



MEMORANDUM

To: Tony Mazzella and Allison Schwartz
From: Thomas Brennan and Oren Eshel
Date: March 29, 2013
Subject: Initial Screening Methodology and Results - DRAFT

This memo provides the results of the initial screening evaluation of street alignments and transit modes against the project's Purpose and Need for the Seattle Center City Connector project. It first describes the alignments and modes that were included in the screening process, describes the screening methodology, and then discusses the initial screening results.

STREET ALIGNMENTS IDENTIFIED FOR INITIAL SCREENING

Figure 1 identifies the alignments recommended for initial screening based on the Project Purpose and Need. Figure 2 shows the alignments on a map. These include the primary alignments identified through the Transit Master Plan (TMP) and additional alignment options that received support during stakeholder interviews held in November 2012 and at a public open house held on February 6, 2013.

- **A:** The 4th/5th Avenue alignment runs from the existing South Lake Union Streetcar terminus at Westlake hub to the International District Station just south of Jackson Street. This alignment was identified in the TMP and received public support at the February open house. An option to use 6th Avenue (east of Pike Street) will be included in this alternative at this stage of evaluation.
- **B/C:** Two potential alignment alternatives run on 1st Avenue. A general alignment using 1st Avenue between Jackson Street and Pike/Pine Streets received substantial support from stakeholders in interviews conducted by the project team.
 - **B:** This alignment runs from Westlake to Jackson Street, using one of several potential east-west connections to connect to the 1st Avenue portion of the alignment. This alignment was identified in the TMP and received substantial public support at the open house. Additional east-west connections options were identified at the open house and by the project team. At this stage of evaluation, this will be evaluated as a single alternative that includes a range of potential east-west connections between 1st Avenue and Westlake (existing streetcar line) as sub-options to the primary alignment. These short east-west connection alternatives were determined not to substantively change the rating of the alignment at this phase of the project.
 - **C:** This alignment runs from Queen Anne to Jackson Street via 1st Avenue, without a connection to Westlake. This alignment was identified in the TMP and received moderate public support at the open house.
- **D:** Two alignments using 3rd Avenue were identified through public input received at the open house.
 - **D1:** This 3rd Avenue alignment would run from Seattle Center to Jackson Street.

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- **D2:** This potential 3rd Avenue alignment would run from Westlake to Jackson Street with the option to connect to the existing South Lake Union Streetcar via Olive/Stewart.
- **E:** This alignment extends the 1st Avenue alignment (C), or other potential alignments, south of Jackson Street to the Stadium District/SODO (approximately Lander Street). It was identified through public input received at the open house and also received support from stakeholders.
- **F:** A Central Waterfront streetcar alignment also received support at the open house. A waterfront streetcar alignment was included, based on potential alignments recommended for further consideration in the Seattle Waterfront Streetcar Reactivation Study (2011).¹

¹A waterfront streetcar is currently being evaluated as part of the Central Waterfront project. The Central Waterfront analysis is anticipated to be completed in late spring 2013.

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Figure 1 Street Alignments Recommended for Initial Screening

Key	Primary Street(s)	Alignment Description	Source(s)/Support	Notes
A*	4 th /5 th	Westlake to International District Station via 4 th /5 th (and/or 6 th north of Pike)	1, 3	Multiple alternatives for connecting to existing South Lake Union line will be considered as a single alternative at this stage
B*	1 st	Westlake to Jackson St. via 1 st Ave. (various connection options, including but not limited to Virginia/Stewart, Pike/Pine, and Stewart/Olive, and 6 th Avenue north of Pike)	1, 2, 3	Various options for connecting 1 st Ave. to Westlake/existing South Lake Union line will be considered as a single alternative at this stage
C	1 st	Queen Anne to Jackson St. via 1 st (No Westlake Connection)	1, 2	Operating plan option to construct this line and to extend South Lake Union line to terminus east of 1 st near Pike Place Market will be considered
D1	3 rd	Seattle Center to Jackson St. via 3 rd Avenue	3	
D2	3 rd	Westlake to Jackson St. via 3 rd Avenue	3	
E	1 st	Extension of C1 (or other potential alignments) from Jackson St. to Stadium District/SODO (Lander St.)	2, 3	This alignment was raised through public process. It is outside the area considered in the Connector Purpose and Need
F*	Waterfront	Main St. (various connection options are possible) to Broad St.	3	The Waterfront Streetcar Activation Study (2011) recommended further study of two possible southern alignments using Main St. and a northern terminus at either Broad St. or Bell St. A waterfront streetcar is currently being analyzed as part of the Central Waterfront project.

Notes: * Multiple alignment options to be evaluated as a single alternative at this stage of evaluation.

