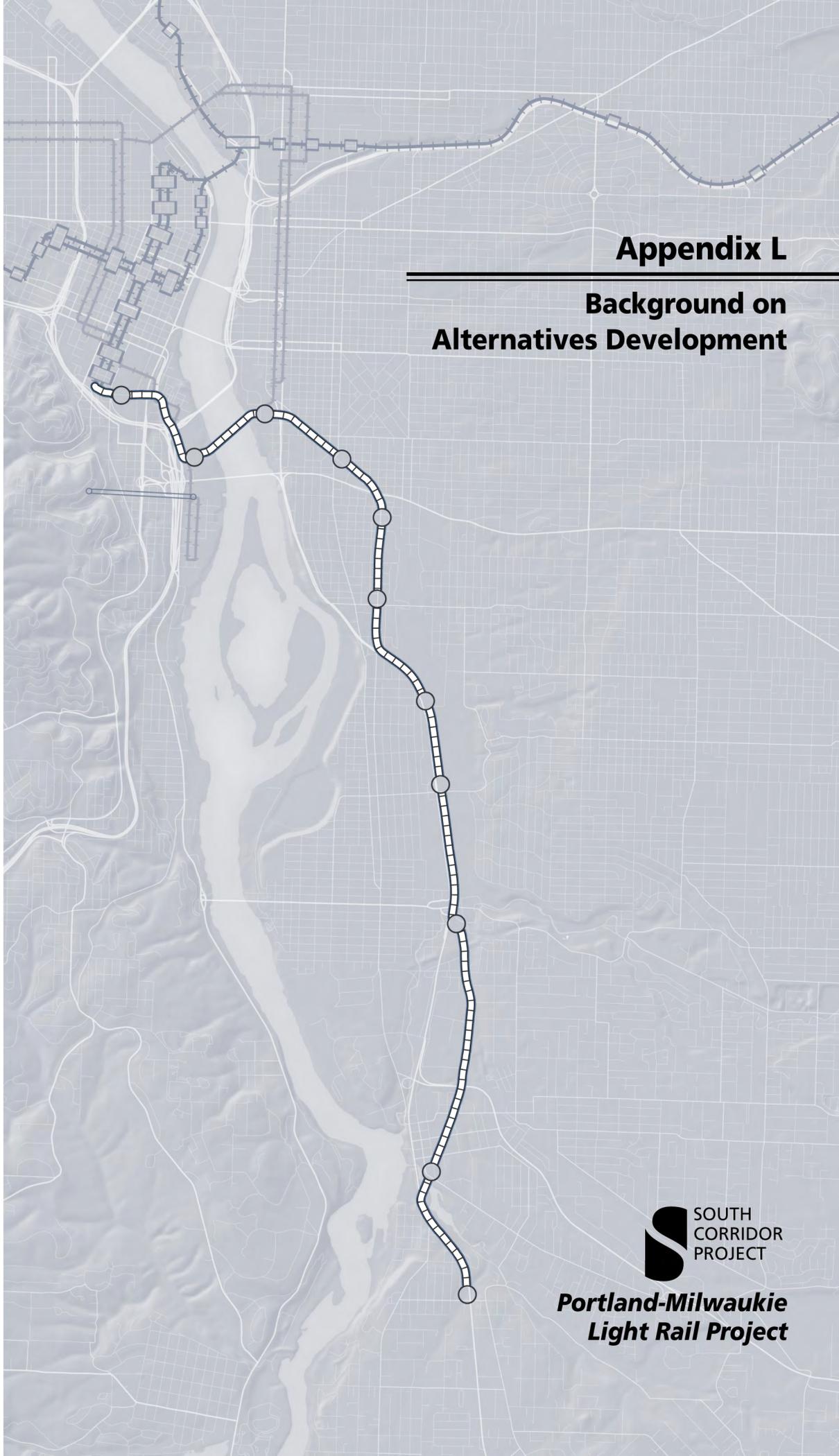


Appendix L

Background on Alternatives Development



**Portland-Milwaukie
Light Rail Project**

APPENDIX L. BACKGROUND ON ALTERNATIVES DEVELOPMENT

L.1 TRANSPORTATION PROJECT DEVELOPMENT

The Locally Preferred Alternative (LPA) evaluated in the Portland-Milwaukie Project Final Environmental Impact Statement (FEIS) is based on over 30 years of regional land use and transportation systems planning, and an environmental process initiated in 1993. This appendix describes the project development process, the mode and alignment alternatives that have been evaluated, the screening and selection process, and the reasons that alternatives were or were not brought forward for further evaluation or selected as the project LPA.

The first section describes the transportation project development process. The section following that describes the process through which the Portland-Milwaukie Light Rail Project has been developed. Following that is a description of the evaluation and selection of the modes and alignments that were studied prior to the Portland-Milwaukie Supplemental Draft Environmental Impact Statement (SDEIS), including the 2006 Refinement Study, which identified the alternatives studied in the SDEIS.

L.1.1 Transportation Project Development Process

Planning and implementing federally funded transit improvements involves steps required by the National Environmental Policy Act of 1969 (NEPA) and the Federal Transit Administration (FTA). These steps, which include identifying the purpose of and need for a project, analyzing alternatives, and identifying environmental impacts, ensure a thorough technical and environmental analysis, with the opportunity for community involvement, including public review and comment.

L.1.1.1 NEPA Requirements

Public transportation supports the economic vitality of the nation's urban centers and provides transportation options, and is therefore generally considered to be environmentally desirable. Nevertheless, major transit construction projects, like any construction, can disrupt a community and its natural resources. Recognizing that activities worthy of federal support—including transit construction—can also have adverse consequences, Congress has over the years enacted numerous laws, including NEPA, to protect communities and their natural resources. NEPA established a national policy of preserving and enhancing the human environment for future generations while meeting the needs, including the transportation needs, of the present generation.

Projects that receive federal funding are required to comply with NEPA, and projects that may have significant environmental impacts must complete an Environmental Impact Statement (EIS) to disclose those impacts. The NEPA regulations integrate the natural and social environmental

realms, along with the necessary engineering and economic considerations, into project planning and decision making. The objective is to balance infrastructure development, economic prosperity, health and environmental protection, community and neighborhood preservation, and quality of life. The potential impacts of the project must be disclosed in the EIS and avoided, minimized or mitigated. The NEPA process is complete when the FTA issues a Record of Decision (ROD), and the project may apply for federal design and construction funding through the FTA Section 5309 New Starts program.

The following are the key environmental processes completed to implement the Portland-Milwaukie Light Rail Project:

- *1993 South/North Alternatives Analysis (1993 South/North AA)*
- *1995 South/North Major Investment Study Final Report (1995 South/North MIS)*
- *1998 South/North Corridor Project Draft Environmental Impact Statement (1998 South/North DEIS)*
- *2000 South Corridor Transportation Alternatives Study (2000 SCTAS)*
- *2002 South Corridor Supplemental Draft Environmental Impact Statement (2002 South Corridor SDEIS)*
- *2003 Downtown Amendment to the South Corridor Project Supplemental Draft Environmental Impact Statement (2003 Downtown Amendment)*
- *2008 Portland-Milwaukie Light Rail Project Supplemental Draft Environmental Impact Statement (2008 Portland-Milwaukie SDEIS)*

L.1.1.2 The Federal Transit Planning Process

The federal transportation project development process is designed to be an integral part of a metropolitan area's long-range transportation planning process. It provides decision-makers and the public with better and more complete information before the final decisions are made. Early in the planning and project development process, regional transportation planning efforts identify corridors or areas with significant transportation problems that may need a major transportation investment. If a need for a transit project is identified, in cooperation with FTA, the lead agency, in this case, Metro, completes an Alternatives Analysis (AA) to determine the LPA that would best address identified transportation problems—in other words, the purpose of and need for the project.

The following is a brief summary of the primary steps taken through the federal transportation planning development process. A discussion of the South Corridor and the Portland-Milwaukie Light Rail Project development history follows in Section 2.

Systems Planning During the systems planning phase, Metropolitan Planning Organizations (MPOs) such as Metro, in consultation with local jurisdictions, identify transportation problems and determine whether a major transportation investment should be evaluated and/or advanced into an Alternatives Analysis. The MPO establishes priorities for development, and the lead local

agency submits an application to the federal government for advancing a corridor into the federal project planning process.

Alternatives Analysis (AA) The intent of an alternatives analysis (AA) is to identify and compare the costs, benefits, and impacts of a range of transportation alternatives as a means of providing local decision makers with the information necessary to implement the most appropriate transportation solutions in priority corridors. Alternatives Analysis is the process of reaching a broad consensus on exactly what type of improvement best meets locally defined goals and objectives for a specified corridor. Typically, the AA is coordinated with the requirements of NEPA. If significant environmental impacts are expected, a Draft Environmental Impact Statement (DEIS) is prepared that discloses the impacts and evaluates the alternatives. Occasionally the DEIS is prepared during a later phase of the project, such as during Preliminary Engineering.

Selection of the Locally Preferred Alternative (LPA) The LPA is selected by the MPO based on a thorough technical analysis and evaluation of the alternatives, as well as input received through an extensive public involvement process. It is a broad collaborative process involving local transportation planning agencies, service providers, local governments, state and federal resource agencies, potential funding partners and the general public (through a formal citizen participation process).

Preliminary Engineering (PE) Following the selection of the LPA, the local lead agency submits an application to the FTA requesting permission to enter into PE. The FTA may authorize a project to proceed into the PE phase of project development. PE is intended to refine the design of the LPA to the extent necessary to complete a Final Environmental Impact Statement and obtain a Record of Decision (ROD), which completes the NEPA process. PE results in estimates of project costs, benefits, and impacts for which there is a much higher degree of confidence. Also during PE, local funding commitments are secured and the FTA Section 5309 New Starts criteria are addressed. PE typically proceeds simultaneously with completion of the NEPA process, usually including preparation of an EIS. PE is considered complete when the FTA and/or the Federal Highway Administration (FHWA) declare in the ROD that the NEPA process has been completed.

Final Design (FD) FD is the last phase of project development and includes right-of-way acquisition and the preparation of final construction plans, detailed specifications, construction cost estimates, and bid documents. Once FD has advanced to the 60 percent level, project sponsors may negotiate a Full Funding Grant Agreement (FFGA) with FTA that defines the amount of federal participation in the project. Following completion of FD, the project sponsors initiate construction and operation of the project.

L.1.2 South Corridor Project Development Process

This section discusses the project development process for the South Corridor and the Portland-Milwaukie Light Rail Project. Following that discussion is a detailed discussion of the modes and alignments that have been studied and the rationale for the selection of project alternatives up to the identification of the options studied in the *2008 Portland-Milwaukie SDEIS*. See Chapter 2, Section 2.3, Background on Alternatives Considered of this FEIS for the options

studied during the SDEIS and the selection of the LPA for the Portland-Milwaukie Light Rail Project.

Beginning with the withdrawal of the Mt. Hood Freeway from the Federal Interstate Highway System, when in 1976, the U.S. Department of Transportation agreed to exchange the funds for the construction of the freeway for funds that could be used on transit and other transportation projects, there has been a series of major transportation analyses and actions taken that implemented the shift away from the construction of freeways and toward a greater emphasis on meeting transportation demand through investments in public transit.

In 1978, the Columbia Region Association of Governments, the predecessor to Metro, adopted the *Regional Transportation Corridor Improvement Strategy*, which identified the need to consider transitways in the major radial corridors in the region. In 1982, Metro adopted the region's first *Regional Transportation Plan (RTP)*, which called for developing a transitway to serve Portland and Clackamas County after implementation of the Banfield and Westside light rail projects. Between 1984 and 1986, Metro, in cooperation with its regional partners, conducted a system-level study of transitways in the regions, which included the South Corridor—Interstate 205 (I-205) and Portland-Milwaukie corridors and the North Corridor—I-5 North and I-205 corridors. That study recommended a more detailed study of the corridor. Figure L-1 shows the detailed project development process for the South/North Corridor Project.

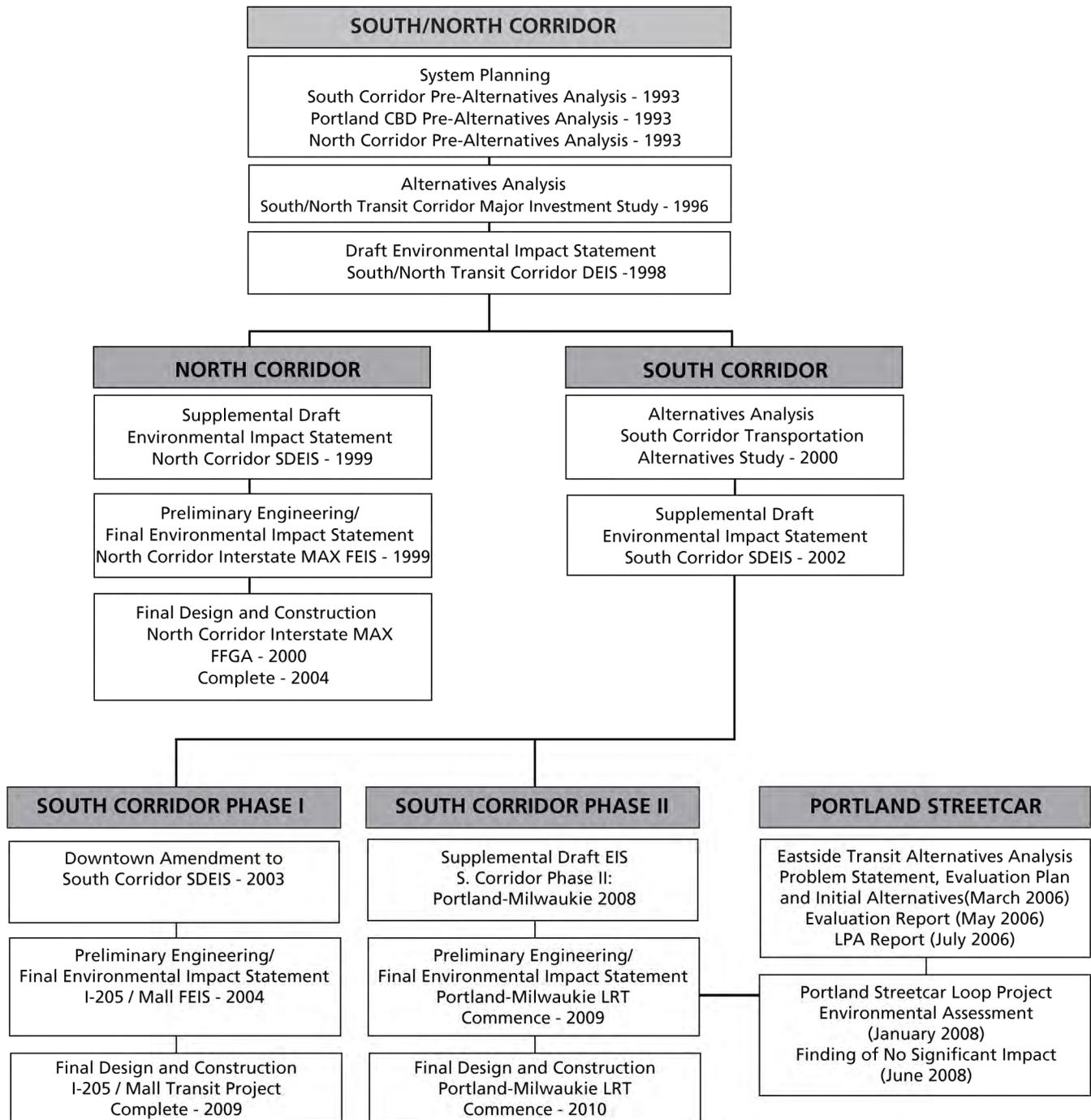
L.1.2.1 1993 South/North Pre-Alternatives Analysis and Tier I

In 1990, the Metro Council adopted Resolution No. 91-1456, which called for an alternatives analysis to be conducted within the I-5 and I-205 North Corridors, and I-205 and Milwaukie South Corridors. The primary purpose of the AA was to evaluate and recommend the priority Corridor for the south and north corridors.

