Lake Oswego to Portland Transit Project

Visual Quality and Aesthetics Technical Report

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TriMet and Metro

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1 INTRODUCTION

This report contains the detailed analysis and documentation that is the basis for Chapter 3, Section 3.4 on visual quality and aesthetics in the Lake Oswego to Portland Transit Project (LOPT) Draft Environmental Impact Statement (DEIS) published by the Federal Transit Administration in December 2010. This chapter of the report includes a summary of the project background, the Purpose and Need, the alternatives/options considered and the description of the alternatives analyzed.

1.1 Project Background

Transit improvements in the Lake Oswego to Portland corridor have been studied several times in recent history. In the 1970s and 80s, a light rail alignment through Johns Landing was studied as part of the Westside Corridor Alternatives Analysis, and in the 1990s potential light rail alignments through Johns Landing were studied as part of the South/North Corridor Study.

The Willamette Shore Line right of way was first established in 1885-1887 as the Portland and Willamette Valley Railroad, which began operation in July 1887. The Southern Pacific Railroad (SPRR) later purchased the railway in 1914. The railroad had a major impact on the development of southwest Portland. Initially, 14 trains operated between Portland and Oswego (as it then was known), and it became the main transportation link for developing residential communities along the route. The line was electrified in 1914 and passenger traffic hit its peak in 1920 with SPRR running 64 daily trains between Portland and Oswego. Passenger service ended on October 5, 1929, while freight service continued until 1983.

In August of 1984, the Interstate Commerce Commission granted SPRR permission to abandon the line. In 1988, the Willamette Shore Line Consortium (the Consortium) purchased the 6.3-mile-long line from SPRR for approximately $2 million. The Consortium, comprised of the City of Lake Oswego, City of Portland, Oregon Department of Transportation (ODOT), Clackamas County, Multnomah County, Metro, and TriMet, purchased the line to preserve it for future passenger rail transit use. TriMet holds title for the Consortium and the City of Lake Oswego provides maintenance services funded by the Consortium.

In 2005, with the endorsement of the Joint Policy Advisory Committee on Transportation, the Metro Council directed staff to initiate the Lake Oswego to Portland Transit and Trail Alternatives Analysis. The alternatives analysis focused on improving the ability to serve travel demand in the corridor through improved transit service and development of a multi-use pathway.

1.2 Purpose and Need

The **Purpose** of the project is to optimize the regional transit system by improving transit within the Lake Oswego to Portland transit corridor, while being fiscally responsive and supporting regional and local land use goals. The project should maximize, to the extent possible, regional resources and economic development opportunities, and garner broad public support. The project should build on previous corridor transit studies, analyses, and conclusions and should be environmentally sensitive.

The **Need** for the project results from:

- Historic and projected increases in traffic congestion in the Lake Oswego to Portland corridor due to increases in regional and corridor population and employment;
- Lengthy and increasing transit travel times and deteriorating public transportation reliability in the corridor due to growing traffic congestion;
- Increasing operating expenses, combined with increasingly scarce operating resources and the demand for more efficient public transportation operations;
- Local and regional land use and development plans, goals, and objectives that target the corridor for residential, commercial, retail, and mixed-use development to help accommodate forecast regional population and employment growth, and previous corridor transit studies, analyses, and conclusions;
- The region's growing reliance on public transportation to meet future growth in travel demand in the corridor;
- The topographic, geographic, and built-environment constraints within the corridor that limit the ability of the region to expand the highway and arterial infrastructure in the corridor; and
- Limited options for transportation improvements in the corridor caused by the identification and protection of important natural, built, and socioeconomic environmental resources in the corridor.

1.3 Alternatives/Options Considered

Metro's 2004 Regional Transportation Plan (RTP) identified the need for a refinement plan for a high capacity transit option for the corridor, which included an analysis of several modal alternatives. Metro initiated the corridor refinement plan in July 2005 and issued the *Lake Oswego to Portland Transit and Trail Alternatives Analysis Evaluation Summary Public Review Draft* in June 2007.

On December 13, 2007, after reviewing and considering the alternatives analysis report, public comment, and recommendations from the Lake Oswego to Portland Transit and Trail Project Citizen Advisory Committee (CAC), the Lake Oswego to Portland Transit and Trail Project Management Group (PMG), Steering Committee, and partner jurisdictions and agencies, the Metro Council approved Resolution No. 07-3887A. The resolution adopted the *Lake Oswego to Portland Transit and Trail Alternatives Analysis: Alternatives to be Advanced into a Draft Environmental Impact Statement and Work Program Considerations* (December 13, 2007). (See Section 2.1 for additional detail on the process used to identify and narrow alternatives.) It also selected the No-Build, Enhanced Bus, and Streetcar alternatives to advance into the project's DEIS for further study, and directed staff to conduct a refinement study to identify design options in the Johns Landing Area and terminus options to advance into the project's DEIS. The resolution called for further refinement of the trail component to move forward as a separate process.

1.3.1 Alternatives Analysis

The project's alternatives analysis process developed a wide range of alternatives for evaluation and early screening, which included: a no-build alternative, widening of Highway 43, reversible lanes on Highway 43, river transit (three options), bus rapid transit (BRT) (three options);

commuter rail, light rail, and streetcar (a wide range of alignment alternatives and terminus alternatives and options).

Through a screening process that assessed the ability of the alternatives to meet the project's Purpose and Need, the initial range of possible alternatives was narrowed. Appendix C of the DEIS provides a summary of the technical evaluation of the alternatives and options considered during the alternatives analysis phase.