Sources: (1) Seattle Transit Master Plan. (2) Stakeholder Interviews. (3) February 6, 2013 Public Open House.

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Figure 2 Street Alignments Recommended for Initial Screening



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MODES IDENTIFIED FOR INITIAL SCREENING

Figure 3 identifies the modes recommended for initial screening. Local streetcar and/or enhanced bus (electric trolley bus) were the modes that the TMP recommended for consideration for the potential Center City Connector alignments. Open house participants favored a local streetcar mode by a large margin. A relatively small number of participants supported an enhanced bus mode and several participants indicated that transit priority to achieve speed and reliability through downtown is more important than mode. Several additional modes recommended for inclusion in the initial screening evaluation are either currently used or proposed transit modes serving downtown Seattle: Rapid Streetcar (recommended in the TMP for several other high-capacity transit corridors); monorail (suggested by one open house participant), and Link light rail. Light rail as evaluated is defined by Sound Transit standards for light rail design and operation.

Figure 3 Modes Identified for Initial Screening

Key	Mode	Source(s)/Support
M1	Local Streetcar	1, 2, 3
M2	Rapid Streetcar	1, 2, 3
M3	Enhanced Bus (Electric Trolley Bus)	1, 3
M4	Monorail	3
M5	Link Light Rail (based on ST design criteria)	4

Sources: (1) Seattle Transit Master Plan. (2) Stakeholder Interviews. (3) February 6, 2013 Public Open House, (4) Project Team.

INITIAL SCREENING METHODOLOGY

The project evaluation framework defined several key questions to be addressed in the initial screening of alternatives, with the aim of removing alternatives that clearly do not meet the stated project purpose and need from further consideration. These questions include:

- Is the alternative consistent with local and regional plans? These plans were summarized in the Policy Background and Framework section of the project purpose and need statement.
- Does the alternative meet the identified transportation needs (mobility and connectivity)? These needs were identified in the project purpose and need statement.
- Does the alternative serve the key destinations and attractions identified?
- Is there public and stakeholder support for the alternative?

Alignments and modes were evaluated against criteria derived from these questions. The evaluation was primarily qualitative, rating each criterion as Best, Good, Fair, or Poor. An overall assessment was assigned using the same rating scale. Where possible, quantitative data sources were used to measure criterion and the rating was applied using a natural breaks technique. For quantitative measures, a 1/8 mile buffer was created around each alignment to calculate metrics such as population density; a relatively small buffer distance was chosen to minimize overlap between corridors. In addition, for the screening of modes, two additional criteria were added—

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transit capacity and greenhouse gas (GhG) reduction potential—to capture elements of project needs. However, these criteria were not significant at this high level of evaluation.

Figure 4 describes the evaluation process and data sources used to support the evaluation.

Figure 4 Initial Screening Criteria

Criteria	Quantitative Data or Data Sources
Consistency with local and regional plans	<p><i>Qualitative assessment based on:</i></p> <ul style="list-style-type: none"> ▪ Seattle Transit Master Plan (TMP), 2012 ▪ Seattle Comprehensive Plan, Written in 2005, last update 2009 ▪ Seattle Streetcar Network Development Report, 2008 ▪ Seattle Transportation Strategic Plan (TSP), 2005 ▪ Seattle Bicycle Master Plan (BMP), 2005 ▪ Seattle Center City Circulation Strategy Report, 2004 ▪ Seattle Center City Access Strategy, 2003
<p><i>Meets identified needs (mobility/connectivity):</i></p> <ul style="list-style-type: none"> ▪ Significant existing population and employment and projected growth in the Seattle Center City ▪ Growth in demand for Center City circulation trips ▪ Constraints on expansion of Center City transportation capacity ▪ Special mobility needs of tourists, visitors, and casual users in the Center City ▪ Affordable transportation access to key social and human services located in the Center City ▪ Connections for low-income workers who live in the Center City to jobs in the Center City ▪ Reduction in greenhouse gas (GhG) emissions from private vehicle travel and traffic congestion 	<p><i>Assessment based on quantitative analysis:</i></p> <ul style="list-style-type: none"> ▪ Total population and employment; population and employment density¹ ▪ Projected 2030 total population and employment; 2030 population and employment density ▪ Physical constraints (e.g., impacting directness, conflicts with other modes) ▪ Number of landmarks/attractions² and number per alignment mile ▪ Number of social service sites and number per alignment mile ▪ Number and density of low-income workers who live and work in Center City (home and work locations) <p><i>Qualitative assessment based on:</i></p> <ul style="list-style-type: none"> ▪ Physical constraints (e.g., impacting directness, conflicts with other modes)
Serves key destinations and anchors	Qualitative assessment
Public and stakeholder support	Qualitative assessment based on stakeholder interviews and open house #1 feedback
Transit capacity	Qualitative assessment (mode screening only)
Reduction in GhG emissions	Qualitative assessment (mode screening only)

Notes: (1) Density evaluated based on a 1/8 mile buffer of each alignment. (2) As identified in the project Purpose and Need statement.

