, promotes recommendations of the Center City Circulation Study. Its goals include: creating a livable and walkable Center City; integrate and simplify the transit system; and accommodate anticipated growth. It identified 23 critical projects to improve access to downtown by expanding rail and bus networks; developing parking and demand management strategies; and enhancing the bicycle and pedestrian environment.
- **Streetcar Network Plan.** The Seattle Streetcar Network Development Report (2008) evaluated route options for the most promising potential streetcar corridors and routes in the Seattle Streetcar Network Concept that was approved by the City Council in February 2008.[2] The report evaluated potential corridors with respect to considerations including funding opportunities, cost and construction issues, travel time, connectivity and operating efficiency benefits, ridership potential, and development potential. The City Council subsequently adopted a resolution supporting a streetcar network in Seattle and prioritizing the four lines shown in the map in Figure A-3, including the Central Line (blue).[3]

[2] City of Seattle, City Council Resolution Number 31042, http://bit.ly/UHLdGQ

[3] City of Seattle, City Council Resolution Number 31091, http://bit.ly/13gVyh8

Figure A-3 Seattle Streetcar Network Concept Map

The Streetcar Network Plan includes the Central Line along First Avenue, shown in blue.

Source: Seattle Streetcar Network Development Report

- **Urban Mobility Plan/Alaskan Way Viaduct.** The Urban Mobility Plan (UMP) (2008) defined a "systems" solution for replacing the Alaskan Way Viaduct (AWV), including enhanced transit service; surface street and highway improvements; and other transportation programs and policies. This solution was analyzed as part of the Central Waterfront Partnership Process, which included the City of Seattle, King County, and the Washington State Department of Transportation (WSDOT) in a collaborative effort to select an AWV replacement approach. The final UMP report is based on the I-5/Surface/Transit Hybrid scenario developed as part of the Partnership Process. Among a variety of Center City streetcar connections analyzed, the hybrid scenario included a streetcar line along First Avenue connecting Pioneer Square, Seattle Center, and Uptown/Queen Anne.

Source: http://www.seattle.gov/transportation/docs/awvFinal_BoredTunnel_folio_Jan09.pdf, p. 3

- **Central Waterfront.** The Central Waterfront Project extends along the Elliott Bay waterfront from the Stadium District and Pioneer Square to Olympic Sculpture Park. A Waterfront Concept Plan was completed in 2006, anticipating future replacement of the AWV and Elliott Bay Seawall. An effort currently underway to develop more detailed design concepts has resulted in a Concept Design and Framework Plan (July 2012) for the central waterfront. The plan's transit framework includes a proposed streetcar or trolley bus on First Avenue, depending on the alignment selected in the Center City Connector Transit Study.
- **Economic Development**. The Seattle Jobs Plan for 2012 has four organizing themes: Innovate, Educate, Build, and Partner. Of particular relevance to the Center City

Connector Transit Study, the plan calls for connecting "Seattle's neighborhoods with high capacity transit, including rail, to provide residents and businesses with an affordable, reliable way to get around (the) city."[4]

- **Climate Action Plan.** Seattle's 2012 Climate Action Plan develops a Carbon Neutral Scenario for the city, consisting of strategies that would reduce greenhouse has (GhG) emissions by 90% by 2050 relative to 2008 levels. Within the transportation sector, this scenario assumes a 30% reduction in travel by light-duty vehicles (cars and light trucks)[5] travel by 2030 and a 40% reduction by 2050. It targets expansion of transit infrastructure and service sufficient to increase transit's share of passenger miles from 8% today to 25% by 2050 (a level achieved in cities such as San Francisco). The plan also notes that denser urban development can help facilitate achievement of travel reduction strategies and the carbon neutral goal.

Existing and Planned/Funded Transit in the Center City

Figure A-4 provides an overview of existing and funded transit services and facilities in the Seattle Center City. Transit services include bus services operated by King County Metro, Sound Transit, and other regional providers, which carry the majority of local and regional transit trips. Two Seattle RapidRide[6] lines began operating in 2012 with service to downtown Seattle. Link light rail, Sounder commuter rail, the Seattle Center monorail, water taxis, ferries, and the South Lake Union streetcar are other transit modes that serve the Center City. The City of Seattle owns the monorail and the streetcar; a private entity, Seattle Monorail Services, operates the monorail and the City and King County Metro operate the Streetcar.