The following alternatives were selected for further study through the alternatives analysis phase: 1) No-Build Alternative, 2) Bus Rapid Transit Alternative, and 3) Streetcar Alternative. Following is a description of those alternatives as they were studied in the alternatives analysis (see the *Lake Oswego to Portland Transit and Trail Study Evaluation Summary Public Review Draft* for more information).

- **No-Build Alternative.** Similar to the project's current No-Build Alternative, as described in Section 1.4.1.

- **Bus Rapid Transit Alternative.** The Bus Rapid Transit Alternative would operate frequent bus service with Line 35 on Highway 43 between downtown Portland and downtown Lake Oswego, generally in mixed traffic, with bus station spacing that would be longer than TriMet typically provides for fixed-route bus service. Transit queue bypass lanes would be constructed at congested intersections, where feasible.

- **Streetcar Alternative.** The Streetcar Alternative would extend the existing Portland Streetcar line, which currently operates between NW 23rd Avenue and SW Lowell Street, to downtown Lake Oswego. Study of this alternative includes an evaluation of whether the Willamette Shore Line right of way would be used exclusively of whether it would be used in combination with SW Macadam Avenue or other adjacent roadways.

1.3.2 Scoping/Project Refinement Study

This section describes the alignment and terminus options developed, evaluated, and screened in 2009 as a part of the project's scoping and refinement study phase. In August 2010, Metro published the *Lake Oswego to Portland Transit Project Refinement Report*, which detailed the study's results and summarized public comment. This phase focused on refinements in two areas: 1) alignment options for the Johns Landing area; and 2) terminus options in the Lake Oswego area. In summary, the project's Purpose Statement during the refinement phase was to:

- Optimize the regional transit system;
- Be fiscally responsive and maximize regional resources;
- Maximize the economic development potential of the project;
- Be sensitive to the built and social environments; and
- Be sensitive to the natural environment.

The options, evaluation measures, and results of the Johns Landing streetcar alignment refinement process and the Lake Oswego terminus refinement processes are summarized below.

A. Johns Landing Streetcar Alignment Refinement. For the refinement of streetcar design options within the Johns Landing area, the project used the following criteria: streetcar operations, streetcar performance, financial feasibility, traffic operations, accessibility and development potential, neighborhood sustainability, and adverse impacts to the natural environment. Measures for each of the criteria were developed and applied to each of the alignment options studied, which included:

- Hybrid 1: Macadam Avenue In-Street
- Hybrid 2: East Side Exclusive
- Hybrid 3: Macadam Avenue with New Northbound Lane
- Willamette Shore Line
- Full Macadam In-Street

B. Lake Oswego Terminus Option Refinement. For the refinement of terminus options in the Lake Oswego area, the project used the following criteria: expansion potential and regional context, streetcar operations, streetcar performance, financial feasibility, traffic operations, accessibility and development potential, and neighborhood sustainability. Measures for each of the criteria were developed and applied to each of the alignment options studied, which included: a) Safeway Terminus Option; b) Albertsons Terminus Option; and c) Trolley Terminus Option.

On June 1, 2009, in consultation with FTA and based on the findings of the analysis, public and agency comment and recommendations from the Lake Oswego to Portland Project Management Group, the Lake Oswego to Portland Transit Project Steering Committee selected the following options in the Johns Landing area to advance into the DEIS: Willamette Shore Line; Hybrid 1 – Macadam Avenue In Street (Boundary Street to Carolina Street); and Hybrid 3: Macadam Avenue with New Northbound Lane (Boundary Street to Carolina Street).

1.4 Description of Alternatives Analyzed in this Technical Report and the DEIS

This section summarizes the roadway and transit capital improvements and transit operating characteristics for the No-Build, Enhanced Bus, and Streetcar alternatives. Table 1-1 provides a summary of the transit capital improvements associated with the three alternatives, and Table 1-2 summarizes the operating characteristics of the alternatives. A more detailed description of the alternatives may be found in the *Lake Oswego to Portland Transit Project Detailed Definition of Alternatives Report* (Metro/TriMet: January 2010). Detailed drawings of the Streetcar Alternative, including the various design options, can be found in the *Streetcar Plan Set*, November 2009.

1.4.1 No-Build Alternative

This section describes the No-Build Alternative, which serves as a reference point to gauge the benefits, costs, and effects of the Enhanced Bus and Streetcar alternatives. In describing the No-Build Alternative, this section focuses on: 1) the alternative's roadway, bicycle and pedestrian, and transit capital improvements; and 2) the alternative's transit operating characteristics. This description of the No-Build Alternative is based on conditions in 2035, the project's environmental forecast year.

1.4.1.1 Capital Improvements

Following is a brief description of the roadway, bicycle and pedestrian, and transit capital improvements that would occur under the No-Build Alternative. Table 1-1 provides a summary of the transit capital improvements associated with the No-Build Alternative and Table 1-2 summarizes the operating characteristics of the alternatives. Figure 1-1 illustrates the location of those improvements.

- **Roadway Capital Improvements**. The No-Build Alternative includes the existing roadway network in the corridor, with the addition of roadway capital improvements that are listed in the financially constrained road network of Metro's 2035 RTP.[1]Following is a list of the roadway projects that would occur within the corridor by 2035.