INITIAL SCREENING RESULTS

Street Alignments

Figure 6 summarizes the initial street alignment screening results.

- Alignments A and B are recommended for further study in the Tier 1 evaluation. These include 4th and 5th Avenues and 1st Avenue with a connection to Westlake. Both serve the key project purpose of connecting the SLU and FH streetcars.
- Alignment C, which follows Alignment B along 1st Avenue between approximately Jackson Street and Pike Place, extends north to serve Uptown/Queen Anne. The connection to Uptown/Queen Anne received strong support, but this alignment in isolation does not serve the key project purpose of connecting the SLU and FH streetcars; many supporters of this alignment also expressed this connection as a strong priority. Alignment C is recommended for consideration in the Tier 2 evaluation, pending Tier 1 evaluation of Alignments A and B.
- Alignments D1/D2 (3rd Avenue) are not recommended for further study. While 3rd Avenue serves mobility/connectivity needs, either a streetcar or bus circulator would negatively impact regional bus operations on 3rd Avenue, which is already near capacity during peak hours and will be required to carry additional buses in the future as Seattle Downtown Transit Tunnel capacity is utilized by Sound Transit Link light rail extensions to the north and east; a bus circulator would not serve the purpose of connecting the FH and SLU streetcars.
- Alignment E (Extension of B or C to SODO/Stadium District) is not recommended for further study as part of this project. However, its future potential was recognized in public and stakeholder input; it could be suitable for further consideration as part of a future study or study phase. This corridor has been considered in previous studies as part of a 1st Avenue line running from Lower Queen Anne to Starbucks Center and may be a viable future phase of an alignment considered in this study.
- Alignment F (Waterfront) is currently being studied as part of a Center Waterfront transit circulator system as part of the Central Waterfront project. Historic streetcar mode is being considered along with rubber-tired modes. This alignment is not recommended for further study as part of the Center City Connector Transit Study. It will continue to be considered as part of the Central Waterfront project evaluation.

The quantitative and qualitative evaluation supporting these results will be provided in an Appendix.

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Modes

Figure 7 summarizes the results of the initial mode screening. It is recommended that the local streetcar and rapid streetcar modes be carried into the Tier 1 screening evaluation. The Tier 1 evaluation process will be structured to include characteristics of both local streetcar and rapid streetcar modes. In general, these modes are differentiated by the overall level of transit priority and several other characteristics, as described in Figure 5.

Figure 5 Typical Features of Rapid Streetcar and Local Streetcar Modes

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

For the purposes of comparison for the Center City Connector Tier 1 screening, these modes will primarily be distinguished in the Tier 1 screening through the development of mixed-traffic and exclusive lane right-of-way scenarios for the 1st Avenue and 4th/5th Avenue street alignment options. The Tier 1 analysis of these scenarios will reflect the tradeoffs between mixed-traffic and exclusive-lane operations, e.g., potential travel time and capacity benefits, with potentially greater impacts on other travel modes. These impacts will be quantified through traffic analysis and other portions of the quantitative analysis. Local and rapid streetcar characteristics will also be evaluated according to a qualitative assessment of feasibility with each of the alignments under consideration.

No further study is recommended for bus, monorail, or light rail modes.

The qualitative assessment supporting these results will be provided in an Appendix.

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Figure 6 Summary of Street Alignments Screening Results