The AA developed a two-tier process: in Tier I, an initial set of alternatives would be identified, analyzed, and evaluated. In Tier II a small set of the most promising alternatives selected in Tier I would be studied further in the DEIS. The transportation problems and opportunities, the purpose and need, and goals and objectives for the South/North Corridor were first articulated during this phase of the project.

A scoping process included an evaluation, public comment, and narrowing process that included a series of eight mode and alignment workshops. Six modal alternatives were examined prior to and within Scoping: no-build, transportation system management, busway, commuter rail, river transit and light rail. Within the 30-day public comment period, four public scoping meetings were held to receive comments on the project's proposed range of alternatives and impacts to be studied further.

Figure L-1: South/North Corridor and Portland Streetcar Loop Development Processes



The North and South Corridors were evaluated separately. Portland-Milwaukie and I-205 alignment alternatives were evaluated in the South Corridor. For the Milwaukie Corridor, the analysis evaluated a light rail alignment connecting downtown Portland and Milwaukie, then branching in a “Y” configuration to the Clackamas Regional Center and Oregon City.

In April 1993, following the 1993 South/North AA, the Metro Council selected the Milwaukie Corridor to be the priority HCT corridor for the South Corridor and selected the I-5 Corridor as the priority corridor for the North Corridor based on findings documented in the *Priority Corridor Analysis: Findings and Recommendations* (Metro 1993). Although the Milwaukie and I-5 Corridors were chosen as priority corridors for immediate HCT project development, the I-205 Corridor remained an important transit corridor.

Through this process, the region identified light rail as the preferred mode. The background and process of this analysis is described in the *Scoping Process Narrowing Report* (Metro 1993). The process included eight public workshops, numerous meetings with civic and community groups and numerous meetings with individual citizens and businesses. The technical analysis completed is summarized in the *Scoping Process Narrowing Report*. River transit, busway, and commuter rail were evaluated and light rail was found to provide the highest quality transit service and the greatest assurance of effective transit system operations, and it would best meet financial, growth accommodation, land use, and environmental objectives adopted for the corridor. The *Tier I Description of Alternatives Report* making that recommendation was adopted by the South/North Steering Committee (Metro 1993). Therefore, light rail was the only mode evaluated when Tier II, the South/North DEIS process was initiated.

In 1994 the FTA modified its procedural requirements for major transit investments, replacing the AA with the Major Investment Study (MIS) regulations. It was determined through consultation with FTA that Tier I would conclude by meeting the MIS requirements. This requirement was met with the local adoption of the *South/North Major Investment Study Final Report* (Metro 1995). The *MIS Final Report* documents the selection of the design concept and scope for the locally preferred alternative for the South/North Corridor.

L.1.2.2 1998 South/North Draft Environmental Impact Statement

The purpose of the Tier II phase of the study was to prepare and publish the South/North DEIS and to select a locally preferred alternative. Work on the South/North DEIS was initiated in January 1996. In December 1996, before completion of the DEIS, the South/North Steering Committee and the Metro Council evaluated the defeat of a November 1996 ballot measure that would have provided State of Oregon funding for a portion of the cost of the South/North Project. In response to the election results, project staff was directed to undertake a cost-cutting process, which included over 200 public meetings, and which resulted in the Metro Council’s adoption of the *Cost-Cutting Measures Final Report* (Metro 1997). The cost-cutting process helped to further refine the set of alternatives and options would be studied within the South/North corridor.

L.1.2.3 2002 South Corridor Supplemental Draft Environmental Impact Statement

In response to the loss of local funding, elected officials in the region held a series of *listening posts*, where they invited the public to comment on how to best meet the future transportation needs of the region. In response, for the South Corridor, a wide range of HCT alternatives, including river transit, high occupancy vehicle (HOV) lanes, high occupancy toll (HOT) lanes, bus rapid transit and busway, but not light rail, were evaluated in the 2000 South Corridor Transportation Alternatives Study (2000 SCTAS).

Following completion of the study, the Policy Committee that was guiding the study determined that river transit, commuter rail, and HOT and HOV lanes failed to meet the project's goals and objectives, such as supporting land use goals, reflecting community values, and providing high-quality transit. Therefore those modes would not meet the purpose of and need for the project. The Policy Committee determined that the following alternatives best met the project's goals and objectives and should be studied in the *2002 South Corridor SDEIS*:

- No-Build
- Busway
- Bus Rapid Transit (BRT) including intelligent transportation management (ITS)

The Policy Committee also heard substantial testimony expressing support for including light rail alternatives in the *2002 South Corridor SDEIS*. The central and southeast Portland neighborhoods, City of Milwaukie neighborhoods, and Clackamas area citizens urged the Policy Committee to add Milwaukie and I-205 light rail as alternatives for further study in the *2002 South Corridor SDEIS*. In response, a lower-cost Milwaukie light rail alignment that would cross the Willamette River on the Hawthorne Bridge and a concept for I-205 light rail between the Clackamas Town Center and the Gateway Transit Center were developed and evaluated in the *2002 South Corridor SDEIS*.

At the end of the SDEIS, light rail was selected as the preferred mode. A two-phased approach, with I-205/Portland Mall as the first phase and Portland-Milwaukie as the second phase, was selected as the preferred alignment for the LPA. The Downtown Amendment was prepared to evaluate the alignment on the Downtown Portland Transit Mall, which had not been evaluated in the *2002 South Corridor SDEIS*. The *Downtown Amendment to the South Corridor Project SDEIS* was adopted by the Metro Council in October 2003. Section 2.2.1, Portland Alignments, provides additional information on the selection of the Downtown Portland Transit Mall alignment.

L.2 Screening and Selection of Alternatives

This section documents the decisions that led to the mode and alignment alternatives and options selected for study in the Portland-Milwaukie Project SDEIS. The criteria used to analyze, evaluate, and select mode and alignment alternatives have been based on goals and objectives, which are based on the Purpose and Need. The Purpose and Need for a transportation improvement project in the corridor was first identified during the 1993 AA for the South/North Corridor. It has remained the same for each subsequent process.

The evaluation and selection of alternatives is based on their ability to meet the project Purpose and Need and its related objectives. There are criteria for each objective and measures for each criterion. Objectives based on the Purpose and Need were established during the *2002 South Corridor SDEIS*. These remained the objectives used to select the LPA for the Portland-Milwaukie Light Rail Project. See Chapter 1, Purpose and Need for additional discussion of the Purpose and Need for the project; see Chapter 5, Financial Analysis and Evaluation of Alternatives for the evaluation criteria and measures for the Portland-Milwaukie Project. For more details on the previous analysis, evaluation, recommendations, and decisions, refer to documents cited.

The process of selecting alternatives involves decisions on:

- Mode (for example, bus, river, commuter rail, and light rail)
- Alignment (the location within a specific corridor, including termini)
- Design options (such as station locations or structure type or height)

Modes, alignments, and significant design options that have been evaluated are described below.

L.2.1 Evaluation and Selection of Modes 1993-2003

This section describes the modes and the study processes undertaken to evaluate modes during the development of the South/North and South Corridor projects. Figure L-2 illustrates the narrowing and refinement of modes. The modes that have been evaluated include:

- No-Build and Transportation System Management (TSM)
- River transit
- Commuter rail
- High Occupancy Toll (HOT) and High Occupancy Vehicle (HOV) lanes
- Busway
- Bus Rapid Transit (BRT) including intelligent transportation management (ITS)
- Light rail

**Figure L-2
Narrowing and Refinement of Modal Alternatives
1993-2003**

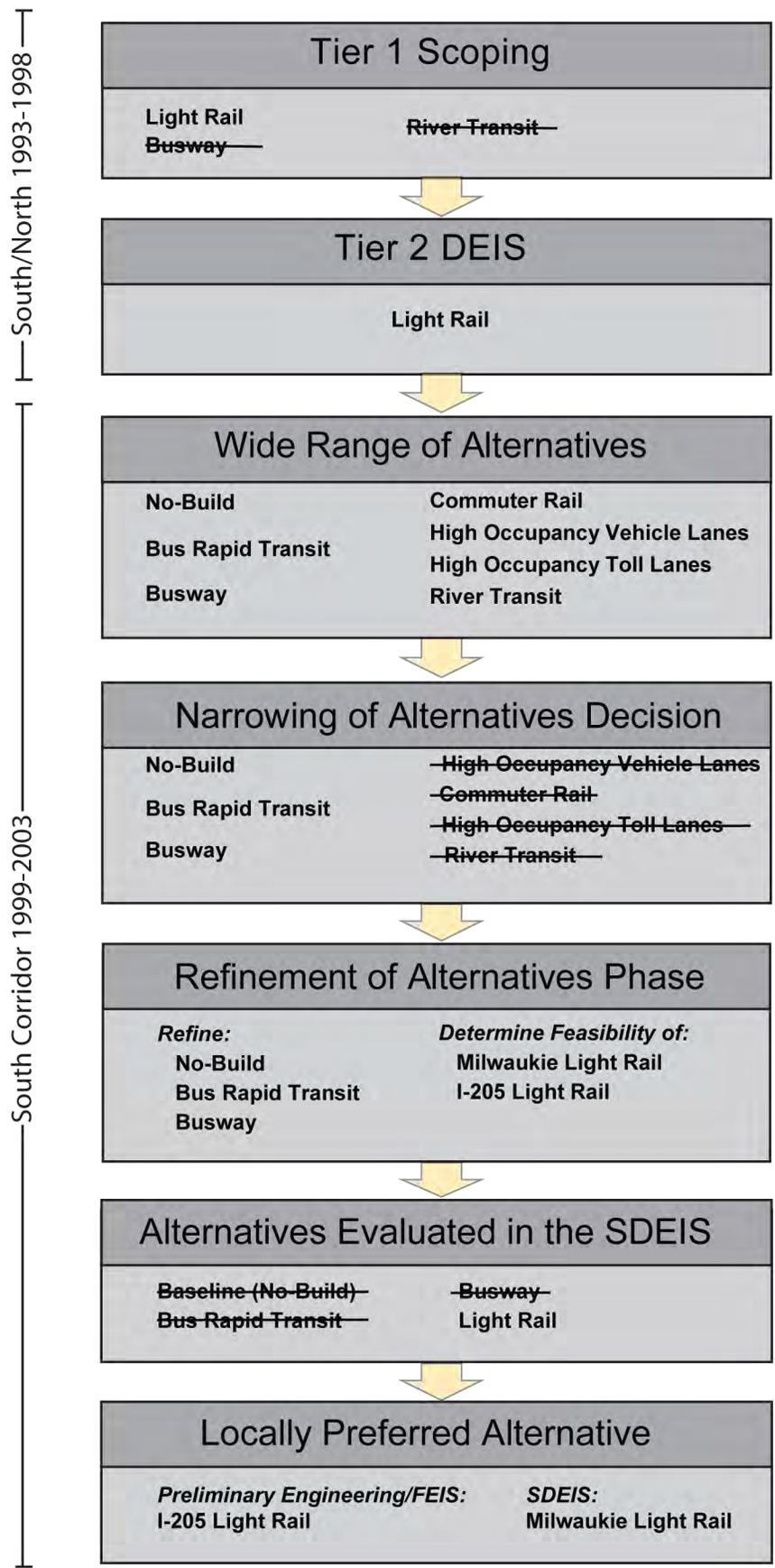


Table L-1 summarizes which study process evaluated each mode.

**Table L-1
Modes Evaluated in Previous Studies**

	1993-95	1997-98	1999-2000	2001-02
	South/North AA ¹	South/North DEIS ²	South Corridor AA ³	South Corridor SDEIS ⁴
No-Build	X	X	X	X
Transportation System Management	X			
River Transit	X		X	
Commuter Rail	X		X	
Busway	X		X	X
Bus Rapid Transit			X	X
HOV/HOT Lanes			X	
Light Rail	X	X		X

1 Tier 1 Description of Alternatives Report (Metro 1993), Tier 1 Final Recommendation Report (Metro 1994), South/North Design Option Briefing Document (1995).

2 South/North Corridor Project Draft Environmental Impact Statement (Metro, Federal Transit Administration 1998).

3 South Corridor Study Wide Range of Alternatives Report (Metro 2000), South Corridor Transportation Alternatives Study Evaluation Report (Metro 2000).

4 South Corridor Supplemental Draft Environmental Impact Statement (Metro 2002).

The sections below describe the modes that have been evaluated, including advantages and disadvantages and the rationale for selecting or eliminating modes. As illustrated in Table L1, several modes were studied in both alternatives analyses processes. Modes eliminated following the South Corridor AA are discussed first, and then modes that were studied in the SDEIS are discussed.

L.2.1.1 Modes Eliminated Prior to the 2002 South Corridor SDEIS

Transportation System Management

A Transportation System Management (TSM) Alternative was studied in the *1993 South/North AA*. A TSM Alternative would provide a lower cost alternative to the HCT alternatives. It would include significant improvements to the transit system using buses operating in mixed traffic. There would be a capital investment component included in a TSM network, which, while relatively lower cost than the HCT alternative, can be significant. The capital elements of a TSM network can include improved trunk-route and feeder route service, expanded park-and-ride facilities, traffic signal exemption, special freeway bus ramps, new transit centers, and vehicle purchases.

During Tier I, through consultation with the FTA, it was determined that the financially constrained transit network in the RTP, which would be analyzed in the DEIS as the No Build Alternative would serve in lieu of the TSM. This agreement was based on the recognition that the financially constrained transit network included service increases and service improvements

typically found in a TSM Alternative (see the *Major Investment Study Final Report*, pp.42-44; Metro 1995).

River Transit

River transit was studied the *1993 South/North AA* and *2000 SCTAS*. It was eliminated following both alternatives analyses rather than being advanced to either of the subsequent EIS processes.

The River Transit Alternative would provide regularly scheduled point-to-point passenger-only boats operating over a defined route and could serve both commuter and recreational trips.

The River Transit Alternative studied in the *2000 SCTAS* would operate between Oregon City and downtown Portland on the Willamette River. River transit would provide the primary transit service in the South Corridor with all-day service and approximately five-minute headways during the peak period and ten-minute headways during the off-peak period. See the *South Corridor Evaluation Report* (Metro 2000) for additional information on the evaluation of this alternative.