Key downtown transit infrastructure includes the 3rd Avenue transit way and the Downtown Seattle Transit Tunnel (DSTT) and major multimodal hubs at Westlake Center, King Street, and Colman Dock. Planned transit services currently under construction include the First Hill Streetcar and expansion of Link light rail to Capitol Hill, the University District, and Northgate. The City of Seattle has secured funding for planning and design of the proposed Broadway Streetcar extension of the First Hill Streetcar, north of the First Hill line's planned terminus at Denny Way.

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[4] Seattle Jobs Plan, 2012, p. 6. http://www.seattle.gov/mayor/jobsplan/

[5] As defined by the National Highway Traffic Safety Administration, light-duty vehicles include minivans, sport utility vehicles, and trucks with gross vehicle weight less than 8,500 pounds.

[6] RapidRide is King County Metro Transit's BRT service. RapidRide operates primarily in shared traffic lanes, but does have exclusive (Business Access Transit) lanes for segments of the corridor, uses intersection signal priority treatments, and has enhanced station features and livery.

Figure A-4 Existing and Planned Transit Services and Facilities

Project Need Background

The need for the Seattle Center City Connector project is based on:

Significant Population and Employment and Projected Growth in the Seattle Center City

The 10 neighborhoods within Seattle's Center City currently contain over 158,000 workers and 24,500 residents. Center City neighborhoods – including Uptown, South Lake Union, Belltown, the Denny Triangle, the Commercial Core, Pioneer Square, and the Chinatown/International District – have the highest employment and population density citywide. By 2030, growth targeted for the area is expected to result in a 60% increase in jobs and a 97% increase in residents, with an estimated total population of over 300,000 people living or working in the Center City. Between 2004 and 2010, development in the South Lake Union neighborhood exceeded projections developed for the City in 2002, with over 13,000 jobs added (74% of the City's 2024 comprehensive plan goal for South Lake Union) despite the impact of the economic downturn.[7]

The Center City is projected to account for over 44% of overall population growth and 63% of overall job growth within the City of Seattle between 2008 and 2030. Figure A-5 illustrates projected population and employment growth in Urban Centers and Villages over this time period. The Denny Triangle, Downtown Commercial Core, and South Lake Union are targeted for substantial employment growth. Significant residential growth is planned in Belltown, Denny Triangle, First Hill, and South Lake Union. Belltown – a neighborhood at the center of the Center City Connector study corridor – is expected to experience the highest projected population growth of any city neighborhood between 2008 and 2030.