    - *Moody/Bond Avenue Couplet* (create couplet with two lanes northbound on SW Bond Avenue and two lanes southbound on SW Moody Avenue);
    - *South Portal* (Phases I and II to extend the SW Moody Avenue/SW Bond Avenue couplet to SW Hamilton Street and realign SW Hood Avenue to connect with SW Macadam Avenue at SW Hamilton Street);
    - *I-5 North Macadam* (construct improvements in the South Waterfront District to improve safety and access); and
    - *Macadam Intelligent Transportation Systems* (install system and devices in the SW Macadam Avenue corridor to improve traffic flow).

[1] Metro, 2035 Regional Transportation Plan, approved Dec. 13, 2007.

Table 1-1 Transit Capital Improvements for the No-Build, Enhanced Bus, and Streetcar Alternatives (2035)

Capital Improvements	No-Build	Enhanced Bus	Streetcar[1]
New Streetcar Alignment Length[2]	N/A	N/A	5.9 to 6.0
One-Way Streetcar Track Miles			
Portland Streetcar System	15.7	15.7	26.2 to 27.0
Proposed Lake Oswego to Portland Project	0	0	10.5 to 11.3
Streetcar Stations			
Portland Streetcar System	69	69	79
Proposed Lake Oswego to Portland Project	0	0	10[3]
Streetcars (in service/spares/total)			
Portland Streetcar System	17/5/22	17/5/22	27/6/33
Proposed Lake Oswego to Portland Project	N/A	N/A	10/1/11
Streetcar Operations and Maintenance (O&M) Facilities			
Number of Facilities[4]	1	1	2
Maintenance Capacity (number of Streetcars)	36	36	36
Storage Capacity (number of Streetcars)	25	25	33
Line 35 Bus Stops			
Line 35 Bus Stops (Lake Oswego to SW Bancroft St.)	26	13	0
Buses (in service/spares)			
TriMet Systemwide	607/712	619/725	601/704
Difference from No-Build Alternative	N/A	13	- 8
Transit Centers[5]	1	1	1
Park-and-Ride Facilities			
Joint Use Surface – Lots/Spaces	3/76	3/76	3/76
Surface – Lots/Spaces	0/0	0/0	1/100
Structured – Lots/Spaces	0/0	1/300	1/300

Note: LO = Lake Oswego; O&M = operating and maintenance.

[1] The transit capital improvements of the Streetcar Alternative summarized in this table would not vary by design option, except when shown as a range and as noted for new streetcar alignment length and one-way track miles. The first number listed is under the Willamette Shore Line design option and the second number listed is under the Macadam design options (in the Johns Landing Segment).

[2] Under the No-Build and Enhanced Bus alternatives, the Portland Streetcar System would include two streetcar lines: a) the existing Portland Streetcar Line, between NW 23rd Avenue and SW Bancroft Street, and b) the Portland Streetcar Loop, which is currently under construction and will be completed when the Milwaukie Light Rail and Streetcar Close the Loop project are constructed. The Streetcar Alternative would extend the existing Portland Streetcar line south, from SW Bancroft Street to Lake Oswego. One-way track miles are calculated by multiplying the mileage of double-tracked sections and adding that to the mileage of single-track sections. Alignment length and one-way track miles are presented as a range, because they would vary by design option. The number of streetcar stations, streetcars in service or as spares and the number and size of streetcar O&M facilities would not change by streetcar design option.

[3] Two optional stations are also being considered for inclusion in the Streetcar Alternative (see Figure 1-5 and Figure 1-6): 1) the Pendleton Station under the Macadam In-Street and Macadam Additional Lane design options in the Johns Landing Segment; and the E Avenue Station in the Lake Oswego Segment.

[4] There is an existing streetcar operations and maintenance (O&M) facility at NW 16th Avenue, between NW Marshall and NW Northrup streets; under the Streetcar Alternative, additional storage for eight vehicles would be provided along the streetcar alignment under the Marquam Bridge. There would be no change in the number or size of bus O&M facilities under any of the alternatives or design options. Bus stops are those that would be served exclusively by Line 35 between Lake Oswego and SW Bancroft Street

[5] Under the No-Build and Enhanced Bus alternative, the Lake Oswego Transit Center would remain at its current location (on 4th Street, between A and B avenues); under the Streetcar Alternative, the transit center would be moved to be adjacent to the Lake Oswego Terminus Station.

Source: TriMet, January 2010.

Table 1-2 Streetcar and Bus Network Operating Characteristics of No-Build, Enhanced Bus, and Streetcar[1] Alternatives (2035)

Operating Characteristics by Vehicle Mode	No-Build	Enhanced Bus	Streetcar
Streetcar Network Operating Characteristics[1]			
Weekday Streetcar Vehicle Miles Traveled			
Systemwide	2,180	2,180	3,200 or 3,230
Difference from No-Build Alternative	N/A	0	1,020 or 1,050
Weekday Streetcar Revenue Hours			
Systemwide	267	267	326 or 332
Difference from No-Build Alternative	N/A	0	59 or 65
Corridor Weekday Streetcar Place Miles[2]	N/A	N/A	89,000 or 91,320
Corridor Streetcar Round-Trip Time[3]	N/A	N/A	37 or 44 minutes
Corridor Streetcar Headways[4]			
Lake Oswego to PSU	N/A	N/A	7.5 / 7.5 minutes
Bus Network Operating Characteristics			
Weekday Bus Miles Traveled			
Systemwide	76,560	77,560	75,520
Difference from No-Build Alternative	N/A	1,000	-1,040
Weekday Bus Revenue Hours			
Systemwide	5,300	5,400	5,210
Difference from No-Build Alternative	N/A	100	-90
Line 35 (bus) Weekday Place Miles[2]	37,000	57,840	0
Line 35 (bus) Headways[4]			
Lake Oswego to Downtown Portland	15 / 15 min.	6 / 15 min.	N/A
Oregon City to Lake Oswego	15/15 min.	15/15 min.	15/15 min.