River transit was not recommended for study in the *2002 South Corridor SDEIS* because it would have:

- Poor service to the major activity centers in the corridor
- Poor service to downtown Portland
- Potential impacts to threatened and endangered fish
- Poor accessibility for bus transfers and park-and-ride trips.

River transit is, therefore, not a reasonable alternative in terms of meeting the purpose and need statements to:

- Be environmentally sensitive
- Optimize the transportation system
- Support land use goals
- Maintain livability

Commuter Rail

Commuter rail service is typically passenger train service that has longer trip lengths and station spacing than light rail. Commuter rail service typically utilizes diesel locomotives or self-propelled diesel rail cars, and existing freight or passenger railroad tracks. Operations are focused on peak commute periods serving peak directional flows from outlying communities to major employment centers.

Commuter rail was evaluated during the *1993 South/North AA* and the *2000 SCTAS*. The *1993 South/North AA* study evaluated a 47.4-mile corridor between Canby, Oregon, and Ridgefield,

Washington, and used portions of the Burlington Northern and Southern Pacific Railroad rights-of-way.

Two commuter rail alignment alternatives were considered during the 2000 SCTAS. One was a corridor connecting Oregon City to Clackamas Regional Center, Milwaukie, and Portland via the Union Pacific Railroad (UPRR) main line. The line would terminate near the Oregon Museum of Science and Industry (OMSI), where dedicated shuttle buses would carry passengers across the Hawthorne Bridge to the transit mall and the center of downtown Portland. The line could only operate during peak periods because the UPRR main line is heavily used by Amtrak and freight operations.

The other commuter rail alternative proposed tested two roles for commuter rail. One was as a feeder route to boost ridership in the South Corridor, and the second was a circumferential transit link that would serve trips between Milwaukie and Beaverton. The line would serve stations in Milwaukie, Lake Oswego, and Lake Grove and connect with the Wilsonville-to-Beaverton commuter rail line between Tigard and Tualatin. See the *South Corridor Evaluation Report* (Metro 2000) for additional information on the evaluation of this alternative.

Reasons for removing Commuter Rail Alternatives from further study included:

- Commuter rail attracted only 5 percent of the ridership projected for light rail in the same corridor.
- Commuter rail would not directly serve the main trip generators in the corridor such as Clackamas Regional Center, downtown Milwaukie, North Macadam/RiverPlace, Portland South Downtown/Portland State University (PSU), Portland Central Downtown, and the Rose Quarter.
- Distribution of trips in downtown Portland would be slow, with transfers required either at Union Station or at a Hawthorne Bridge/OMSI station.
- Commuter rail would be unlikely to influence land use in the same manner as light rail given that stations would be located in heavy rail corridors, while light rail would offer more flexible station locations that could be integrated into the built environment.
- While implementation costs would be less than for light rail, the cost-effectiveness of commuter rail in the South/North Corridor would be poor due to the low ridership potential.

Commuter rail, therefore, is not a reasonable alternative in terms of meeting the project purpose and need statements to:

- Optimize the transportation system
- Support land use goals
- Be fiscally responsive

High Occupancy Vehicle Lanes and High Occupancy Toll Lanes

HOV lanes are reserved for vehicles that have a minimum number of passengers, including the driver. An HOV is a transit bus, vanpool, or any other vehicle that meets the minimum occupancy requirements. An HOT lane would charge a toll to single occupant vehicles (SOVs) for access to a HOV lane. High occupancy lane alternatives were studied in the *2000 SCTAS*.

This alternative would increase transit capacity in the corridor by the addition of HOV lanes along SE McLoughlin Boulevard and OR 224. Bus service would be expanded between Milwaukie and Oregon City to meet the demand for transit service in the corridor, and buses would operate in the HOV lane. Two-person carpools would also be allowed to use the HOV lanes.

The HOV Alternative between Portland and Milwaukie would include a reversible HOV lane in the center of SE McLoughlin Boulevard between the Ross Island Bridge and SE Harold Street. During the morning peak traffic hours, barriers would be positioned to provide an extra lane in the northbound direction for HOVs. Prior to the evening peak hours, the barrier would be relocated to provide an additional lane of traffic in the southbound direction. Before the next morning, the barrier would be reset. Between SE Harold Street and SE Tacoma Street, the HOV lane would operate with no barrier between the HOV lane and general-purpose traffic lanes.

HOT lanes would operate in a manner and alignment similar to HOV lanes described above. Qualifying vehicles would access a dedicated lane at no charge, while SOVs would pay a toll to gain access to the HOT lane. This option could be implemented during peak periods to regulate the capacity of the tolled express lane. In the study of this alternative, it was assumed that the payment of tolls would occur electronically, with SOVs operating in the HOT lane using a dashboard-mounted transponder that would be read by overhead readers across the roadway. See the *South Corridor Evaluation Report* (Metro 2000) for additional information on the evaluation of this alternative.

The rationale for removing the HOV and the HOT Lanes Alternatives from further study in the *2002 South Corridor SDEIS* included:

- Lowest public acceptance of all alternatives studied
- Lack of direct connection to Clackamas Regional Center
- Elimination and reduction of local access
- Lack of compatibility with land uses
- Environmental impacts
- High number of displacements
- Lack of downstream capacity to handle additional vehicles attracted to the facility

HOV and HOT lanes therefore are not a reasonable alternatives in terms of meeting the project purpose and need statements to:

- Be environmentally sensitive
- Optimize the transportation system
- Support land use goals
- Reflect community values

L.2.1.2 Modes Evaluated in the 2002 South Corridor SDEIS

No-Build, Busway, Bus Rapid Transit and Light Rail were evaluated in the *2002 South Corridor SDEIS*. The significant tradeoffs between light rail and the other two modes are discussed in this section. These modes were evaluated on the alignments shown in Figure L-3. See the *South Corridor Project SDEIS* (Metro 2002) and the *South Corridor Project Locally Preferred Alternative Report* (Metro 2003) for additional information the evaluation of this alternative.

No-Build

The No-Build Alternative represents future conditions without the project. The No-Build Alternative represents both a possible outcome of an Alternatives Analysis process and a reference point to gauge the benefits, costs, and impacts of build alternatives. Analyzing a No-Build Alternative is required under NEPA.

Bus Rapid Transit

Bus Rapid Transit (BRT) was studied in the *2000 SCTAS* and in the *2002 South Corridor SDEIS*.

BRT describes a variety of capital improvements designed to reduce transit travel time and improve transit system reliability. BRT components studied have included exclusive bus lanes, simplified fare payment methods, special vehicles, limited stations with amenities, and intelligent transportation systems (ITS). ITS elements included real-time customer information, automatic bus stop announcement, and bus priority at traffic signals. The BRT Alternative evaluated in the *2002 South Corridor SDEIS* crossed the Willamette River on the Hawthorne Bridge and would have operated on SE Grand Avenue, SE Martin Luther King, Jr. Boulevard and SE McLoughlin Boulevard (OR 99E), connecting the Downtown Portland Transit Mall, Milwaukie, and Oregon City as well as connecting Milwaukie and the Clackamas Regional Center.

The reasons for eliminating the BRT Alternative in the 2003 LPA decision were that, compared to the other alternatives, BRT had:

- The fewest number of corridor transit trips
- The worst reliability due to the lack of separated right-of-way

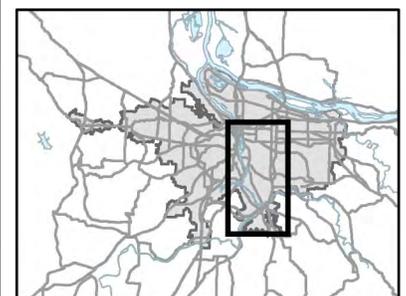
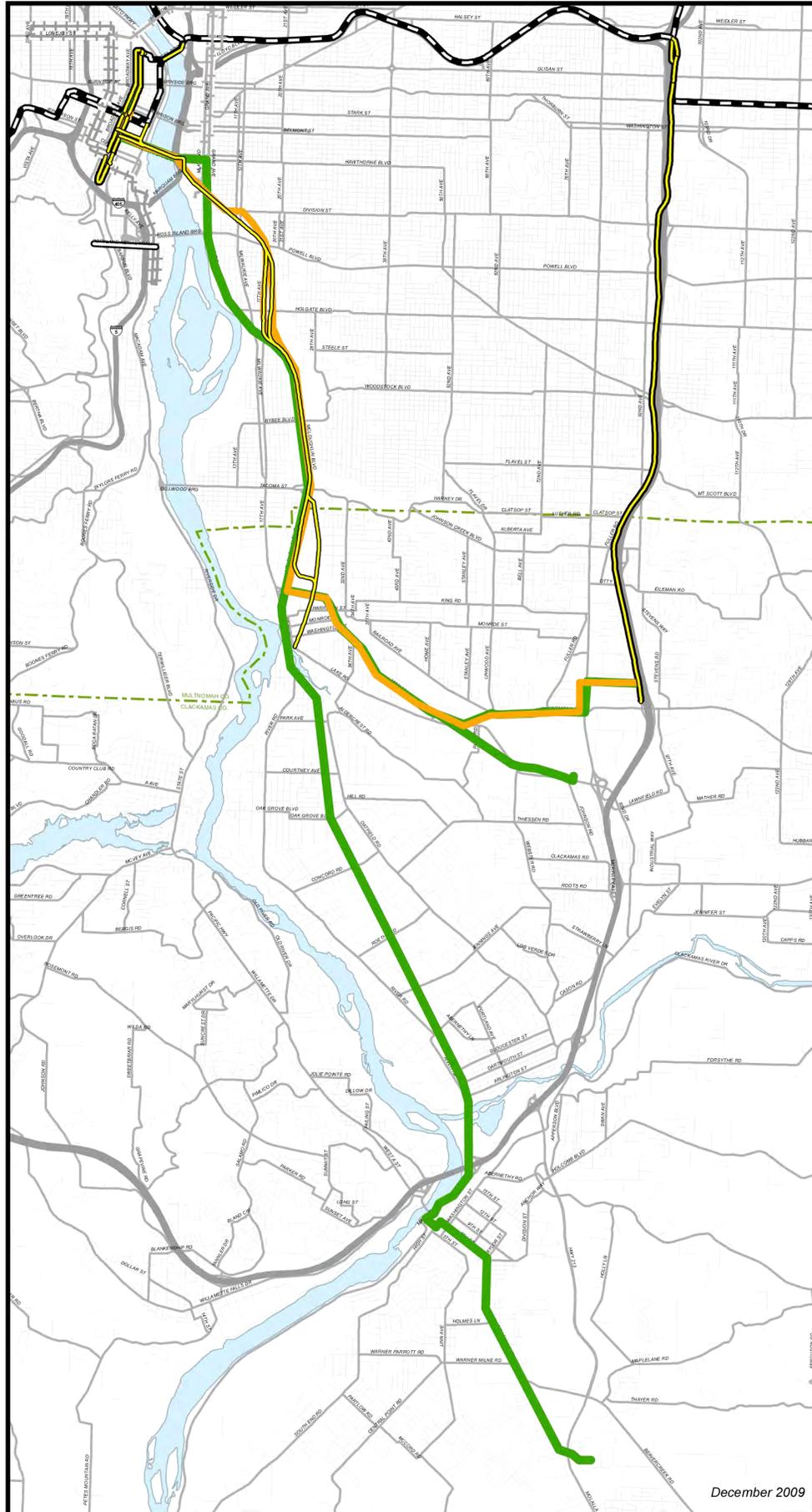
Portland-Milwaukie Light Rail Project

South Corridor SDEIS Light Rail, Busway, and BRT Alternative Modes 2002

Figure L-3

-  Light Rail
-  Busway
-  BRT

-  Existing MAX
-  Existing Streetcar
-  Under Construction Streetcar
-  Railroad
-  County Line



0 0.5 1 1.5 2 Miles



December 2009

- The least number of protected intersections
- The least travel time savings for most major origin and destination locations
- The second smallest reduction in vehicle miles traveled and vehicle hours of delay
- The greatest number of hazardous materials sites near the alignment
- Little public support

The BRT Alternative therefore performed substantially worse than the light rail alternative in terms of meeting the project purpose and need statements to:

- Be environmentally sensitive
- Reflect community values
- Optimize the transportation system

Busway Alternative

A Busway Alternative was considered in both the *1993 South/North Pre-Alternatives Analysis* and *2000 SCTAS* and advanced for further study in the *2002 South Corridor SDEIS*. A busway is a roadway for the exclusive use of transit buses. Typically, a busway is differentiated from bus-only lanes by the degree of physical separation and protection provided to the buses from adjacent and intersecting mixed traffic, with a busway providing a more definitive barrier, such as a concrete curb, while a bus lane might be separated by a paint stripe and other lane markings. The typical configuration is two lanes (one for each direction), with pull-out lanes so express buses can pass local buses and ramps to provide access to and egress from other highways and streets. Busways are often operated to provide both local service and express service.

A grade-separated busway in the SE McLoughlin Boulevard/OR224 corridor was considered in the *1998 South/North DEIS*. Another busway concept was developed for the SE McLoughlin Boulevard corridor north of SE Tacoma Street during the *2000 SCTAS* that used portions of the proposed light rail alignment. This concept was advanced for analysis in the *2002 South Corridor SDEIS*.

The Busway Alternative evaluated in the *2002 South Corridor SDEIS* included a variety of components designed to increase the speed and reliability of trunkline bus service in the South Corridor. It would be located parallel to OR99E/SE McLoughlin Boulevard, between the Hawthorne Bridge and the North Milwaukie Industrial Area and between the SE Lake Road on- and off-ramps to Highway 224 and the Clackamas Town Center Transit Center. The busway would be a two-way roadway for the exclusive use of transit vehicles. It would be physically separated from both adjacent and cross-streets to ensure that transit buses would operate at relatively high speeds with a high degree of reliability.

Reasons cited that the Busway Alternative was not recommended as the LPA included:

- Low public acceptance due to potential traffic impacts, displacements, and noise impacts

- Strong opposition in the Milwaukie-to-Clackamas Regional Center segment due to traffic impacts
- Slower transit travel time than light rail
- Significantly lower transit ridership than light rail (10,090 fewer trips per day)
- Most noise impacts
- Most displaced businesses
- Greatest number of riparian and ecosystem impacts of all the alternatives considered
- Greatest amount of new impervious surfaces
- Concerns about the capacity of the Hawthorne Bridge and the Downtown Portland Transit Mall

The Busway Alternative therefore performed substantially worse than the light rail alternative in terms of meeting the project purpose and need statements to:

- Maintain the livability of the region
- Be environmentally sensitive
- Reflect community values
- Optimize the transportation system

Light Rail

Light rail has been examined extensively in previous studies, including the *1993 South/North AA* and the *1998 South/North DEIS*. This alternative would provide high-capacity light rail transit service, generally separated from traffic congestion, and include an expanded feeder bus network to residential areas and employment sites in southeast Portland and Clackamas County. The line would connect with the existing light rail system in downtown Portland.