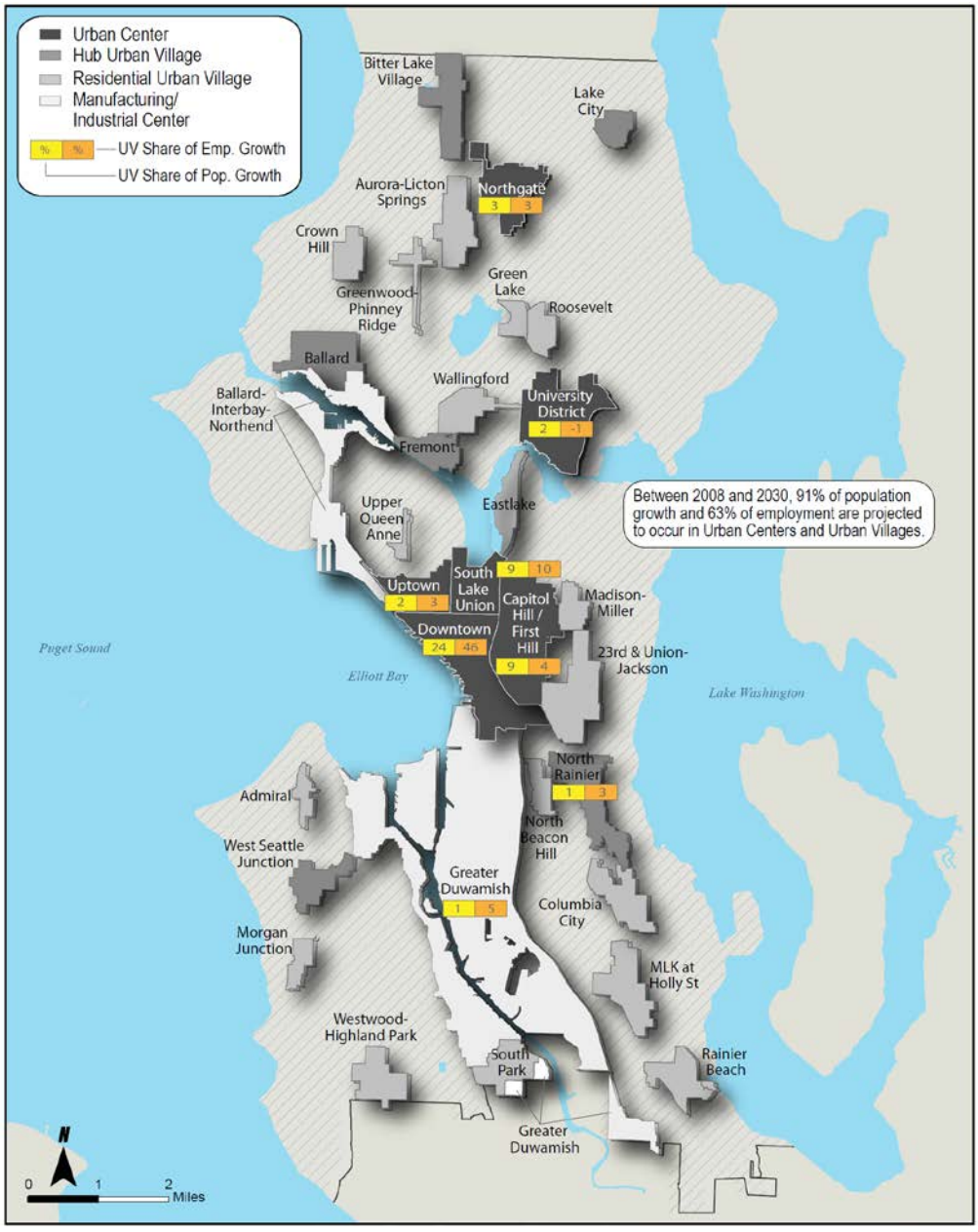
Recent upzoning amendments to the Seattle Comprehensive Plan will further encourage high-density residential housing in areas outside the main office core and greater office development in the downtown core. An example of this investment is the Daniels/Nitze-Stagen development that broke ground in 2011 on the Century-Link Field North parking lot adjacent to King Street Station at the south end of the Center City Connector study corridor. This development adds 668 residential units, 35,000 square feet of retail, and 420,000 square feet of commercial space in the first phase of the development. In addition, Amazon.com announced plans to develop three office towers – nearly 3.3 million square feet of office space and 66,000 square feet of shop and restaurant space – on three blocks in the Denny Triangle.

The upzoning regulations are also projected to promote affordable housing over the next 20 years. In South Lake Union, an over 11,000 additional housing units are targeted by 2031 under the upzoning regulations, beyond the number of units that were either completed or

[7] South Lake Union Development Update, 2004-2010.
http://www.seattle.gov/economicdevelopment/pdf_files/SLU%20Development%20Update%20FINAL%205-25.pdf

received a building permit in 2012. Over 4,000 of these new units are targeted to be affordable units, i.e., by households earning 0-80% of the area median income (AMI).[8]

Figure A-5 Projected Growth in Urban Centers and Villages, 2008-2030



Source: PSRC and City of Seattle projections; Seattle TMP Summary Report, Figure 1-2

[8] Housing: South Lake Union 2012 Update.
http://www.seattle.gov/dpd/cms/groups/pan/@pan/@plan/@proj/documents/web_informational/dpdp022279.pdf