Note: N/A = not applicable; LO = Lake Oswego; O&M = operating and maintenance; PSU = Portland State University.

[1] The operating characteristics of the Streetcar Alternative summarized in this table would not vary by design option, except when shown as a range and as noted for streetcar vehicle miles traveled, place miles, and round-trip time. The first number listed is under the Willamette Shore Line Design Option and the second number listed is under the Macadam design options (in the Johns Landing Segment).

[2] Place miles are a measure of the passenger carrying capacities of the alternatives, similar to airline seat miles. Place miles = transit vehicle capacity (seated and standing) of a vehicle type, multiplied by the number vehicle miles traveled for that vehicle type, summed across all vehicle types. The No-Build Alternative bus place miles are based on lines 35 and 36.

[3] Round-trip run time for the proposed streetcar line would include in-vehicle running time from SW Bancroft Street to the Lake Oswego Terminus Station and back to SW Bancroft Street; it does not include layover time at the terminus.

[4] Headways are the average time between transit vehicles per hour within the given time period that would pass by a given point in the same direction, which is inversely related to frequency (the average number of vehicles per hour in the given time period that would pass by a given point in the same direction). Weekday peak is generally defined as 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m.; weekday off-peak is generally defined as 5:00 to 7:00 a.m., 9:00 a.m. to 4:00 p.m. and 6:00 p.m. to 1:00 a.m. There would be streetcar service every 12 minutes between SW Bancroft Street and the Pearl District (via PSU) under the No-Build and Enhanced Bus alternatives. The peak headways shown for the No-Build Alternative are the composite headways for Lines 35 and 36.

Source: TriMet – January 2010.

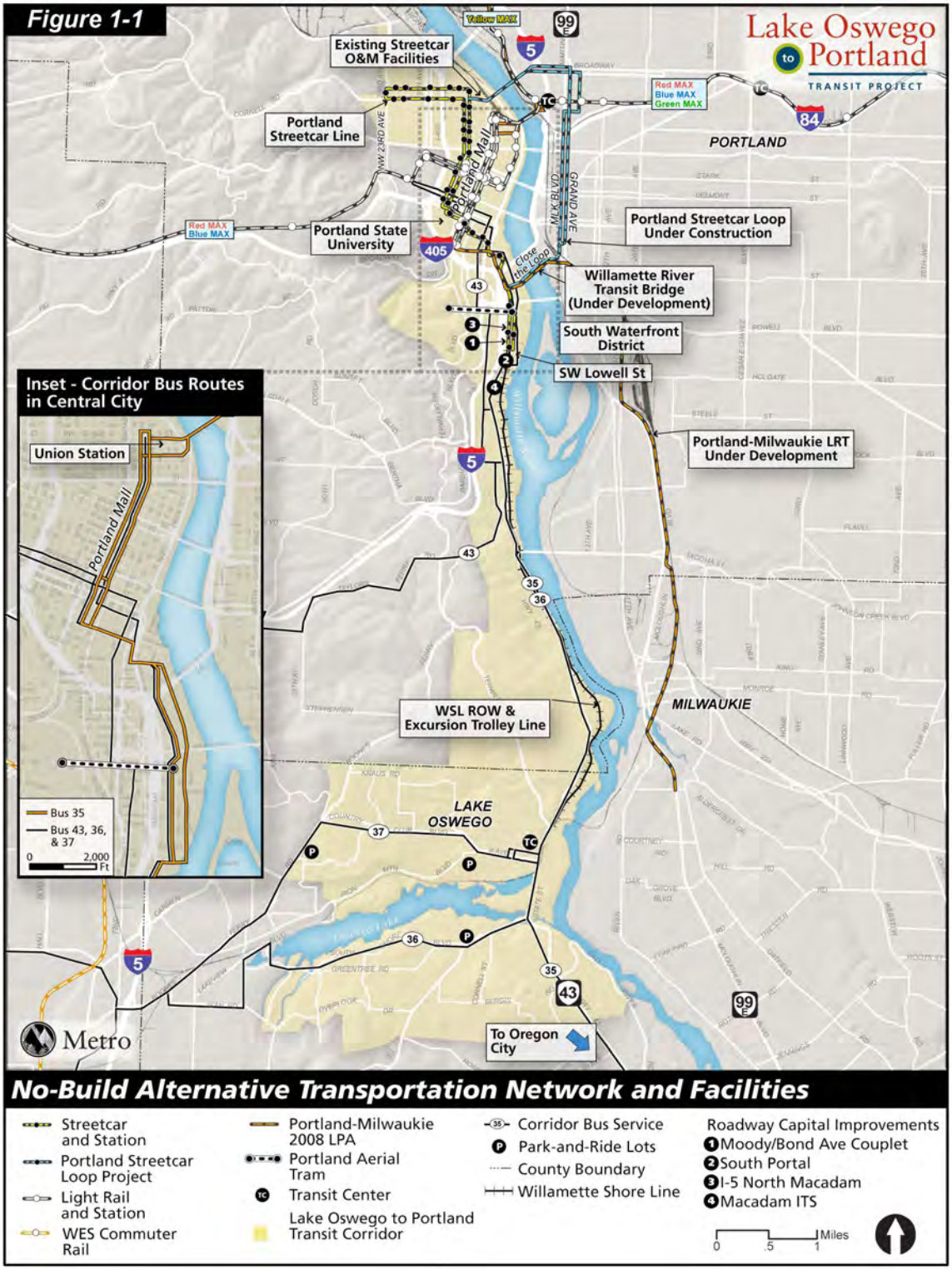


FIGURE 1-1 NO-BUILD ALTERNATIVE TRANSPORTATION NETWORK AND FACILITIES

- **Bicycle and Pedestrian Improvements**. The No-Build Alternative includes the existing bicycle and pedestrian network in the corridor, with the addition of bicycle and pedestrian capital improvements that are listed in the financially constrained road network of Metro's 2035 RTP. Following is a list of the bicycle and pedestrian projects that pedestrian projects proposed to occur within the corridor by 2035.