In 1999, in response to the defeat of the November 1998 ballot measure that would have provided funding for the South/North Corridor light rail, non-light rail transportation options were developed to address the transportation problems in the Portland-Milwaukie Corridor. Only alternatives other than light rail were evaluated in the *2000 SCTAS*. However, the citizens of the central and southeast Portland neighborhoods, the Milwaukie neighborhoods, and the Clackamas area advocated for adding light rail alternatives for study. In response, the following three light rail alignment alternatives were studied along with BRT Alternative and Busway alternatives in the *2002 South Corridor SDEIS*:

- I-205
- Portland-Milwaukie
- Combined I-205/Portland Mall and Portland-Milwaukie

Following completion of the *2002 South Corridor SDEIS* process, the Metro Council adopted a two-phased light rail strategy for the South Corridor. The Combined Light Rail Alternative was selected with the I-205 alignment as the first phase, to be followed by the Portland-Milwaukie alignment as the second phase. Light rail implemented as two-phased strategy was adopted for the South Corridor because it would:

- Provide light rail to Clackamas Regional Center and Milwaukie Town Center
- Result in the greatest increase in corridor and system-wide transit trips
- Result in the greatest reduction in vehicle miles traveled and vehicle hours of delay
- Result in the greatest reduction in traffic infiltration into neighborhoods
- Better support activity centers as measured by access to fast and reliable transit service to town and regional centers
- Provide greater access to high-quality transit service as measured by population located within one-quarter mile of fixed guideway stations, the number of park-and-ride spaces and lots, the ease of transfers, and the reliability of the alternative
- Result in the greatest reduction in air pollution
- Result in the most significant economic benefit in the region in both jobs created during construction and additional personal income

In addition, the following rationale for the selection of the Portland to Milwaukie Light Rail was cited:

- In 2020, Milwaukie LRT would have the highest number of transit trips in this segment of any alternative, adding over 20,000 light rail trips in addition to I-205 light rail for a combined total of over 53,000 daily light rail trips in the South Corridor.
- The Milwaukie LRT Alternative would provide the fastest travel time of any of the Alternatives between Milwaukie and downtown Portland.
- LRT station areas would provide opportunities for transit oriented development in southeast Portland and in downtown Milwaukie.
- Milwaukie LRT would provide better neighborhood transit service than the BRT or Busway Alternatives, by providing accessible, high-capacity transit service to Southeast Portland neighborhoods, Milwaukie and downtown Portland.
- The Milwaukie LRT Alternative has generated significant community support in Milwaukie, southeast Portland and downtown Portland. For example, the Milwaukie Neighborhood Leaders have actively engaged their community and City Council over a period of two years in a grass-roots effort to identify light rail alignments that fit with community goals.
- The Milwaukie LRT Alternative would have fewer environmental and displacement impacts than the Busway Alternative.

- Milwaukie LRT would be compatible with and would augment the regional light rail transit system offering direct service to downtown Portland, the Rose Quarter and north Portland as well as easy transfers to the Blue and Red Lines between Hillsboro, downtown Gresham and the Portland Airport.

Light rail therefore met the following purpose and need statements to:

- Maintain livability
- Support land use goals
- Be environmentally sensitive
- Optimize the transportation system
- Be fiscally responsive
- Reflect community values

Streetcar

Streetcar provides an important transportation function and is being implemented in the region. Local and regional transportation plans call for improving transit circulating service for the Portland Central City, specifically serving the east side of the Willamette River and linking it to the west side. The Portland Streetcar Loop Project was initiated based on that plan. In 2005 Metro, TriMet and the City of Portland initiated the Eastside Transit Alternatives Analysis, which studied various alignments and compared streetcar service to bus service as a way of both transporting people and inducing economic development. The *Eastside Transit Alternatives Analysis Evaluation Report* (Metro 2006) documents the evaluation of the alternatives.

The Metro Council concluded the study by adopting an extension of the streetcar service from the Pearl District in northwest Portland, across the Broadway Bridge to the Lloyd and Central Eastside Districts, to OMSI, and eventually crossing the Willamette River again linking up to RiverPlace as the LPA. The LPA identified OMSI as an interim terminus and called for extending the streetcar across the Willamette River as part of the Portland-Milwaukie Light Rail Project.

At public meetings held during the development and refinement of the options for the Portland-Milwaukie SDEIS, several community members asked why a streetcar option was not being proposed. Streetcars have not been studied during an environmental process for the South Corridor, because a streetcar option does not meet the purpose and need for the corridor.

Streetcars would not offer the higher speeds or reliability that light rail would in this congested corridor. Light rail operates primarily in exclusive right-of-way and streetcars operate in mixed traffic; therefore, speed and reliability are affected by adjacent autos, thus slowing travel time and affecting reliability considerably compared to light rail. In addition, streetcars would contribute to increased congestion in the corridor. In a congested corridor with longer trips, it would be preferable to operate in a separated right-of-way rather than in mixed traffic. Streetcars are smaller and have significantly less capacity than light rail. The ridership forecast of 22,000 to

27,000 trips per day in this corridor exceeds the ability of streetcars to provide service efficiently. Meeting this demand would mean accommodating an afternoon peak demand of 1,300 to 2,280 passengers per hour in the peak direction. This would require eight light rail trains consisting of two light rail vehicles or 22 streetcars. The addition of the 22 streetcars per hour would increase congestion in the corridor.

Because streetcars are nine inches narrower than light rail vehicles, streetcars cannot operate on the transit mall without modification to stations, vehicles, or both. Through routing with the Yellow Line light rail would not be possible for the same reasons. Riders would also need to transfer at a higher rate to reach destinations served by the light rail system, and transfer opportunities from streetcar to light rail would be more limited than if the corridor were served by an extension of the regional light rail system.

Considering rider benefits, operating costs, integration with the existing light rail system, and effects on traffic, streetcars would not be an effective option for this corridor, compared to light rail. A streetcar option does not “optimize the transportation system” for this corridor. Therefore, on its own, a streetcar option is not a reasonable alternative in terms of meeting the Purpose and Need for the Portland-Milwaukie corridor.

L.2.2 Evaluation and Selection of Light Rail Alignments 1993-2003

This section describes the evaluation of light rail alignments in the South Corridor between 1993 and 2003, which culminated with the following LPAs adopted by the Metro Council:

- *South Corridor Locally Preferred Alternative* adopted April 17, 2003
- *Downtown Portland Mall Segment Locally Preferred Alternative* adopted January 15, 2004

Light rail alignments evaluated in the Portland-Milwaukie Corridor between 1993 and 2003 are described below in two sections, Portland Alignments and Milwaukie Alignments, and shown in Figures L-4 through L-7. Figure L-4 illustrates light rail alignments that have been evaluated in the Portland-Milwaukie Corridor in either an alternatives analysis or a DEIS phase. Figure L-5 shows the alignments in Portland; Figure L-6 shows alignments in Milwaukie. Figure L-7 illustrates alignments evaluated in either the *1998 South/North DEIS* or the *2002 South Corridor SDEIS*.

L.2.2.1 Portland Alignments

Portland-Milwaukie Corridor alignments in Portland must consider the following three interrelated geographic areas:

- Downtown Portland
- Willamette River crossing
- Southeast Portland

The location of alignments in each of these areas affects the alignment possibilities for the other areas. Figure L-5 shows alignments considered in Portland between 1993 and 2002.

Downtown Portland

An alignment on the Downtown Portland Transit Mall—with the Caruthers Willamette River crossing from RiverPlace to OMSI—was selected as the light rail alignment in downtown Portland following the *1998 South/North DEIS*. In the *2002 South Corridor SDEIS*, the Hawthorne Bridge was evaluated as a low cost alternative for the river crossing option. This option would have continued the existing alignment on SW 1st Avenue south to cross on the Hawthorne Bridge.

The *Downtown Light Rail Systems Analysis* (Metro and TriMet 2002), prepared in conjunction with the *2002 South Corridor SDEIS*, assessed the ability of the existing downtown Portland Cross Mall alignment on NW 1st and SW 1st avenues and SW Morrison and SW Yamhill streets to accommodate future light rail. The analysis found that adding the I-205 light rail project to the service anticipated for Blue, Red and Yellow lines by 2020 would exceed the capacity of the Cross Mall alignment. In addition, the study determined that the Hawthorne Bridge would not provide effective or reliable operations, and its environmental impacts would be difficult to mitigate. The Hawthorne Bridge, an historic structure, would require extensive retrofitting, and trains would operate in mixed traffic on the bridge. New traffic signals on both ends of the Hawthorne Bridge and frequent trains moving slowly across the bridge would impact already congested traffic. The frequent bridge lifts would degrade transit reliability.

Downtown Portland businesses were also opposed to this alignment because it would not serve the downtown office and retail core along the Downtown Portland Transit Mall. In addition, the alignment did not serve PSU, a key destination in downtown Portland.

Therefore, the 1st Avenue-Hawthorne Bridge is therefore not a reasonable alternative to meet the project purpose and need statements to:

- Maintain the livability of the region
- Be environmentally sensitive
- Reflect community values
- Optimize the transportation system

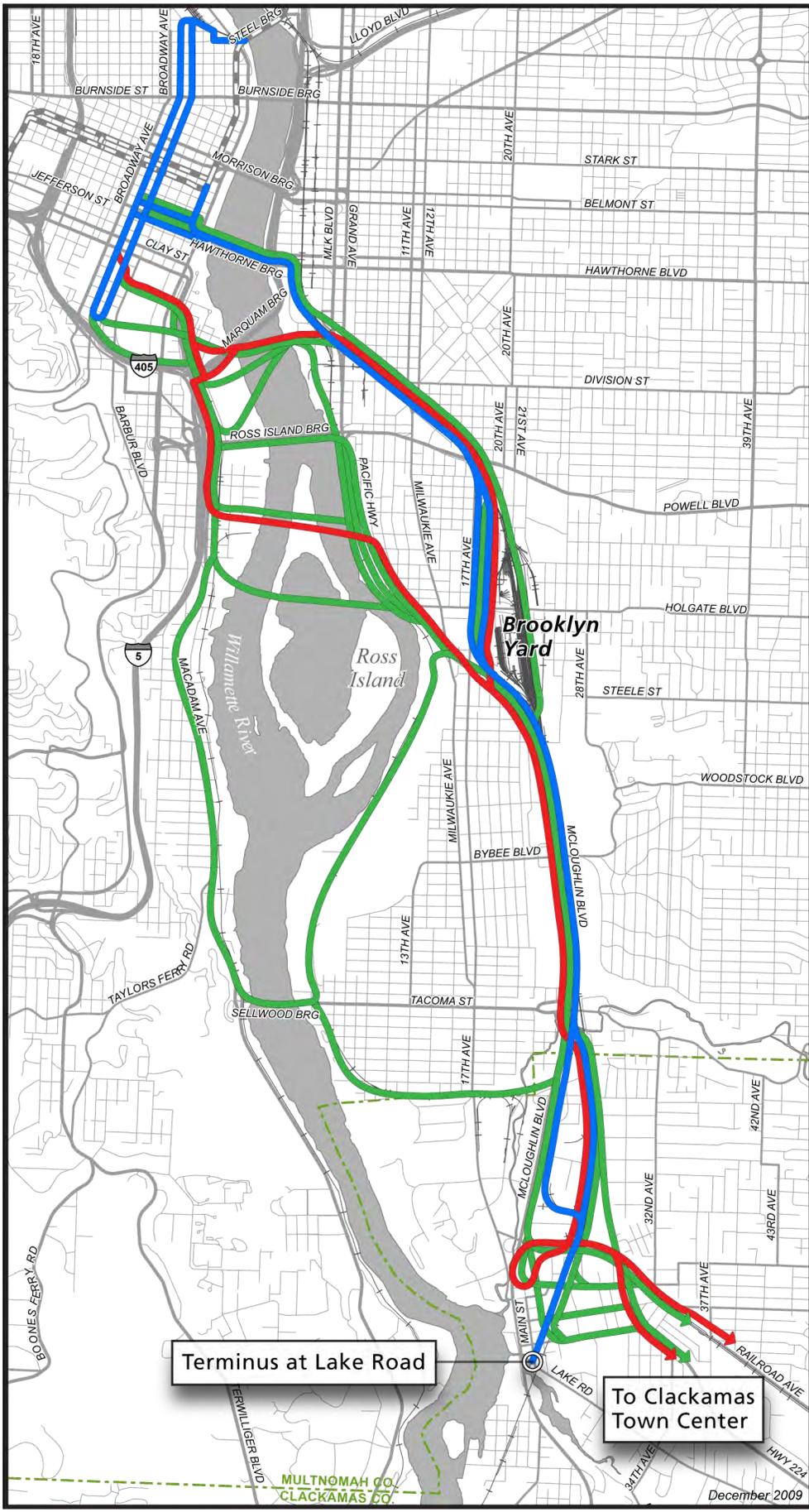
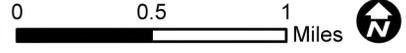
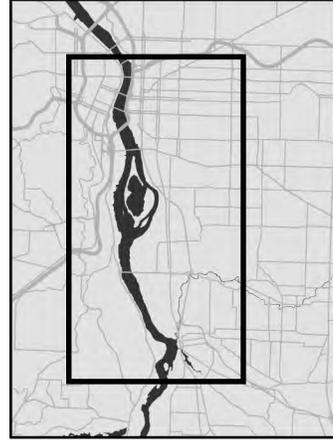
This decision triggered a reexamination of the Portland Mall alignment. The *2003 Downtown Amendment* reevaluated the Portland Mall light rail alignment and amended the LPA to revise the alignment prior to initiation of the *I-205/Portland Mall Light Rail Project FEIS*. The Caruthers Bridge was identified as the Preliminary LPA and was the 2003 LPA under

Portland-Milwaukie Light Rail Project

Light Rail Alignments Evaluated 1993-2002 Portland - Milwaukie Corridor

Figure L-4

- South/North Alternatives Analysis 1993-1998
- South/North DEIS 1998
- South Corridor SDEIS 2002
-  Light Rail Constructed 1986-2004
-  Railroad
-  County line