Growth in Demand for Center City Circulation Trips

The Center City Connector corridor is characterized by strong market demand for short trips between the 10 neighborhoods that comprise the Seattle Center City and the many destinations, employment sites and services in the area. Recent analysis conducted for the TMP found high demand for trips between downtown, the International District, Lower Queen Anne, South Lake Union, and Denny Triangle, First Hill, Capitol Hill and other neighborhoods. Figure A-6 shows all daily tripmaking in the Center City, including home-based work and all other trips. A significant number of trips are made throughout the day between all market areas in the central part of the city. Most of these trips are relatively short distance, but are longer than the distance many people will choose to walk and often include challenging grades. Frequent and reliable transit service between these activity centers has the potential to attract many of these trips in the future. Planned development and projected growth in Center City population and employment is likely to only intensify the strong demand for Center City circulation trips, and the need for transit to help serve this increased demand.

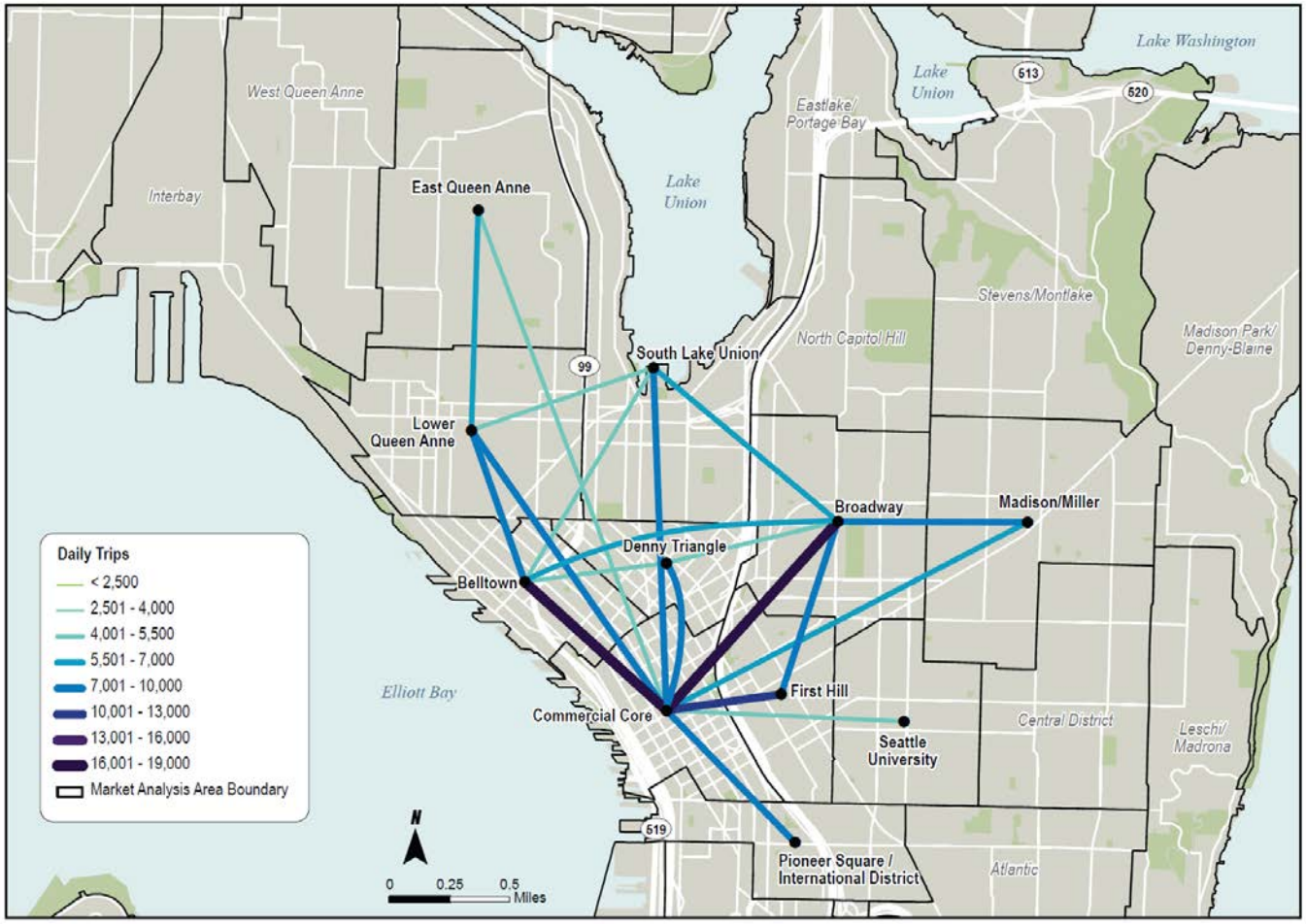
Stakeholders interviewed as part of this project included over 40 individual stakeholders and stakeholder groups representing a range of interests and geographies for which a new Center City transit line could improve access or connectivity.[9] Stakeholders consistently indicated a strong desire for enhanced transit connections between existing and funded investments in bus and rail service, such as the existing South Lake Union streetcar, the planned and funded First Hill Streetcar, and RapidRide. In particular, stakeholders felt a connection between the South Lake Union and First Hill streetcar lines would greatly enhance connectivity between key Center City destinations.[10]