    - *Lake Oswego to Portland Trail* (extension of a multiuse path between Lake Oswego and Portland);
    - *I-5 at Gibbs Pedestrian/Bicycle Overcrossing* (construct a bicycle and pedestrian bridge over I-5 in the vicinity of SW Gibbs Street); and
    - *Tryon Creek Bridge* (construct a new pedestrian/bicycle bridge near the mouth of Tryon Creek).

- **Bus Capital Improvements.** There are currently two primary bus capital facilities in the corridor: *Lake Oswego Transit Center* (on 4th Street, between A and B avenues); and *Portland Mall* (bus and light rail lanes and shelters on NW/SW 5th and 6th avenues between NW Glisan Street and SW Jackson Street). These bus facilities would remain as-is under the No-Build Alternative. (The financially constrained transit project list of the RTP includes relocation of the Lake Oswego Transit Center to be adjacent to the Lake Oswego to Portland Streetcar alignment, which is also in the financially constrained project list. Neither would occur under the No-Build Alternative.) No additional bus capital improvements are planned for the corridor under the No-Build Alternative by 2035.

- **Light Rail Capital Improvements.** Under the No-Build Alternative, TriMet's existing Yellow Line light rail service would continue to operate on the Portland Mall (with a station at PSU added), across the Steel Bridge and into North Portland. Yellow Line facilities and service would be extended north from the existing Expo Center Station, across the Columbia River into Vancouver, Washington, and south from the Portland Mall, generally via SW Lincoln Street, across the Willamette River to Milwaukie, Oregon. In addition, downtown Portland would be served by the following TriMet light rail lines: Blue Line (Gresham to Hillsboro); Red Line (Beaverton to Portland International Airport); and Green Line (downtown Portland to Clackamas Town Center).

- **Excursion Trolley Capital Facilities.** Under the No-Build Alternative there would be no changes to the existing excursion trolley capital facilities that are located or operate within the corridor. Those excursion trolley capital facilities include approximately six miles of single-tracked Willamette Shore Line tracks and related facilities; stations at SW Bancroft and Moody streets and at N State Street at A Avenue; a trolley barn at approximately N State Street at A Avenue; and typically one vintage and/or other trolley vehicle propelled by externally attached diesel units.

- **Streetcar Improvements and Vehicles.** Under the No-Build Alternative, the existing Portland Streetcar Line would continue to operate between NW 23rd Avenue and SW Lowell Street. In addition, the No-Build Alternative includes the Eastside Streetcar Project (currently under construction), which would extend streetcar tracks and stations across the Broadway Bridge, serving NE and SE Portland on N and NE Broadway and NE and SE Martin Luther King Boulevard and Grand Avenue to OMSI. With the Close the Loop Project, the Eastside

Streetcar will be extended across the Willamette River, to complete the planned Streetcar Loop, via a new transit, bicycle, and pedestrian bridge to be constructed under the Milwaukie Light Rail Project, connecting to the Streetcar line in the South Waterfront District. Under the No-Build Alternative in 2035, there would be 22 streetcars in the transit system (including spares), an increase of 11 compared to existing conditions.

- **Park-and-Ride Facilities.** Under the No-Build Alternative, the park-and-ride facilities in the corridor would be those that currently exist: a shared-use 30-space park-and-ride lot at Christ Church (1060 SW Chandler Road); a shared-use 34-space park-and-ride lot at Lake Oswego United Methodist Church (1855 South Shore Boulevard); and a shared use 12-space park-and-ride lot at Hope Church (14790 SW Boones Ferry Road).

- **Operations and Maintenance Facilities.** Under the No-Build Alternative, there would be one operations and maintenance facility within the corridor, which would be the existing streetcar maintenance building and storage yard on NW 16th Avenue under I-405. With the Streetcar Loop and Close the Loop Projects, the storage yard could accommodate 25 streetcars and the maintenance facility would have the capacity to service 36 streetcars (an increase in capacity of 13 and 18 vehicles, compared to existing conditions, respectively).

1.4.1.2 Transit Operations

This section summarizes the transit operating characteristics that would occur under the No-Build Alternative, focusing on bus and streetcar operations (see Table 1-2). Figure 1-1 illustrates the transit network for the No-Build Alternative in the vicinity of the corridor.

- **Bus Operations.** Bus operations under the No-Build Alternative would be similar to TriMet's existing fixed-route bus network with the addition of improvements included in the 2035 RTP's 20-year financially constrained transportation system (see Figure 1-1). Transit service improvements within the No-Build Alternative would be limited to those that could be funded using existing and readily-foreseeable revenue sources. Systemwide, those bus operations improvements would include: 1) increases in TriMet bus route frequency to avoid peak overloads and/or maintain schedule reliability; 2) increases in run times to maintain schedule reliability; and 3) incremental increases in TriMet systemwide bus service hours consistent with available revenue sources and consistent with the 2035 RTP's 20-year financially-constrained transit network, resulting in annual increases in service hours of approximately 0.5 percent per year. Specifically, the No-Build Alternative would include the operation of the TriMet bus route Line 35 between downtown Portland and Lake Oswego (continuing south to Oregon City).