Terminus at Lake Road

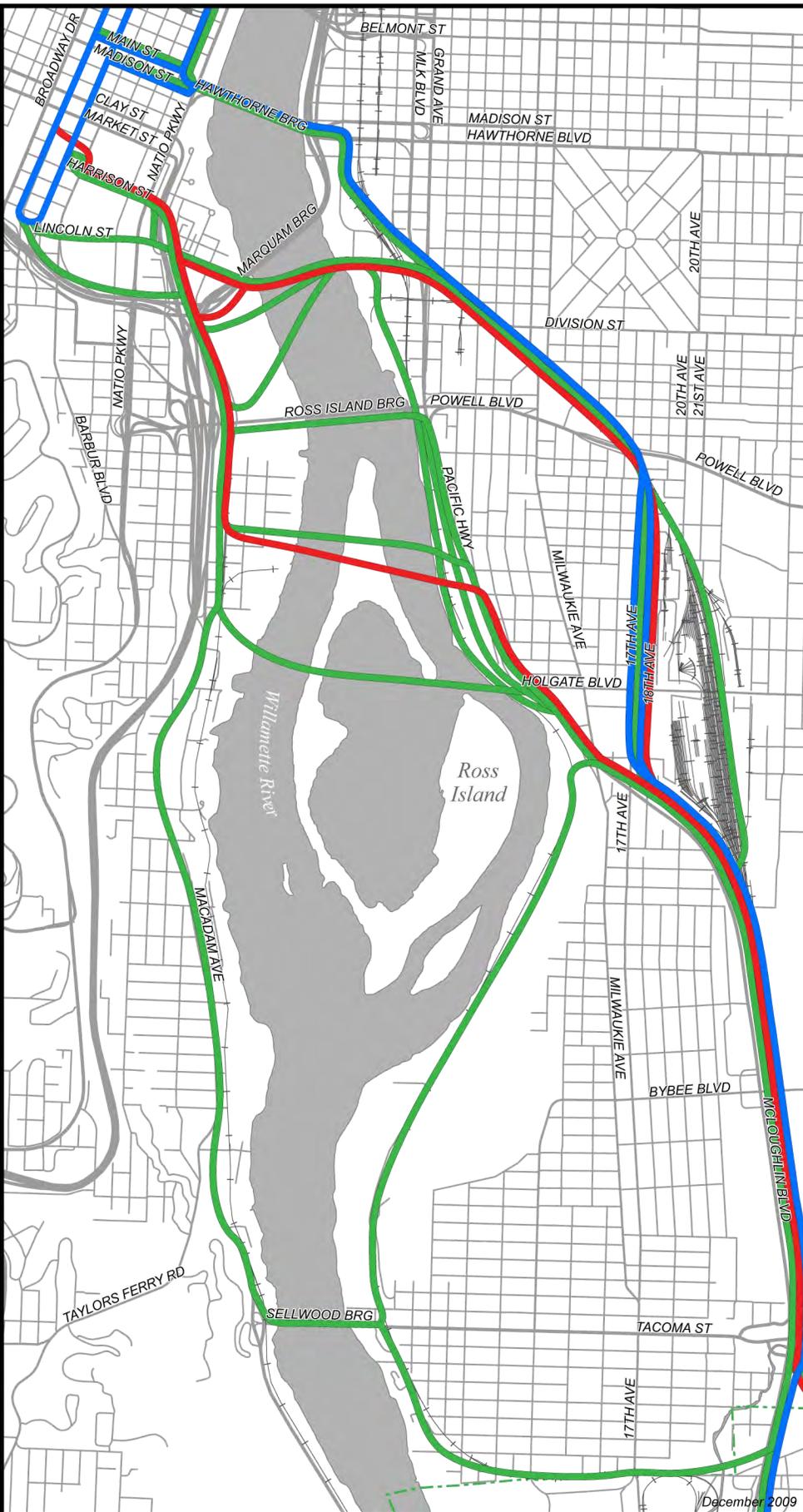
To Clackamas Town Center

Portland-Milwaukie Light Rail Project

Light Rail Alignments Evaluated 1993-2002 Portland

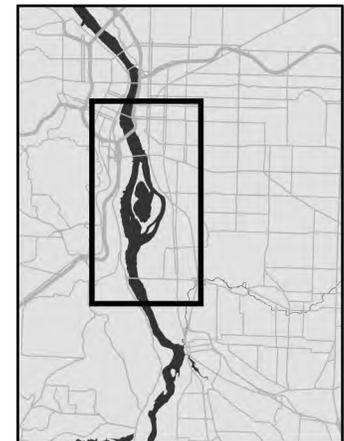
Figure L-5

-  South/North Alternatives Analysis 1993-1998
-  South/North DEIS 1998
-  South Corridor SDEIS 2002
-  Railroad
-  County line



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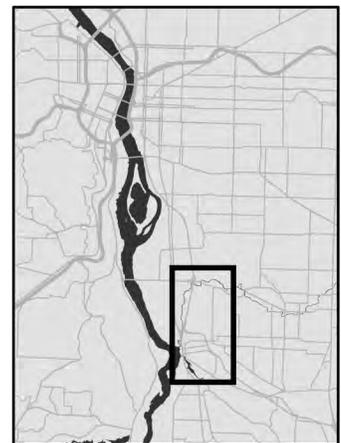
Light Rail Alignments Evaluated 1993-2002 Milwaukie

Figure L-6

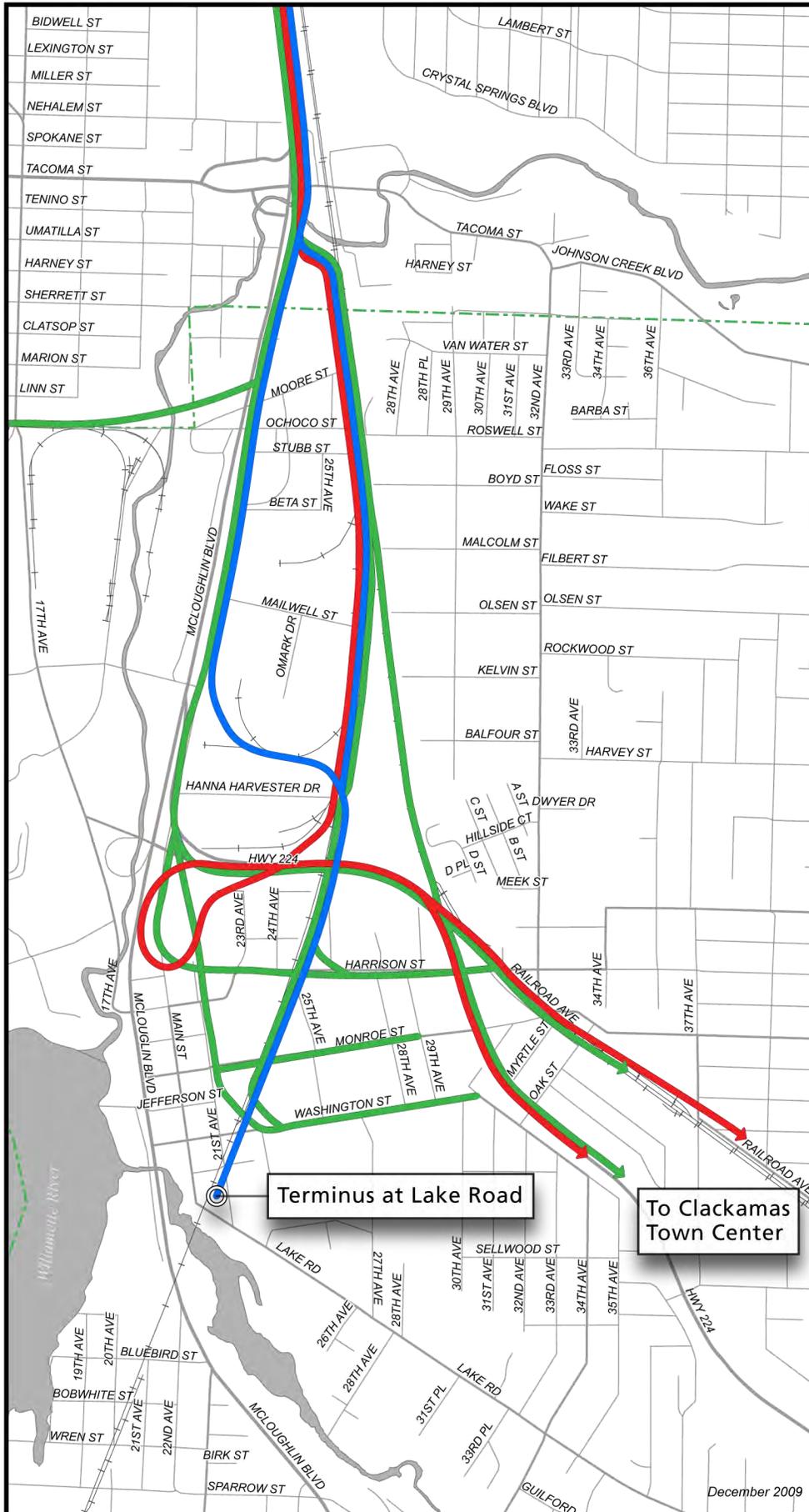
- South/North Alternatives Analysis 1993-1998
- South/North DEIS 1998
- South Corridor SDEIS 2002
-  Railroad
-  County line

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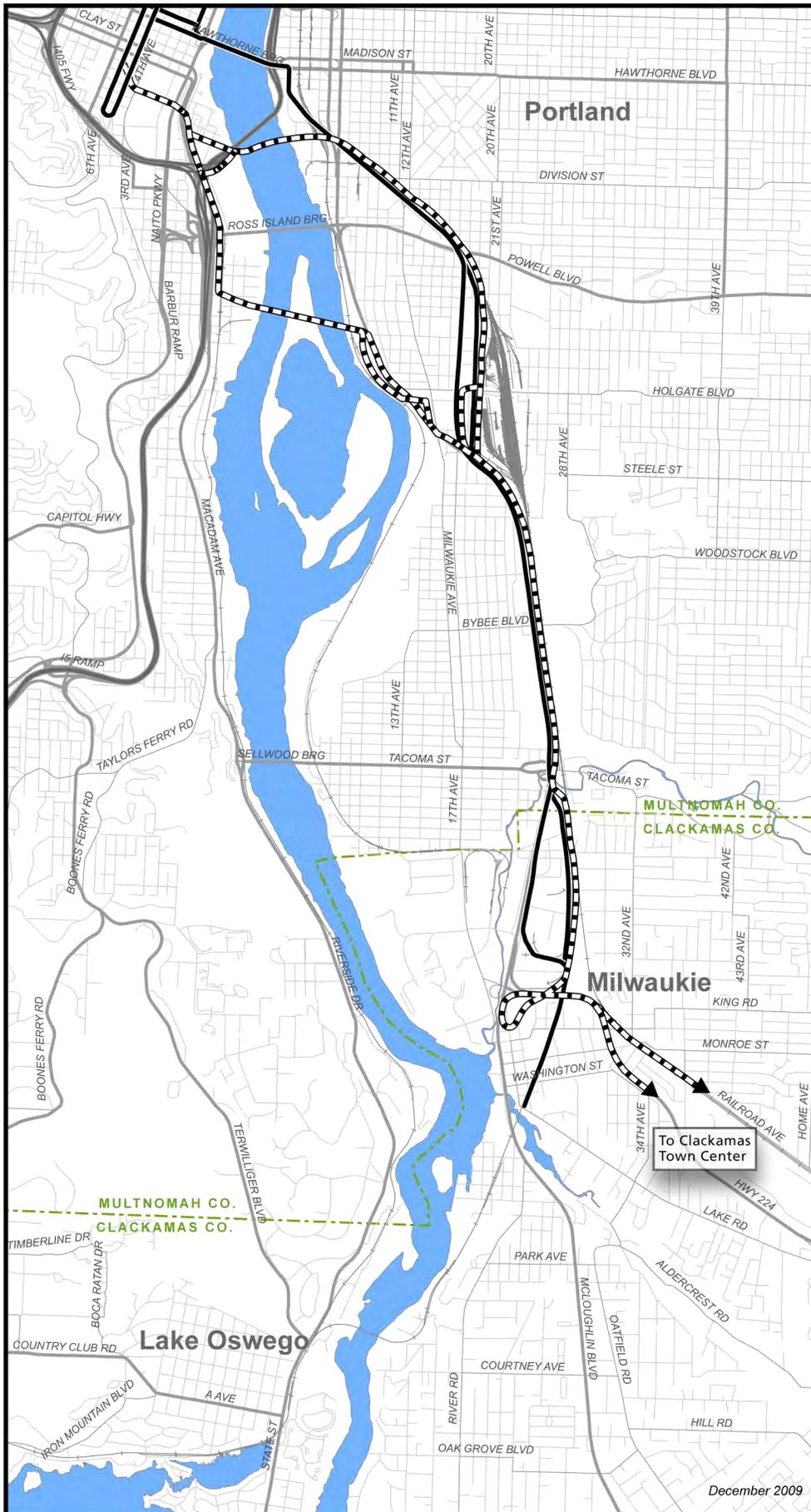
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Portland-Milwaukie Light Rail Project

Light Rail Alignments
Evaluated:
South/North DEIS 1998 and
South Corridor SDEIS 2002

Figure L-7

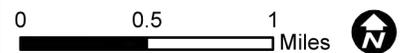
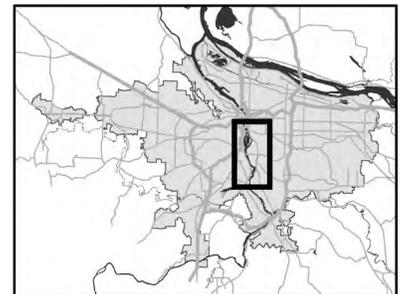
-  South/North DEIS 1998
-  South Corridor SDEIS 2002-2003
-  Railroad
-  County line



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consideration in the *Portland-Milwaukie SDEIS*. Since the Caruthers Bridge had not been studied in the *2002 South Corridor SDEIS*, the environmental analysis needed to be and was updated in the *2008 Portland-Milwaukie SDEIS*.

The selection of the Downtown Portland Mall and Caruthers Bridge led to a need to reexamine the alignment connecting the two. Following the *1998 South/North DEIS* an alignment on SW Harrison Street had been selected as the LPA. Since that time, the Portland Streetcar has been constructed on that alignment. Before the 2003 LPA was adopted, issues related to compatibility of operating streetcar and light rail on the same alignment and the differences in construction techniques were investigated. Cost, construction, service disruption, and long-term operations issues, as well as the opportunity for better station locations in the South Auditorium District and at PSU, were cited in selection of a SW Lincoln Street alignment as the 2003 LPA. The SW Lincoln Street alignment was also identified as a Preliminary LPA in 2003 because the environmental analysis needed to be completed. That analysis was completed in the *2008 Portland-Milwaukie SDEIS*. See the *South Corridor Project Locally Preferred Alternative Report* (Metro 2003) for additional information.

Willamette River Crossing

The evaluation and selection of options for crossing the Willamette River influences and depends on the alignment in downtown Portland, as discussed above, and in Southeast Portland, which is discussed below.

River crossing alignment options evaluated in the *1993 South/North AA* included:

- North of, and adjacent to, the Sellwood Bridge
- Mid-Ross Island
- South of, and adjacent to, the Ross Island Bridge
- Several alignment options from between the Ross Island and Marquam Bridges on the west side to OMSI
- On the Hawthorne Bridge

Two crossing alignment alternatives were selected for evaluation in the *1998 South/North DEIS*:

- North Ross Island, which would cross the northern part of Ross Island from South Waterfront to SE McLoughlin Boulevard
- Caruthers Bridge, which would cross from the Marquam Bridge at RiverPlace to OMSI

The other options were eliminated because they did not:

- Support land use goals because they had worse development potential.
- Optimize the transportation system because they would provide worse transit access and service to inner east side neighborhoods and had slower travel times

- Were not fiscally responsive because they had higher costs

At the conclusion of the *1998 South/North DEIS* process, the Caruthers Bridge option was selected as the LPA for the Willamette River crossing in the adopted *Locally Preferred Strategy Final Report* (Metro 1998). It met the purpose and need as follows:

- Supported land use goals because it had better transit access to East Portland neighborhoods and activity centers
- Reflected community values because it had greater public support
- Was fiscally responsive because it had lower capital cost
- Optimized the transportation system because it had higher light rail ridership
- Was environmentally sensitive because it had fewer residential displacements, fewer noise and vibration impacts, and less potential to impact vegetation, wildlife, wildlife habitat, and fisheries.