There is also increased demand for last-mile transit service from the developing regional rail system that includes Link light rail and Sounder commuter rail, and for connections to/from/between major transit hubs, such as Westlake, Colman Dock, and King Street. Despite a high intensity of bus service in and through the Center City Connector corridor, few routes are directly oriented to Center City travel markets or last-mile connections from regional transit hubs. Moreover, King County Metro bus service was re-routed from 1st Avenue to the 3rd Avenue transit way in 2011, leaving First Avenue without continuous transit service through downtown.

[9] A complete list of stakeholders is provided in the Stakeholder Interviews Findings memorandum.

[10] Stakeholders were asked about the value of potential alignment options as shown in Figure A-1. Almost universally stakeholders indicated that the 1st Avenue alignment was the preferred option due to its ability to connect major civic and activity centers, several major retail and cultural districts, and provide north-south circulator for visitors to the Central Waterfront.

Figure A-6 Center City Travel Demand



Note: This map illustrates major origin-destination travel pairs for all trips and modes in the Seattle Center City.

Source: City of Seattle Travel Demand Model; Seattle TMP Briefing Book, Figure 2-26

Constraints on Expansion of Center City Transportation Capacity

Transportation capacity is already constrained in the Center City, including (1) inadequate commuter access capacity, (2) limited capacity on the 3rd Avenue transit way, and (3) high passenger utilization on existing transit routes serving downtown and the surrounding neighborhoods.

1. **Inadequate commuter access capacity in a mature transportation system with no new rights of way, a discontinuous street system, and reduced freeway portals (due to removal of the Alaskan Way Viaduct)**

   Over half of the surface street capacity in Center City is lost due to street grid discontinuities. Of the nine north-south downtown street corridors (Alaskan Way through 8th Avenue S), only four are continuous through the Center City. The 28 north-south street corridors between Elliott Bay and Lake Washington are funneled to four local bridges that cross the Lake Washington Ship Canal. Altogether, about 70% of Center City streets are dead ends, limiting their usefulness for traffic capacity and limiting solutions to extend and strengthen the street grid. The location of I-5 in downtown exacerbates Center City transportation capacity constraints. There are a limited number of freeway ramps leading in and out of downtown, focusing high volumes of peak-hour traffic on a relatively small number of access points.

   The lack of capacity through the Center City is made more acute by the replacement of the Alaskan Way Viaduct, a limited access facility on Seattle's waterfront, which currently has access ramps into the center of Seattle's downtown. These ramps are currently used by a number of local and regional bus routes. Upon replacement of the Viaduct, these ramps will be eliminated and bus service on the Viaduct will be moved to surface streets.

2. **Limited capacity of, and increased future demand on, the 3rd Avenue transit way and other transit-carrying surface streets**

   Third Avenue is a major north-south transit corridor through downtown and carries many local and regional bus route services. The Third Avenue transit way is approaching peak period transit vehicle capacity and is likely to reach capacity in the near future given projected transit demands and planned projects. Metro's three planned RapidRide BRT-style lines focus their downtown operations on Third Avenue. In addition, the extension of Link light rail to the north (to Capitol Hill, the University District, and Northgate) will force the remaining bus routes currently in the Downtown Seattle Transit Tunnel (DSTT) onto the surface streets by approximately 2020 (and potentially sooner, depending on rail and bus volumes in the tunnel and actual operational experience).