Name	Alignment Description	Assessment of Initial Screening Criteria				Best	Good	Fair	Poor	Overall Evaluation	Recommendation
		1. Consistent with Local/Regional Plans	2. Meets Identified Needs (Mobility/Connectivity)	3. Serves Key Destinations/Attractions	4. Public/Stakeholder Support						
A*	Westlake to Int'l District Station via 4th/5th and/or 6th Ave north of Pike	Good	Good	Good	Fair	0	3	1	0	Good	The 4th/5th Avenue alignment serves the project needs, although modal conflicts with bicycle, auto, and local and regional transit are significant. The alignment is stronger at serving commuters/downtown workers than providing mobility for visitors, tourists, and casual users (an emphasis of project purpose & need). This alignment had relatively low stakeholder support due to modal conflicts. <i>Recommend further study in Tier 1 screening</i>
B*	Westlake to Jackson via 1st connecting on Virginia/Stewart Westlake to Jackson via 1st connecting on Pike/Pine (4th/5th or 5th/6th) Westlake to Jackson via 1st connecting on Stewart/Olive	Best	Good	Best	Best	3	1	0	0	Best	The 1st Avenue alignment with an east-west connection to the SLU Streetcar serves the project needs. The 1st Avenue alignment scores the best in terms of physical constraints and potential conflicts with other modes. Connecting the FH and SLU Streetcars received very strong support from the public and stakeholders. <i>Recommend further study in Tier 1 screening</i>
C	Queen Anne to Jackson via 1st (No Westlake Connection)	Good	Fair	Good	Fair	0	2	2	0	Fair	The 1st Avenue alignment serves the project's mobility needs, although without the east-west connection in alignment B it does not address the purpose of connecting the FH and SLU streetcars. As noted, the 1st Avenue alignment scores the best in terms of physical constraints and potential conflicts with other modes. The connection to Queen Anne and Seattle Center that this alignment provides received strong support from the public and stakeholders, although many noted that the SLU connection was also important. <i>Recommend study of the Jackson to Pike Place area portion of the alignment in Tier 1 as part of alignment B; Recommend deferring overall evaluation of this alignment, including the Pike Place to Uptown segment, as part of the Tier 2 evaluation, pending a Tier 1 decision on 4th/5th (A) vs. 1st</i>
D1	Seattle Center to Jackson via 3rd Avenue	Poor	Fair	Good	Fair	0	1	2	1	Fair	While both 3rd Avenue alignments serve mobility/connectivity needs, a streetcar mode is not consistent with existing street operations and accommodating it is likely to be challenging given high bus volumes; an enhanced bus mode could be feasible but does not serve the purpose of directly connecting the FH and SLU streetcars (and may be somewhat duplicative of existing bus service on the corridor). A circulator operating on 3rd Avenue would negatively impact regional bus operations on 3rd Avenue, which is near peak period bus capacity at present. <i>Recommend eliminating from further study.</i>
D2	Westlake to Jackson via 3rd Avenue	Poor	Fair	Good	Poor	0	1	1	2	Fair	While both the public and stakeholders recognized that a Waterfront Street has some merit, it does not meet the mobility needs for this project as well as other potential alignments. It is also currently being studied as part of the Central Waterfront project. <i>Recommend deferring evaluation as part of this study (pending outcome of Central Waterfront process).</i>
E	Extension of B or C to Stadium District/SODO (Lander St.)	Fair	Poor	Fair	Good	0	1	2	1	Fair	An extension of alignments B or C to SODO does not score as well as other alignments in meeting overall mobility/connectivity needs, but public/stakeholder support for the extension recognizes its future potential. <i>Recommend eliminating from further study as part of this project, however may be suitable for consideration as part of a future study.</i>
F*	Waterfont (Broad to Main via Alaskan Way)	Fair	Fair	Fair	Fair	0	0	4	0	Fair	While both the public and stakeholders recognized that a Waterfront Street has some merit, it does not meet the mobility needs for this project as well as other potential alignments. It is also currently being studied as part of the Central Waterfront project. <i>Recommend deferring evaluation as part of this study (pending outcome of Central Waterfront process).</i>

Rating Key:

Best
Good
Fair
Poor

Notes: * Multiple alignment options to be evaluated as a single alternative at this stage of evaluation.

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Figure 7 Summary of Modes Screening Results

Name	Mode	Assessment of Initial Screening Criteria				Best	Good	Fair	Poor	Overall Evaluation*	Recommendation
		1. Consistent with Local/Regional Plans	2. Meets Identified Needs (Mobility/Connectivity)	3. Public/Stakeholder Support	4. Potential Right-of-Way Impacts						
M1	Local Streetcar	Best	Best	Best	Best	4	0	0	0	Best	Carry into Tier 1 screening; analyze with lower and higher levels of priority in either Tier 1 or Tier 2 evaluation.
M2	Rapid Streetcar	Good	Good	Good	Fair	0	3	1	0	Good	Although some operating characteristics of Rapid Streetcar are not optimal for meeting the mobility needs for this project, its priority characteristics were important to the public and stakeholders. Recommend carrying Rapid Streetcar mode into Tier 1 evaluation.
M3	Enhanced Bus (Electric Trolley Bus)	Fair	Fair	Fair	Best	1	0	3	0	Fair	Eliminate from further study
M4	Monorail	Poor	Poor	Poor	Fair	0	0	1	3	Poor	Eliminate from further study
M5	Link Light Rail (based on ST design criteria)	Poor	Fair	Poor	Poor	0	0	1	3	Poor	Eliminate from further study

Notes:

* Mode criteria 5 and 6 are not summarized here since they do not present a significant difference between mode options.

Rating Key:

Best
Good
Fair
Poor