However, following the defeat of the ballot measure that would have reaffirmed funding for light rail, the Hawthorne Bridge Willamette River crossing was developed as a lower cost light rail option for analysis in the *2002 South Corridor SDEIS*. The Hawthorne Bridge Crossing is discussed in the previous section because it is related to the alignment decision in downtown Portland. The *2002 South Corridor SDEIS* evaluated the Light Rail Alternatives, as well as the Busway and BRT alternatives with a Hawthorne Bridge crossing. The 2003 LPA recommended the Caruthers Crossing, but identified it as preliminary LPA pending the completion of the environmental analysis, which was completed in the *2008 Portland-Milwaukie SDEIS*.

Southeast Portland

The alignment options available in southeast Portland influence and depend on the location of the Willamette River crossing alignment. Each of the two river crossing options selected in the *1993 South/North AA* for analysis in the *1998 South/North DEIS*—North Ross Island and Caruthers—included alignment options in southeast Portland.

The alignment option selected to be studied with the North Ross Island option would use some sections of the former Portland Traction Company right-of-way and run along SE McLoughlin Boulevard from the river south to Milwaukie. The North Ross Island alignment option included an alignment in southeast Portland along SE McLoughlin Boulevard from the river to Milwaukie.

The Caruthers alignment option would include options east and west of the Brooklyn Yard, a freight rail operations yard. The alignment west of the Brooklyn Yard, on SE 17th Avenue, was selected for study in the *1998 South/North DEIS* because it was less expensive and had fewer property impacts.

Options that have been studied on the east side of the Willamette River and not advanced include:

- SE McLoughlin Boulevard, studied in the *1998 South/North DEIS*. This alignment was combined with the Ross Island river crossing option and would use the former Portland Traction Company right-of-way and SE McLoughlin Boulevard between the crossing and Sellwood.
- East Brooklyn Yards, studied in the *1998 South/North DEIS*. This alignment would have run to the east of and parallel to the Brooklyn Yard from SE Powell Boulevard to south of the rail yard.
- West Brooklyn Yards, studied in the *1998 South/North DEIS* and the *2002 South Corridor SDEIS*. This alignment would have run to the east of and parallel to the Brooklyn Rail Yards. This option was selected as the 1998 LPA.

The SE 17th Avenue alignment between SE Powell Boulevard and SE McLoughlin Boulevard was selected as the LPA following the *2002 South Corridor SDEIS*. The alignment better met the purpose and need statements to:

- **Support land use goals** because it would be closer to the Brooklyn neighborhood and provide better station environments and pedestrian access and serve more of the transit-supportive land uses located along SE 17th Avenue
- **Reflect community values** because it was strongly supported by the Brooklyn neighborhood and would avoid displacements to large employers
- **Be fiscally responsive** because it would avoid railroad property that would otherwise be an impediment to timely and cost-effective implementation

From south of the Brooklyn Yards at SE McLoughlin Boulevard to SE Tacoma Street, the alignment along SE McLoughlin Boulevard was the only alignment option that remained in this section after the Sellwood Bridge option was eliminated. The SE McLoughlin Boulevard alignment was studied in the *1998 South/North DEIS* and the *2002 South Corridor SDEIS* and was selected as the LPA for both.

Milwaukie Alignments

This section describes alignments studied in the North Milwaukie Industrial Area and downtown Milwaukie between 1993 and 2002. Consistent with the regional system planning and the original purpose and need defined for the project in the *1998 South/North DEIS*, these alignments were originally developed to serve the town and regional centers in the South Corridor with high-capacity transit. The *1993 South/North AA* evaluated alignments through Milwaukie with terminus options in Oregon City and at the Clackamas Town Center. The *1998 South/North DEIS* evaluated the alignment with a terminus in Milwaukie and at the Clackamas Town Center. The *2002 South Corridor SDEIS* evaluated the alignment to Clackamas Town Center via I-205 instead of through Milwaukie. Figure L-6 shows the alignments that were analyzed in North Milwaukie.

In the North Milwaukie Industrial Area there have been two primary alignment alternatives—the Southgate Crossover on SE Main Street/SE McLoughlin Boulevard and the Tillamook Branch Railroad Line. These are essentially the same alignments studied in the *Portland-*

Milwaukie Light Rail Project SDEIS. The Tillamook Branch line alignment was developed during the *1993 South/North AA* and studied in the *1998 South/North DEIS* and the *2002 South Corridor SDEIS* as well.

The Milwaukie alignment options evaluated in the *2002 South Corridor SDEIS* were developed with input from Milwaukie's seven neighborhood associations. The neighborhood associations developed a set of criteria with 14 points for addressing transportation and growth in the South Corridor study area, which resulted in the addition of the Tillamook Branch line alignment. Alignments on SE McLoughlin Boulevard and SE Main Street were developed during the *2002 South Corridor SDEIS* because those alignments could access a potential park-and-ride location at the site of the former Southgate Theater.

Following the *2002 South Corridor SDEIS*, the Southgate Crossover alignment, which was parallel to SE McLoughlin Boulevard and SE Main Street in the North Milwaukie Industrial Area, and crossed over near the Southgate Theater site to run along the Tillamook Branch line alignment in downtown Milwaukie, was selected as the LPA. This alignment best met the purpose and need statements to:

- **Support land use goals** because it would provide better access to jobs and residents, providing access to 1,500 more jobs and 50 more residents within a quarter-mile of a light rail station than the Tillamook Branch line alignment option.
- **Optimize the transportation system** because it would result in more transit ridership due to an additional station and park-and-ride and a more convenient transit center location that could better accommodate increases in transit service than the other options. It would provide 600 additional park and-ride spaces compared to the Tillamook Branch Line alignment option.
- **Reflect community values** because it would locate a transit center at the Southgate site (Milwaukie Station). Southgate was preferred over the Milwaukie Middle School Transit Center site, which would have been a component of the Tillamook Branch line alignment option.

In 2003, following the adoption of the LPA, the City of Milwaukie convened a Transit Working Group to address issues that had not been resolved at the time the LPA was adopted. The Transit Working Group was charged with:

- Recommending a permanent site for the bus transit center in Milwaukie
- Developing a traffic and parking mitigation plan for the adopted LPA in the industrial area, including revisiting the Tillamook alignment (which had been studied in the *2002 South Corridor SDEIS*).

The Transit Working Group developed nine alignment and design options on SE Main Street and SE McLoughlin Boulevard and along the Tillamook Branch line to mitigate for the loss of parking and access to businesses in the North Milwaukie Industrial Area. Figure L-8 shows the alignments evaluated by the Transit Working Group.

The group recommended a Tillamook Branch line alignment in the North Milwaukie Industrial Area, with a transit center south of Kellogg Lake to replace the park-and-ride capacity that would be lost because this alignment option would not include the park-and-ride at the Southgate Theater site. The Transit Working Group's recommendation was adopted by the Milwaukie City Council in 2004. However, the city later learned that the property at Kellogg Lake was not available for a transit center and park-and-ride. Therefore, park-and-ride locations were revisited during the Refinement Study, which was initiated in 2006.

L.2.3 Refinement Study for the Portland-Milwaukie Project SDEIS

In preparation for the *Portland-Milwaukie Project SDEIS*, Metro and TriMet initiated a Refinement Study in October 2006. The LPA for the South Corridor that was adopted in 2003 and amended in the *2003 Downtown Amendment* was the starting point for the Refinement Study. The purpose of the Refinement Study was to ensure that all reasonable alternatives were considered in the Portland-Milwaukie SDEIS, to address issues that were identified at the time the LPA for the South Corridor was adopted in 2003 and since, and to finalize options for study in the SDEIS.

The study reviewed design options at a conceptual level against a wide range of criteria that represented considerations of the SDEIS and the established purpose and need for the project. The refinement of design options focused on three areas: the Willamette River, the North Milwaukie Industrial Area, and the southern terminus. The issues studied are described below. Figure L-9 shows the 2003 LPA and the areas of focus during the Refinement Study. Additional information is available in the *Portland-Milwaukie Refinement Report* (Metro 2007).

The Refinement Study analyzed and compared the options in order to identify the ones that had the greatest potential to meet the purpose of and need for the project. Criteria included capital cost, engineering feasibility, potential transit ridership, travel time, land use and transportation connections, and known potential environmental and property impacts. Cost-effectiveness was assessed by evaluating the combined effects of the capital cost, potential ridership, and travel time measures.

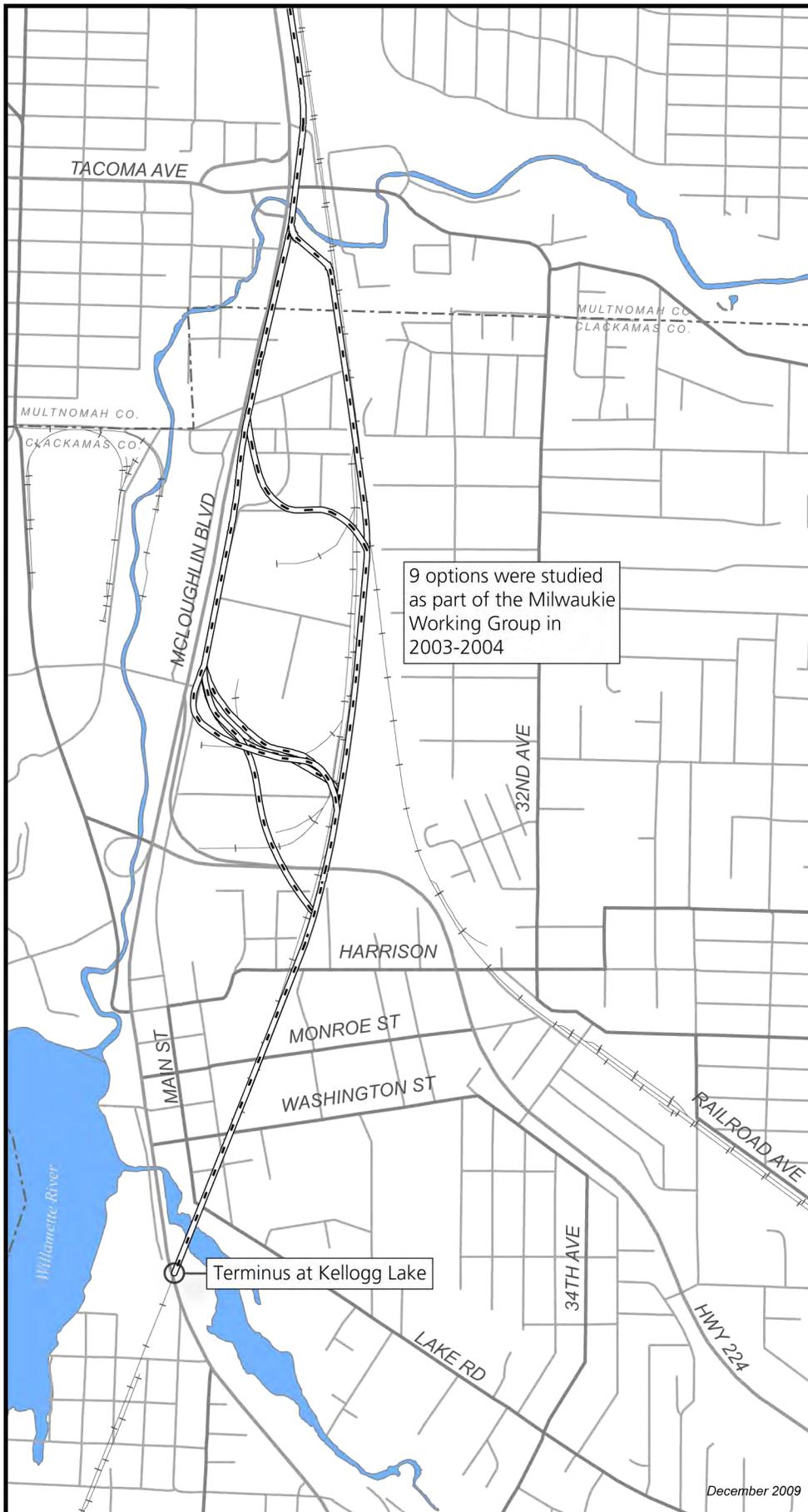
Metro and its project partners conducted public outreach through the winter and spring of 2007 to inform interested parties about the project status and obtain input on the design options. Key stakeholders, including property owners, institutions, and neighborhood and business association representatives were contacted. In Milwaukie, an open house was held on March 5, 2007, which had over 150 attendees. This was followed by three meetings focused on different segments of the alignment: south of downtown Milwaukie, the downtown Milwaukie area, and the area between downtown Milwaukie and the Tacoma Station.