   Furthermore, bus service along the Third Avenue is not designed to serve local circulation trips. While it does provide this function, it is secondary to serving the mobility needs of citywide and regional customers accessing and leaving the Center

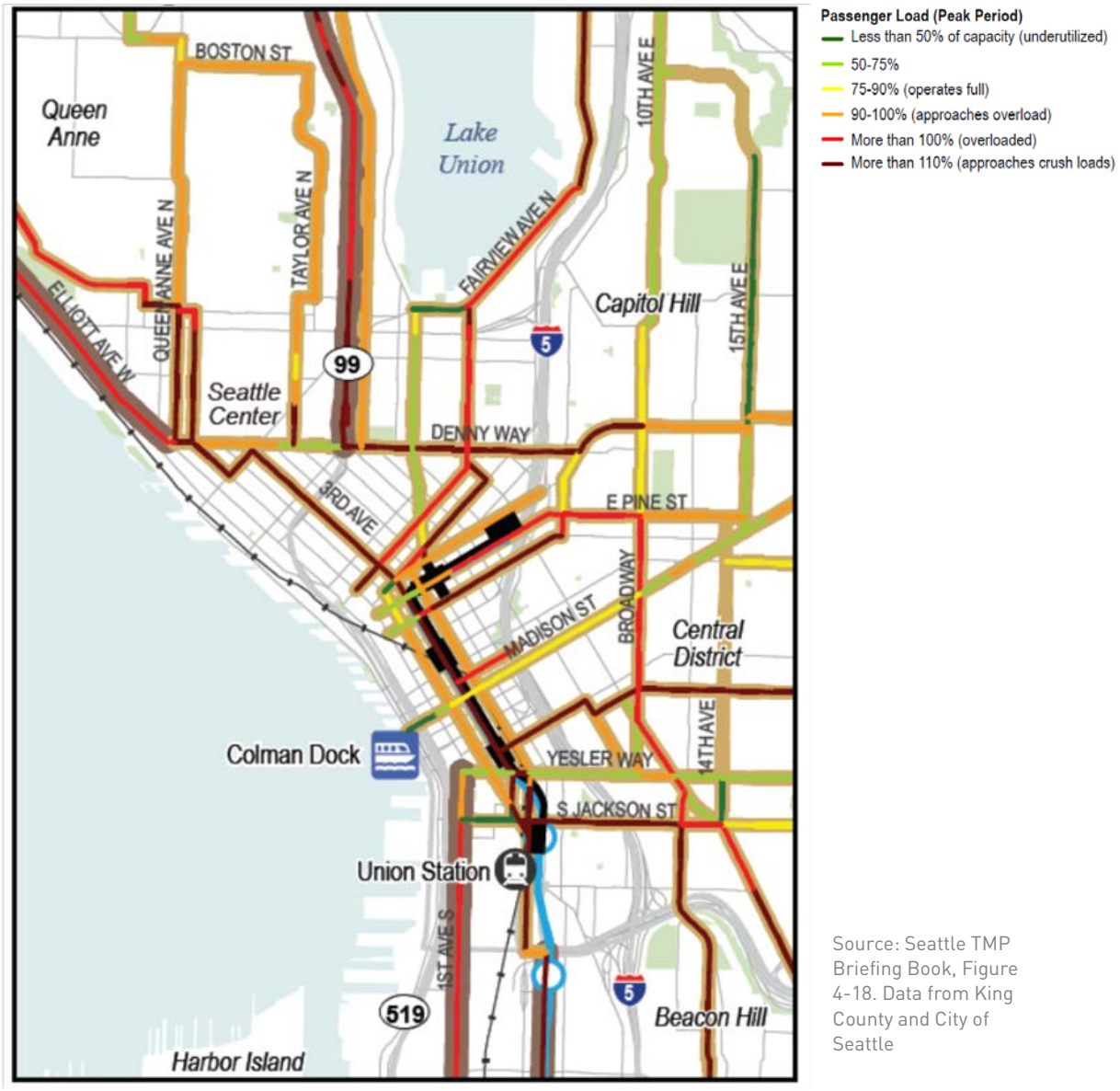
City. Local bus circulation is also more difficult with the elimination of the Ride Free Area in Downtown, and the requirement that riders now pay upon entering buses, which slows boarding times. Stop spacing for most routes is every four blocks, which is longer than is optimal for local circulation. And, it can be difficult, particularly for visitors or infrequent transit riders, to determine what extent of the transit way is served by any given bus line, since some routes do not run the full length of the transit way.