- **Streetcar Operating Characteristics**. Under the No-Build Alternative, the City of Portland, through an operating agreement with the Portland Streetcar, Inc. (PSI), would continue to operate the existing Portland Streetcar line between Northwest Portland and the South Waterfront District, via downtown Portland (see Figure 1-1). On average weekdays in 2035, the Streetcar line would operate every 12 minutes during the peak and off-peak periods. Further, the City of Portland would operate the Streetcar Loop Project, serving downtown Portland, the Pearl District, northeast and southeast Portland, OMSI and the South Waterfront District. Frequency on the line for an average weekday in 2035 would be every 12 minutes during the peak and off-peak periods.

1.4.2 Enhanced Bus Alternative

This section describes the roadway, bicycle and pedestrian, and transit capital improvements and transit operating characteristics under the Enhanced Bus Alternative, generally compared to the No-Build Alternative. The intent of the Enhanced Bus Alternative is to address the project's Purpose and Need without a major transit capital investment.

1.4.2.1 Capital Improvements

This section summarizes the transit, bicycle and pedestrian, and transit capital improvements that would occur under the Enhanced Bus Alternative, compared to the No-Build Alternative (see Table 1-1 and Figure 1-2).

- **Roadway Capital Improvements.** Except for the addition of a two-way roadway connection between the proposed 300-space park-and-ride lot and Foothills Road, there would be no change in roadway improvements under the Enhanced Bus Alternative, compared to the No-Build Alternative.

- **Bicycle and Pedestrian Improvements.** There would be no change in bicycle and pedestrian improvements under the Enhanced Bus Alternative, compared to the No-Build Alternative.

- **Bus Capital Improvements.** Under the Enhanced Bus Alternative, the 26 bus stops that would be served by Line 35 between downtown Lake Oswego and SW Bancroft under the No-Build Alternative would be consolidated into 13 bus stops, which would continue to be served by the Line 35 (the other 13 bus stops would be removed). The bus stops served by Line 35 between Lake Oswego and Oregon City would be unchanged under the Enhanced Bus Alternative, compared to the No-Build Alternative.

- **Light Rail Capital Improvements.** There would be no change in light rail capital improvements under the Enhanced Bus Alternative, compared to the No-Build Alternative.

- **Excursion Trolley Capital Improvements.** There would be no change in excursion trolley capital improvements under the Enhanced Bus Alternative, from the No-Build Alternative.

- **Streetcar Improvements and Vehicles.** There would be no change in streetcar improvements and vehicles under the Enhanced Bus Alternative, compared to the No-Build Alternative.

- **Park-and-Ride Facilities.** In addition to the park-and-ride facilities included under the No-Build Alternative, the Enhanced Bus Alternative would include a 300-space structured park-and-ride lot that would be located at Oswego Village Shopping Center on Highway 43 in downtown Lake Oswego. The park-and-ride lot would be served by Lines 35 and 36.

- **Operations and Maintenance Facilities.** There would be no changes to the region's operations and maintenance facilities under the Enhanced Bus Alternative, compared to the No-Build Alternative, except that the capacity of TriMet's bus operating and maintenance

facilities at either the Center or Powell facility would be expanded to accommodate the additional 13 buses under the Enhanced Bus Alternative (see the *Detailed Definition of Alternatives Report* for additional information).

1.4.2.2 Transit Operations

This section summarizes the corridor's transit operations under the Enhanced Bus Alternative, focusing on bus and streetcar operations. Figure 1-2 illustrates the transit network for the Enhanced Bus Alternative in the vicinity of the corridor.

- **Bus Operations.** Except for changes to the routing, frequency, and number of stops of Line 35 and the elimination of Line 36 service between downtown Portland and downtown Lake Oswego, bus operations under the Enhanced Bus Alternative would be identical to the bus operations under the No-Build Alternative. Under the Enhanced Bus Alternative, Line 35's routing between Oregon City and Lake Oswego would remain unchanged relative to the No-Build Alternative. Further, between Lake Oswego and downtown Portland there would be two routing changes to Line 35, compared to the No-Build Alternative: 1) the bus would be rerouted to serve the new park-and-ride lot at the Oswego Village Shopping Center; and, 2) in downtown Portland, Line 35 would be rerouted to serve SW and NW 10th and 11th avenues, generally between SW Market and Clay streets and NW Lovejoy Street/Union Station to address the travel markets.

- **Streetcar Operating Characteristics.** Under the Enhanced Bus Alternative, there would be no change in streetcar operating characteristics, compared to the No-Build Alternative.