Portland-Milwaukie Light Rail Project

Working Group: Milwaukie Alignment Options 2004

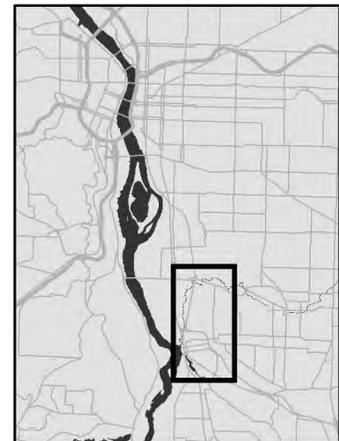
Figure L-8

-  Working Group Alignments
-  Railroad
-  County line



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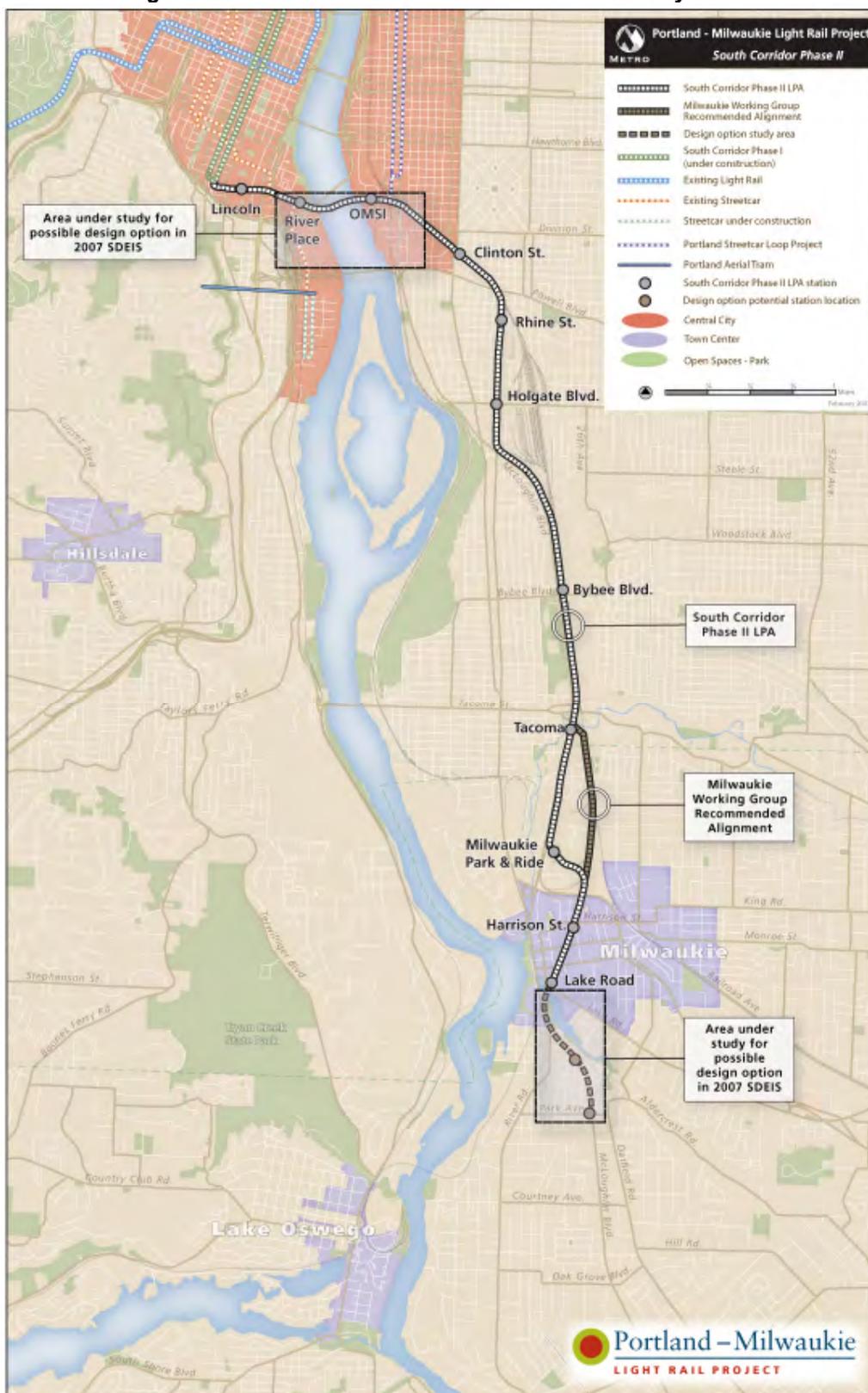


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Figure L-9. The 2003 LPA and the Refinement Study Areas



The project hosted an open house to review the Willamette Crossing options on April 9, 2007, and it was attended by 70 people. In addition, project representatives made presentations and obtained feedback at numerous other community meetings, including neighborhood and business associations throughout the corridor.

L.2.3.1 Willamette River Crossing Area

The LPA adopted in 2003 included the Caruthers Willamette River crossing between RiverPlace and OMSI. That crossing had not been studied in detail since the *South/North Corridor Project DEIS* in 1998, when it was selected over a mid-Ross Island crossing. Since 1998, the South Waterfront area has undergone dramatic changes. The South Waterfront Plan, adopted by the Portland City Council in 2002, has triggered significant public and private investments in the area. Over 1,000 housing units have been completed, and approximately 1,700 additional housing units are planned. In 2006, the City of Portland completed work on the Portland Aerial Tram, which provides access from the South Waterfront area. Oregon Health & Science University (OHSU) has completed a 400,000-square-foot Center of Health and Healing and is currently developing a new master plan for a 19-acre university complex. In addition, OMSI's acquisition of six acres south of the current museum site creates new opportunities on the eastern bank of the river.

In order to provide better transit service to the South Waterfront area, during the 2007 Refinement Study several options between the Marquam Bridge and the Ross Island Bridge were developed and evaluated to identify the options that would be most promising in terms of meeting the project purpose and need. The alignment options evaluated during the 2007 Refinement Study are shown in Figure L-10.

Figure L-10 Willamette River Crossing Refinement Study options



There were two alignment options between SW Lincoln Street and the South Waterfront area in the Refinement Study, one along SW Naito Parkway and the other along the former Lake Oswego trolley alignment. One option would have run just to the north of the Ross Island Bridge. The bridge locations on the east side of the river included SE Caruthers Street, SE Division Place, and just north of the Ross Island Bridge. All options were designed to accommodate pedestrians and bicycle facilities and could accommodate streetcars and buses as well as light rail.

There was considerable interest among the public in improved service to the South Waterfront area. There were also concerns expressed about any options that would reduce service to, or otherwise negatively impact, eastside neighborhoods. Public comment generally supported including options that continued to serve the Central Eastside Industrial District (CEID) and OMSI.

Table L-2 summarizes the evaluation of the river crossing options.

Table L-2. Willamette River Crossing Summary Matrix*

	LPA	Meade / Caruthers	Porter / Division	Ross Island Bridge	Naito Parkway
Cost	○	●	●	●	●
Potential transit ridership	●	○	○	○	○
Potential transit travel time	○	●	●	○	●
Direct connection to key land uses - Westside	●	○	○	○	●
Direct connection to key land uses - Eastside	○	○	●	●	●
Urban design and land use compatibility - Eastside	○	○	●	●	●
Urban design and land use compatibility - Westside	○	○	○	●	●
Engineering feasibility	○	●	●	○	●
Property impacts (sq. ft. land)	○	○	●	●	●
Historic and visual impacts	○	○	○	●	●
Potential traffic impacts	○	○	●	●	●
Connection to Portland Aerial Tram	●	○	○	○	○
Connection to streetcar	○	○	○	●	●
Bicycle and pedestrian impacts	○	○	●	●	●



*Analysis is based on a conceptual level of design and does not include full transit model runs, etc.

The Ross Island Bridge and SW Naito Parkway options were eliminated from further consideration by the Portland-Milwaukie Steering Committee, the group of elected and agency representative responsible for guiding the process. The *Portland-Milwaukie Light Rail Project Refinement Report* (Metro 2007) cites the following issues with the Ross Island Bridge option:

- Potentially significant impact to the historic Ross Island Bridge
- Lack of service to the CEID and OMSI
- Substantial property impacts on the east side
- Elevated station in South Waterfront District
- High cost

The Ross Island Bridge alignment option is therefore not a reasonable alternative to meet the project purpose statements to:

- Be environmentally sensitive
- Support land use goals
- Be fiscally responsive

The SW Naito Parkway option had the following issues:

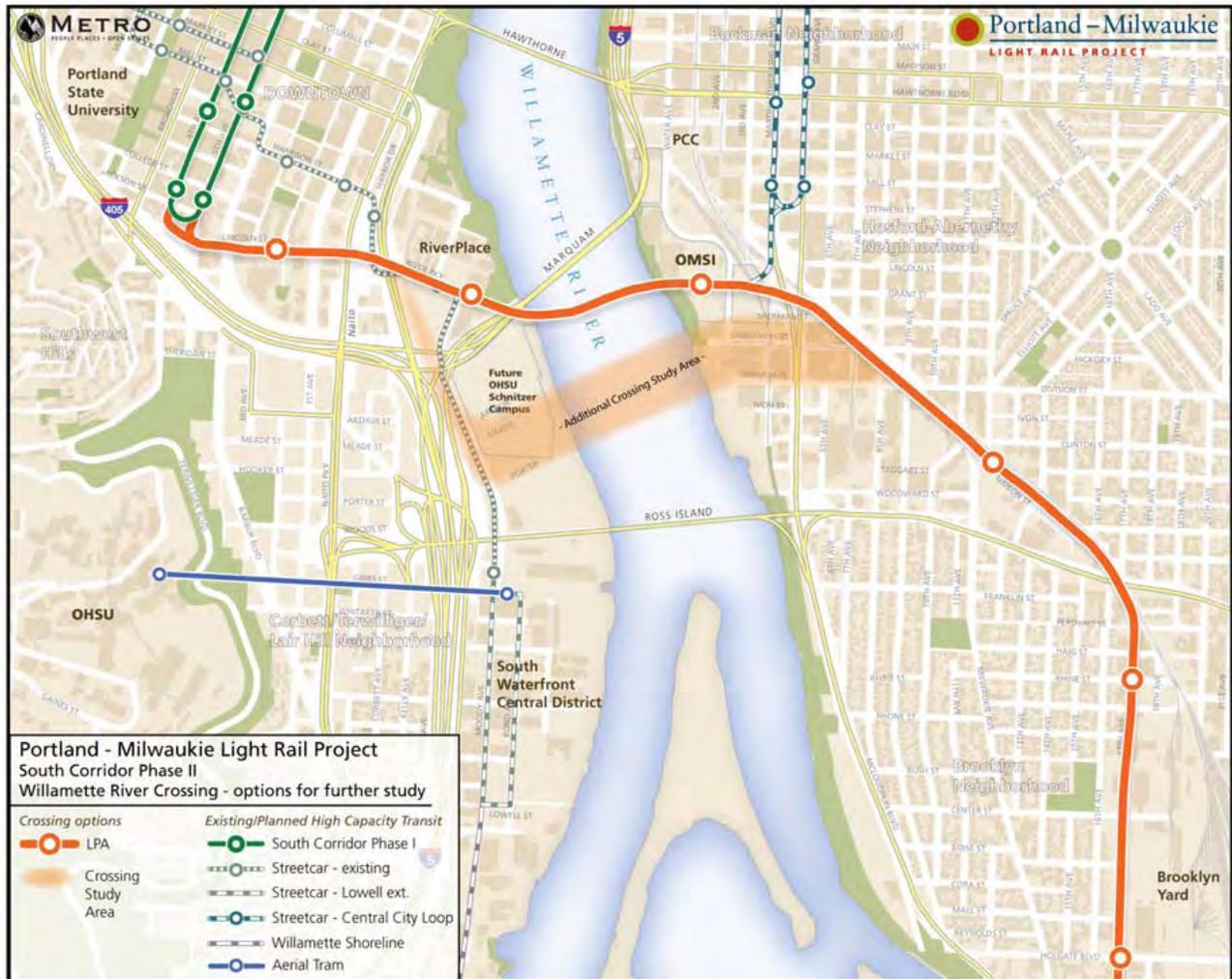
- Longest alignment
- Longest travel time
- Very significant infrastructure cost
- Significant property impacts
- Elevated station in South Waterfront District
- Poor streetcar connections
- Lack of service to RiverPlace

The SW Naito Parkway option is therefore not a reasonable alternative to meet the project purpose statements to:

- Optimize the transportation system
- Be fiscally responsive
- Support land use goals
- Reflect community values

Based on the evaluation of the Refinement Study options, in May 2007, the Portland-Milwaukie Steering Committee recommended that two design options be developed in the area from SE Sherman Street to SE Division Place, and SW Arthur Street and SW Porter Street for study in the *Portland-Milwaukie SDEIS*. See Figure L-11.

Figure L-11 Area Recommended for Willamette River Options



In response, the City of Portland, TriMet, and Metro staff worked to develop the two most promising options based on the Refinement Study evaluation and community input, that would best meet the purpose of and need for the project and proposed two primary options and two sub-options. The study team felt that the sub-options were a necessary addition to the project, because they would allow the project to respond to a series of master planning activities by OHSU and OMSI. The two primary options would allow the project to study the two most logical combinations among the four potential street alignments preferred by the project team and stakeholders. The sub-options represented variations, with two possible street network configurations in the South Waterfront District. An alignment on SE Division Place was eliminated because other options had fewer traffic and property impacts and would better serve OMSI and the CEID. An alignment one block north of SE Caruthers Street at SE Sherman Street appeared to have more potential to meet the project purpose and need.

The Portland-Milwaukie Steering Committee at its July 2007 meeting approved the study of four river crossing options that were considered to have the best potential to meet the purpose of and

need for the project for evaluation in the *Portland-Milwaukie SDEIS*. These options, which are described in Chapter 2, Section 2.3.1, Selection of Willamette River Crossing Alignment Option, include:

- 2003 LPA
- Meade-Sherman
- Porter-Caruthers
- Meade-Caruthers
- Porter-Sherman

L.2.3.2 Milwaukie Alignment, Stations, and Park-and-Ride

Subsequent to the LPA decision in 2003, the Milwaukie City Council established the Transit Working Group to address issues that had been identified when the LPA was adopted including parking impacts on SE Main Street. The group developed a number of options and ultimately the group recommended an alternative alignment along the Tillamook Branch Railroad that terminated at a park-and-ride south of Kellogg Lake, south of downtown Milwaukie. The Kellogg Lake site was not available, which necessitated the study of other park-and-ride and terminus locations. One goal of the Refinement Study was to identify termini and park-and-ride locations for further review in the SDEIS.

In order to provide additional park-and-ride opportunities, an alignment south of downtown Milwaukie along SE McLoughlin Boulevard to SE Park Avenue was considered as an extension to both the 2003 LPA and the Tillamook Branch line alignment recommended by the Working Group. A variety of potential park-and-ride and station locations were reviewed for each of these alignments. The alignment and park-and-ride options that were reviewed are shown in Figure L-12, below. Figure L-13 shows the station options in downtown Milwaukie.

Public comment was solicited on alignment, and park-and-ride and station location choices. This input, along with technical criteria, was used to develop specific options for study in the SDEIS.

The Portland-Milwaukie Steering Committee recommended that both the Tillamook Branch line alignment recommended by Milwaukie Working Group and the adopted 2003 LPA alignment be combined with the extension to SE Park Avenue to be studied further in the SDEIS. Figure L-14 shows the LPA and the two proposed design options, with associated stations and park-and-ride locations, proposed for further study in the SDEIS in this portion of the alignment. Park-and-ride options included locations and parking capacity ranges at SE Sparrow Street and SE Park Avenue. Additional work was to be completed to determine the capacities at these locations.