In addition, the Bicycle Master Plan is expected to identify locations of downtown cycle tracks, which could impact north-south traffic-carrying capacity through downtown.

3. **High passenger utilization on existing transit services serving connections between Center City neighborhoods**

   Currently, routes traveling through the Commercial Core from Lower Queen Anne to the Chinatown/International District frequently run at 110% of seated capacity during peak periods. Increased capacity (e.g., higher frequency and/or higher capacity vehicles) is needed to ensure transit remains a comfortable, reliable, and convenient travel mode for passengers making local trips within the Center City and between the Center City and adjacent neighborhoods. Figure A-7 illustrates passenger loads along transit corridors in the Center City.

Figure A-7 Downtown Passenger Load



Source: Seattle TMP Briefing Book, Figure 4-18. Data from King County and City of Seattle

Special Mobility Needs of Tourists, Visitors, and Casual Users in the CenterCity

Downtown Seattle is home to numerous regional activity centers. As the core of the region, it is the established cultural and civic center, attracting local visitors from adjacent and surrounding communities. Approximately nine million visitors spend $5 billion in Seattle and King County annually, including nearly $500 million on local transportation. Tourism revenue supports jobs for more than 49,000 people in the region.

Transit supports Seattle's tourism economy, helping to make the city an attractive destination for regional, national, and international visitors. Over half of these visitors arrive in Seattle by air, train, or means other than a private car. A highly transparent, visible, and legible circulation system for visitors, tourists, and casual users is needed to connect key attractions in the Center City.

Connections between retail districts are needed to support a vital local economy (e.g., Pioneer Square, Pike Place Market, Chinatown/International District, Belltown, and the commercial core). Downtown transit service must also meet the increased demand for access to Seattle's entertainment and cultural centers, such as the Waterfront, Seattle Center, and the Olympic Sculpture Park. This includes local transit connections to these destinations from the regional network. Figure A-8 provides an overview of major cultural assets and visitor destinations in the Center City.

Figure A-8 Major Center City Cultural Assets and Visitor Destinations

Cultural	Institutional/ Educational	Recreational/ Tourism	Shopping/Dining
▪ Seattle Art Museum (SAM) ▪ Seattle Asian Art Museum ▪ SAM Waterfront Sculpture Park ▪ Seattle Aquarium ▪ Seattle Children's Museum ▪ Pacific Science Center ▪ Experience Music Project ▪ Seattle Center Attractions (Various)	▪ Seattle and King County Administrative Offices ▪ Seattle City Hall ▪ King County Government Services ▪ Sound Transit Offices ▪ Seattle, King County, and Federal Courthouses ▪ Seattle Central Library ▪ Seattle Central Community College ▪ Seattle University ▪ First Hill Hospitals and Medical Offices	▪ CenturyLink Field ▪ CenturyLink Event Center ▪ Safeco Field ▪ Key Arena ▪ Memorial Stadium ▪ Convention Center ▪ Bell Harbor Conference Center ▪ Central Waterfront Attractions ▪ Elliott Bay Waterborne Attractions	▪ Pike Place Market ▪ Downtown Retail Core/Westlake Shopping and Hotel District ▪ Pioneer Square Historic District ▪ Chinatown/International District ▪ Belltown Retail District ▪ South Lake Union Commercial Businesses

Affordable Transportation Access to Key Social and Human Services Located in the Center City