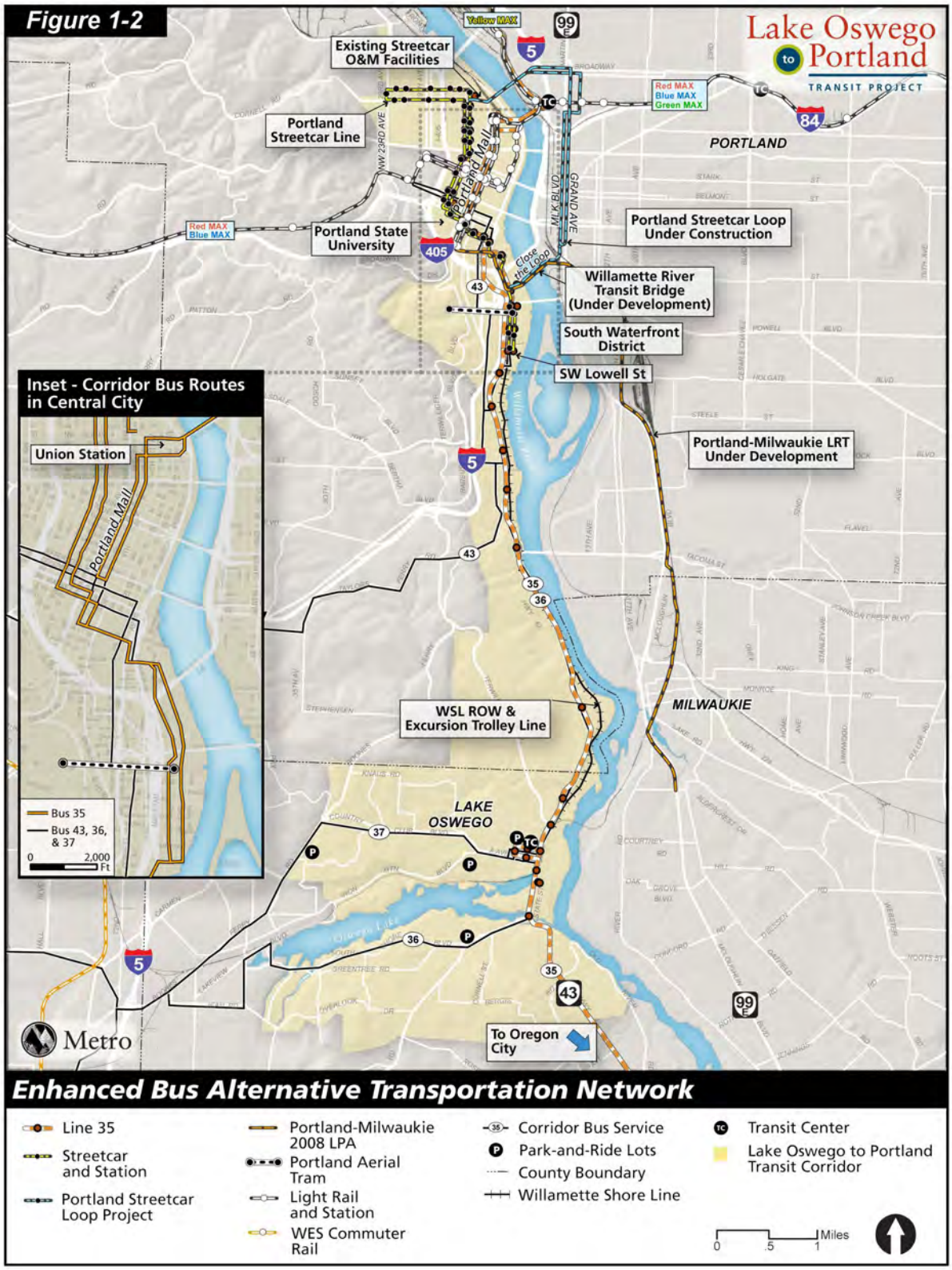


FIGURE 1-2 ENHANCED BUS ALTERNATIVE TRANSPORTATION NETWORK

1.4.3 Streetcar Alternative

This section describes the roadway, bicycle and pedestrian, and transit capital improvements and transit operating characteristics under the Streetcar Alternative, generally compared to the No-Build Alternative.

1.4.3.1 Capital Improvements

This section summarizes the transit, bicycle and pedestrian, and transit capital improvements that would occur under the Streetcar Alternative, generally compared to the No-Build Alternative (see Table 1-1 and Figure 1-3). This section provides a general description of the capital improvements that would occur under the Streetcar Alternative, independent of design option, and it highlights the differences between design options within three of the corridor's segments.

A. Summary Description

Following is a general description of the roadway, bicycle and pedestrian, and transit improvements that would occur under the Streetcar Alternative. The next section provides a description of differences in capital improvements for design options that are under consideration in three of the project's six segments. See Figure 1-4 for an illustration of the project segments and the design options under consideration.

- **Roadway Capital Improvements.** There would be no roadway improvements under the Streetcar Alternative in the following corridor segments: 1) Downtown Portland; and 2) South Waterfront. The roadway capital improvements that would occur under the other corridor segments are described below for those segments. Changes to traffic controls at signalized and non-signalized intersections would occur throughout the corridor to accommodate the safe and efficient operation of the streetcar and local traffic. The *Detailed Definition of Alternatives Report* and the *Streetcar Plan Set* provide additional details on changes to traffic operations at intersections under the Streetcar Alternative.

- **Bicycle and Pedestrian Improvements.** There would be no change in bicycle and pedestrian improvements under the Streetcar Alternative, compared to the No-Build Alternative, except as noted in the following segment-by-segment description.

- **Bus Capital Improvements.** Under the Streetcar Alternative, all 26 bus stops that would be served by Line 35 on Highway 43 between downtown Lake Oswego and the Sellwood Bridge and on SW Macadam Boulevard north of SW Corbett Street under the No-Build Alternative would be removed, because Line 35 service would be replaced in the corridor by streetcar service. The bus stops served by Line 35 between Lake Oswego and Oregon City would be unchanged under the Streetcar Alternative, compared to the No-Build Alternative. In addition, under the Streetcar Alternative, Figure 1-3 Streetcar Alternative Transportation Network the Lake Oswego Transit Center would be relocated to be adjacent to the Lake Oswego Terminus Station, from its existing location on 4th Street, between A and B avenues.