Figure L-12. Refinement Study: Alignments Tacoma Station to Project Terminus

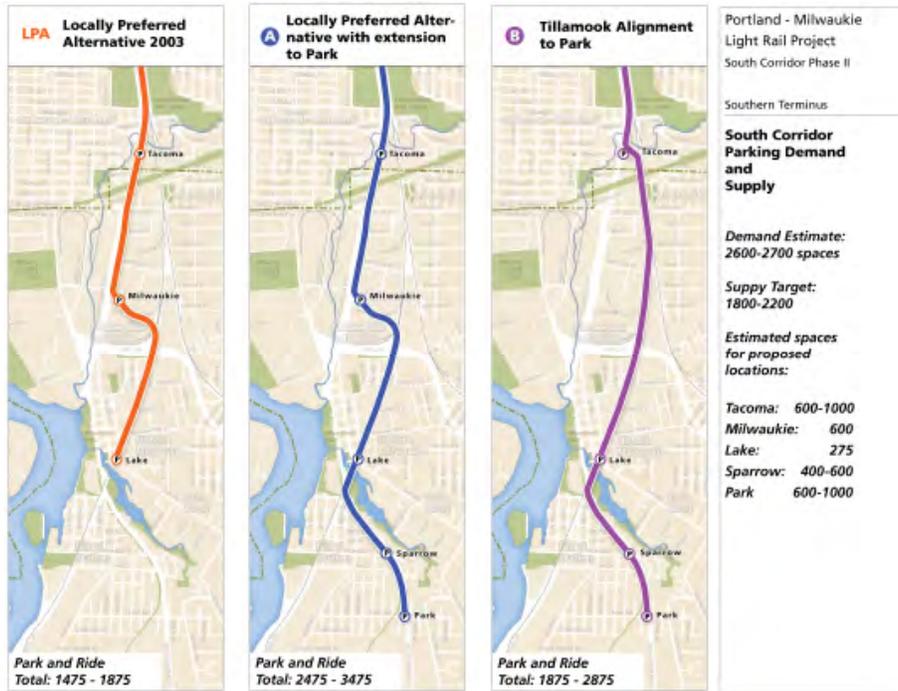
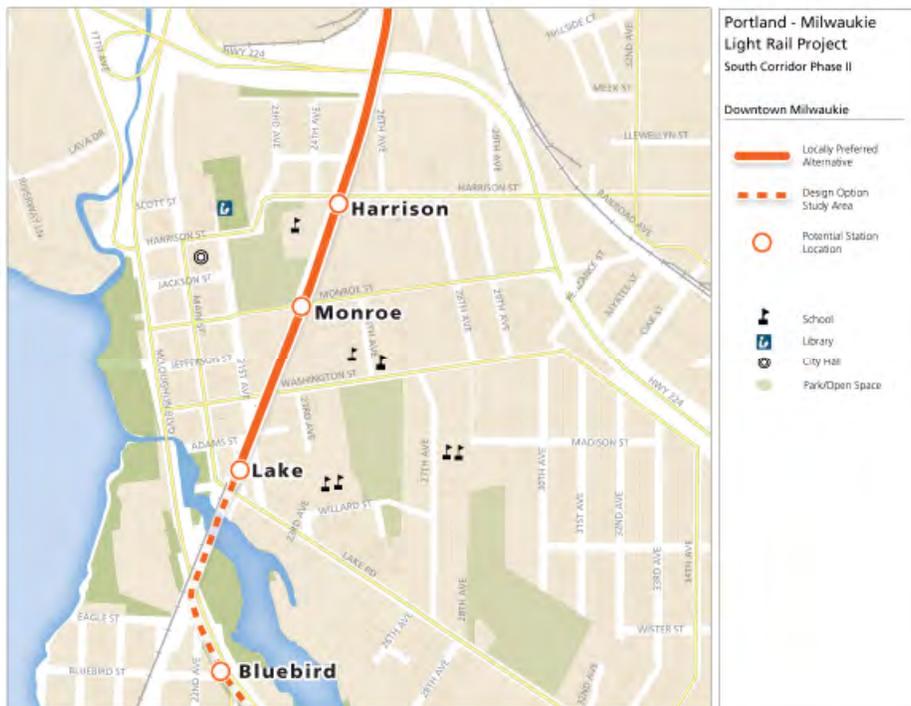


Figure L-13. Downtown Milwaukie station options



The design options were intended to allow further study of key choices in terms of alignment, locations, and amount of park-and-ride capacity and stations. For example, to accommodate park-and-ride demand, both design options increased the proposed amount of park-and-ride capacity at the Tacoma Station to 1,000 spaces, while the LPA remained with 600 spaces. One design option eliminated a SE Lake Road park-and-ride in favor of a park-and-ride at SE Sparrow Street to test the trade-offs between these choices. Due to the public preference for the station at SE Monroe Street over the station at SE Harrison Street that was expressed at public meetings, both design options incorporated Monroe Station and only the 2003 LPA included the Harrison Station.

Initially no recommendation to consider alternative alignments in downtown Milwaukie was made because the Tillamook Branch line alignment in this portion of the corridor was selected after an extensive community process in 2003 and confirmed through the Working Group process in 2004.

At the request of the Mayor of the City of Milwaukie, the Portland-Milwaukie Steering Committee agreed to more fully examine alignment options in downtown Milwaukie between OR 224 and SE Lake Road. Metro and TriMet staff developed additional options and made information and staff available so that the potential impacts of other alignments could be better understood.

The project team first developed five options along SE McLoughlin Boulevard and SE Main Street. The *Portland-Milwaukie Light Rail Project Downtown Milwaukie Alignments Review* (Metro 2007) contains an initial assessment of each alignment using a number of factors that must be considered in an SDEIS. The Milwaukie City Planning Commission also suggested that additional alignment concepts on SE Main and SE 21st streets be considered. Public workshops were held to draft and review alignment options on SE Main Street or a SE Main Street/SE 21st Avenue couplet. Information on the additional concepts studied is available in the *Downtown Milwaukie Workshops Summary* (Metro 2007). The additional alignments studied in Milwaukie are shown in Figure L-14.

The Milwaukie City Council met on August 7, 2007, to provide guidance on whether an additional option should be considered for study in the SDEIS. The Milwaukie City Council voted not to recommend the study of additional alignments in the SDEIS. The Mayor of Milwaukie submitted a letter to the Portland-Milwaukie Steering Committee recommending that no new alignments through downtown Milwaukie be added. In August 2007, the Portland-Milwaukie Steering Committee determined not to study any additional options between OR 224 and SE Lake Road in the SDEIS. Alignments recommended for study in the SDEIS are shown in Figure L-14 below.

The Sparrow Street Station and Park-and-Ride was eliminated before the SDEIS was initiated, as well following additional analysis. The problems identified with the option included limited parking capacity, traffic impacts, inconsistency with the surrounding residential zoning, and local opposition. The Sparrow Street Park and Ride option is therefore not a reasonable alternative to meet the project purpose statements to optimize the transportation system, support land use goals and reflect community values.

Portland-Milwaukie Light Rail Project

Refinement Study Light Rail Alignments: Additional Downtown Milwaukie Alignments

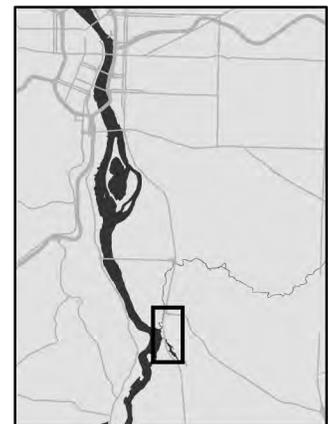
Figure L-14

Alignment Options

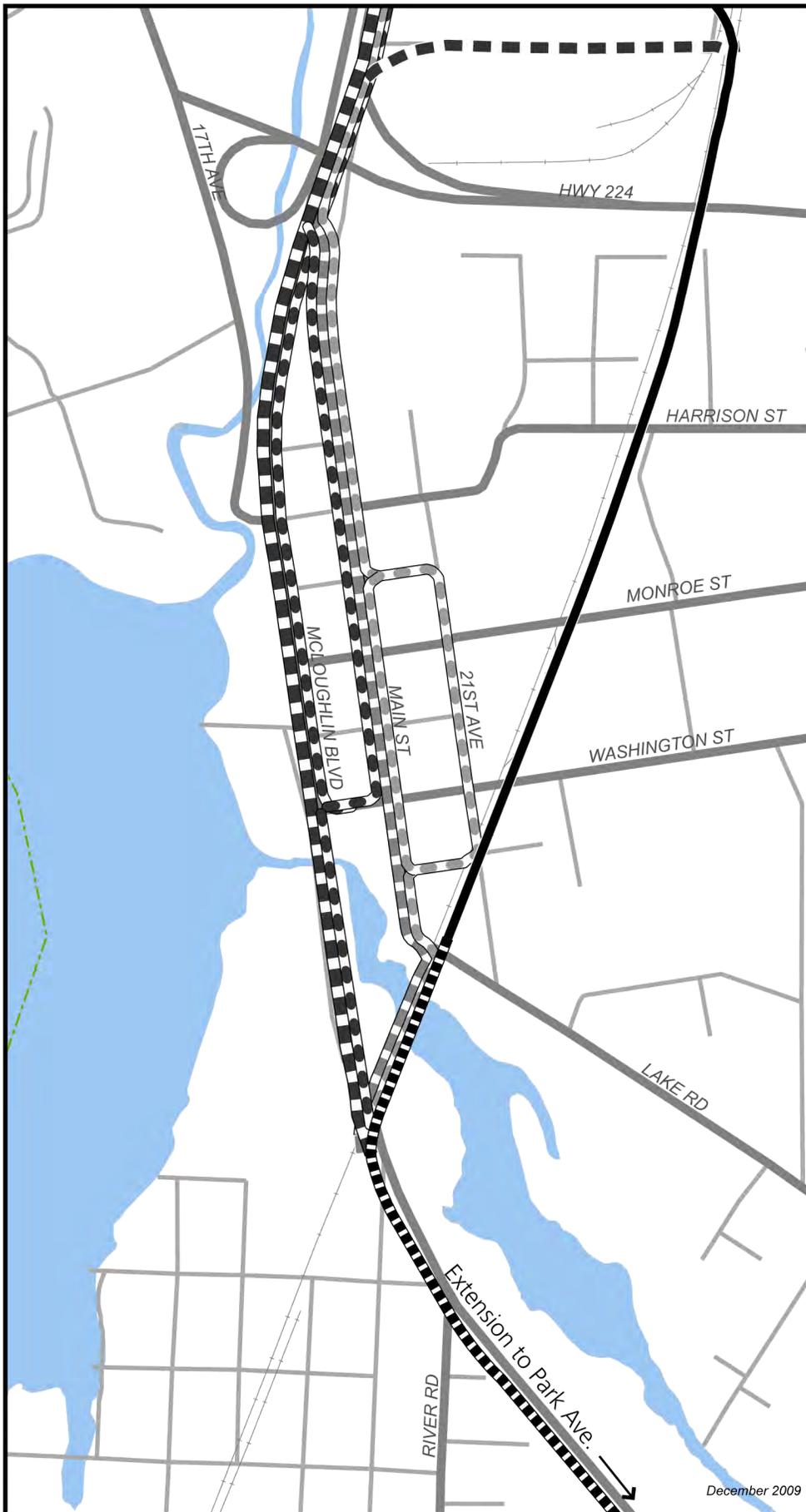
-  2003 LPA
-  Extension to Park Ave.
- McLoughlin Options**
-  McLoughlin double-track
-  McLoughlin/Main couplet
- Main Street Options**
-  Main double-track
-  Main/21st couplet
-  Railroad

TRI MET

 **Metro**

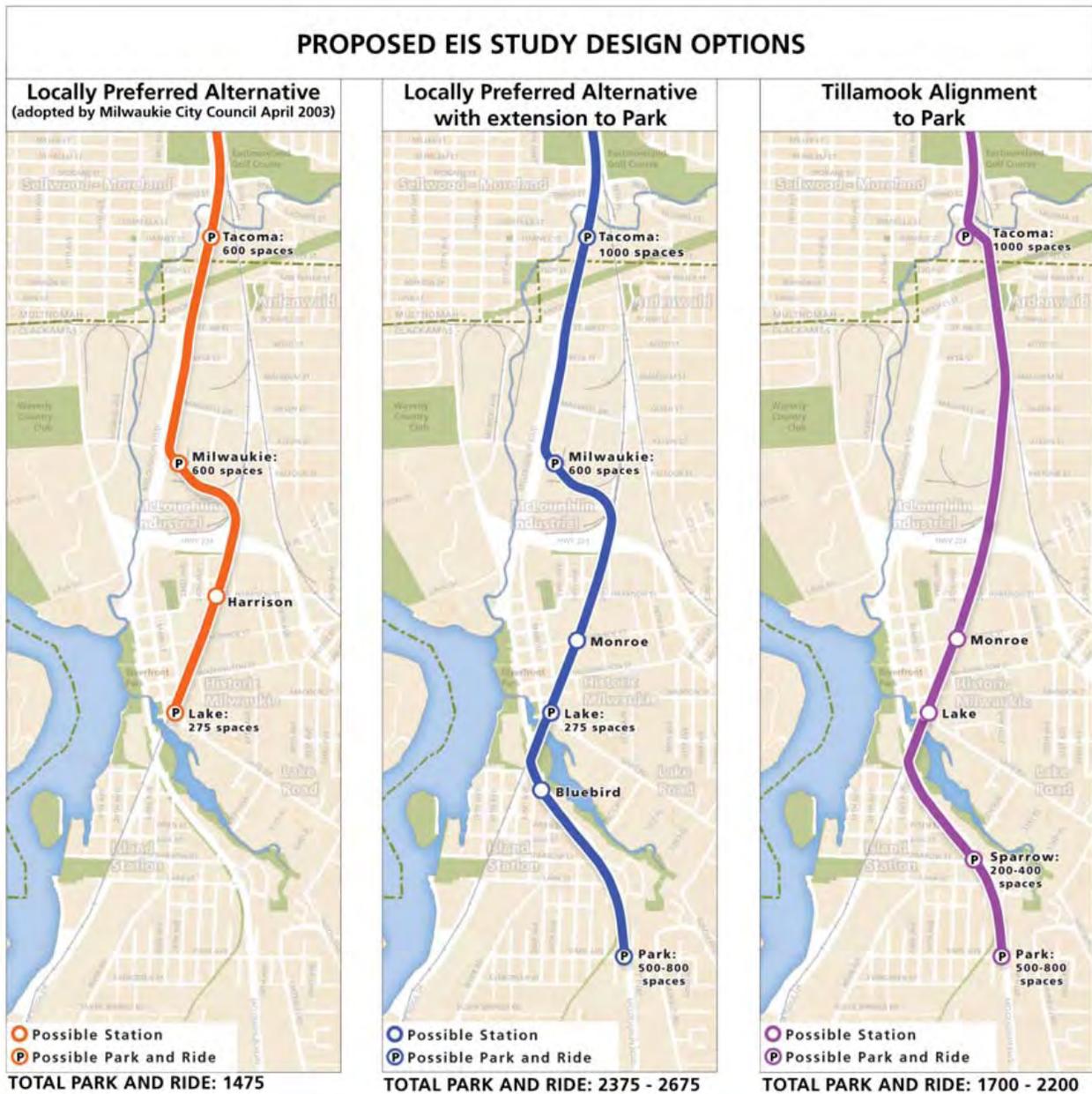


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December 2009

L-15 Southern Terminus Study Options



These station and park and ride locations are proposed for study in a SDEIS. The final alternative could incorporate elements from several options.

L.2.3.3 Other Refinement Study Recommendations

Due to the large potential transit benefits resulting from accommodating buses on the Willamette River bridge, the Portland-Milwaukie Steering Committee recommended that this issue be considered in depth during the SDEIS. The committee asked for further study to determine the number of buses and the appropriate infrastructure improvements and operating characteristics if buses use the Willamette River crossing.

At various public meetings, there were suggestions to consider adding or replacing one of the proposed stations with a SE Harold/SE 22nd Street station. Analysis indicated that there is strong potential station area ridership; however, there was not time or resources to complete an analysis of the trade-offs between travel time and net ridership. The Portland-Milwaukie Steering Committee recommended that an analysis of the viability of a station at SE Harold Street as a stand-alone or as a substitute for the Bybee Station be studied in the SDEIS.