Seattle's Center City has the highest concentration of services for homeless and vulnerable populations in the Puget Sound region. These services include the Downtown Emergency Service Center (DESC), Orion Center, the Pike Place Market Foundation, and the Downtown Food Bank. There are over 9,000 affordable housing units, i.e., income-restricted to 0-80% of the AMI, located throughout the Center City, of which nearly 54% are restricted to those earning up to 30% of the AMI and 88% are restricted to those earning up to 60% of the AMI.[11] A large concentration of affordable housing is at Yesler Terrace at the corner of E Yesler Way and 12th Avenue. This site will be the location of a planned 5,000-unit Housing and Urban Development (HUD)-funded mixed-income development, being developed by the Seattle Housing Authority. Over 1,800 of these units will be for people earning below the AMI for Seattle.[12]

Connections for Low-Income Workers who Live in the Center City to Jobs in the Center City

Concentrations of low- and moderate-income workers both reside and work in and around the Center City and need affordable and reliable transportation access. Figure A-9 illustrates concentrations of home locations for low- and moderate-income workers who both live and work in the Center City in relation to the potential alignments, based on U.S. Census Bureau Longitudinal Employer- Household Dynamics (LEHD) data for 2010, categorizing workers who earn under $1,250 per month and between $1,251 and $3,333 per month.

[11] Analysis of data provided by the Seattle Office of Housing for affordable and/or subsidized rental housing, 2009 (initial inventory) and 2011 (update).

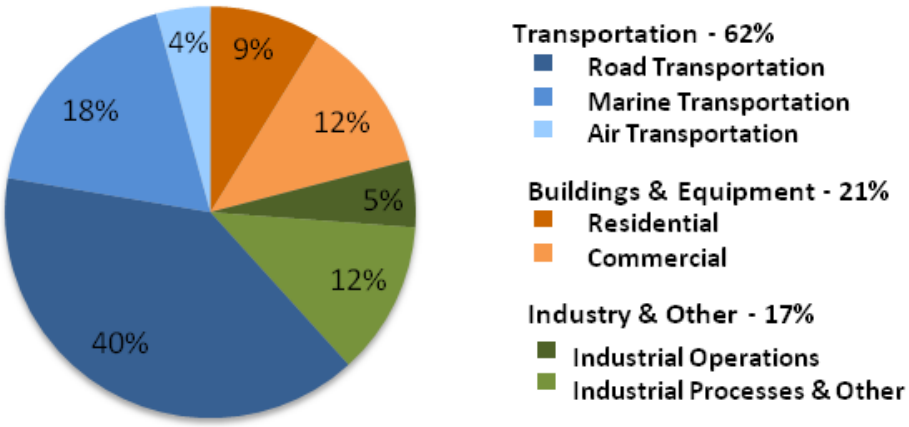
[12] The planned housing mix at the new Yesler Terrace includes 661 units for people with incomes below 30% Average Median Income (AMI), 290 additional units for people from 30-60% AMI, 850 workforce housing units for people with incomes below 80% AMI, and 1,200-3,200 market-rate units. (Source: http://www.seattlehousing.org/redevelopment/yesler-terrace/overview/index.html#newhousing)

Figure A-9 Home Locations of Low/Moderate-Income Workers who Live and Work in the Center City

Reduce Greenhouse Gas (GhG) Emissions from Private Vehicle Travel and Traffic Congestion

To meet its goals for GhG reduction, the City of Seattle needs to create an environment that will promote long-term sustainable growth, with development patterns that are less automobile-oriented and more supportive of its environmental goals. Seattle is in the process of updating its Climate Action Plan with a goal of achieving zero net greenhouse gas emission by 2050. The City of Seattle also signed on to the 2005 U.S. Mayor's Climate Protection Agreement, which adopted the goal of the Kyoto Protocol to reduce citywide GhG emissions by 7% below 1990 levels. To achieve these aggressive goals, Seattle will need to invest in an efficient public transportation system that connects key residential and employment areas to encourage residents and visitors to travel by transit. As of 2008, approximately 40% of Seattle's greenhouse gas emissions came from road-related transportation sources, as shown in Figure A-10. Transportation is the only sector in Seattle for which GhG emissions have increased, now roughly 7% above 1990 levels. Specific transportation actions recommended in the draft Climate Action Plan – developed through a Transportation Advisory Group and Green Ribbon Committee process – include providing higher capacity transit to support dense mixed use neighborhoods in the Center City.

Figure A-10 Seattle Emissions by Sector, 2008



Source: City of Seattle Climate Action Plan

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