FIGURE 1-3 STREETCAR ALTERNATIVE TRANSPORTATION NETWORK

The changes to the bus capital improvements under the Streetcar Alternative would not vary by any of the design options under consideration.

- **Light Rail Capital Improvements.** There would be no change in light rail capital improvements under the Streetcar Alternative, compared to the No-Build Alternative.

- **Interim Excursion Trolley Capital Improvements.** Under the Streetcar Alternative, there would no longer be an operating and maintenance agreement between the City of Lake Oswego and the Willamette Shore Line Consortium that would allow for the operations of the excursion trolley between SW Bancroft Street and Lake Oswego. Further, the Oregon Electric Railway Historical Society would no longer operate the vintage excursion trolley on the Willamette Shore Line alignment under agreement with the City of Lake Oswego, as they currently do and as they would under the No-Build and Enhanced Bus Alternatives.

- **Streetcar Improvements and Vehicles.** The Streetcar Alternative would extend streetcar tracks and stations south from the existing Portland Streetcar line that operates between NW 23rd Avenue and SW Bancroft Street. Compared to existing conditions and the No-Build Alternative, the Streetcar Alternative would add approximately 5.9 to 6.0 one-way miles of new streetcar tracks and catenary (overhead electrical wiring and support) and ten new streetcar stations between SW Bancroft Street and Lake Oswego. Except when crossing over waterways, roadways, or freight rail lines or through an existing tunnel, the new streetcar line would generally be at the same grade as existing surface streets. Of the approximately six miles of new streetcar tracks, 5.3 miles would be double-tracked (i.e., two one-way tracks) and 0.7 miles would be single-tracked (i.e., inbound and outbound streetcars would operate on the same tracks; see Figure 1-4 for an illustration of the location of single and double-track segments). The new streetcar stations would be of a design similar to the existing streetcar stations in downtown Portland and the Pearl District.

- **Park-and-Ride Facilities.** In addition to the park-and-ride facilities included under the No-Build Alternative, the Streetcar Alternative would include: a) a 100-space surface park-and-ride lot served by the proposed streetcar line at the B Avenue Station; and b) a 300-space structured park-and-ride lot that would be served by the proposed streetcar line at the Lake Oswego Terminus Station. The size and location of these park-and-ride lots would not vary by any of the design options under consideration.

- **Operations and Maintenance Facilities.** With the Streetcar Alternative, a new storage facility that would accommodate eight streetcars would be located adjacent to the streetcar alignment under the Marquam Bridge. The size and location of the streetcar operating and maintenance facilities would not vary by any of the design options under consideration.

B. Segment by Segment Description and Design Option Differences
For the purposes of description and analysis, the Lake Oswego to Portland Corridor has been divided into six segments for the Streetcar Alternative – those segments and design options within three of the segments are illustrated schematically in Figure 1-4. Figure 1-3 illustrates the proposed roadway improvements, streetcar alignment, stations, and park-and-ride lots that would occur in the corridor under the Streetcar Alternative. Figures 1-5 and 1-6 provide more detailed illustrations of the streetcar design options currently under study.

1. Downtown Portland Segment. There would be no roadway or bicycle and pedestrian improvements within the Downtown Portland Segment under the Streetcar Alternative, compared to the No-Build Alternative. Under the Streetcar Alternative, a connection would be added between westbound streetcar tracks on SW Market Street to southbound tracks on W 10th Avenue, which would allow inbound streetcars from Lake Oswego to turn back toward Lake Oswego, providing increased operational flexibility. There are no streetcar alignment design options within this segment and there would be no new streetcar stations within this segment.

2. South Waterfront Segment. The South Waterfront Segment extends between SW Lowell Street to SW Hamilton Court. Streetcar tracks would be extended south of their existing southern terminus at SW Lowell Street, within the right of way of the planned Moody/Bond Couplet extension, to SW Hamilton Street. There would be two new streetcar stations within this segment (Bancroft and Hamilton stations).

3. Johns Landing Segment. The Johns Landing Segment extends between SW Hamilton Court to SW Miles Street. This segment includes three design options: Willamette Shore Line; Macadam In-Street; and Macadam Additional Lane. Under all options, the streetcar alignment would extend south from SW Hamilton to near SW Julia Street, generally within the existing Willamette Shore Line right of way. The three design options would include two new streetcar stations at varying locations, described below. To the south, all three options would share a common alignment between SW Carolina and SW Miles Street, generally via the existing Willamette Shore Line right of way, and they would share one common station at SW Nevada. Following is a description of how the design options would differ:

a. ***The Willamette Shore Line Design Option*** would continue the extension of streetcar tracks south within the existing Willamette Shore Line right of way from SW Julia Street to SW Carolina Street (extending to SW Miles Street). There would be three new streetcar stations (Boundary, Nebraska, and Nevada stations).

b. ***The Macadam In-Street Design Option*** would locate the new streetcar tracks generally within the existing outside lanes of SW Macadam Avenue, approximately between SW Boundary and Carolina streets. Between approximately SW Julia and Boundary streets, the streetcar alignment would be within the right of way of SW Landing Drive, which would be converted from a private to a public street. There would be three new streetcar stations (Boundary, Carolina, and Nevada stations). An optional station at Pendleton Street is also under consideration.

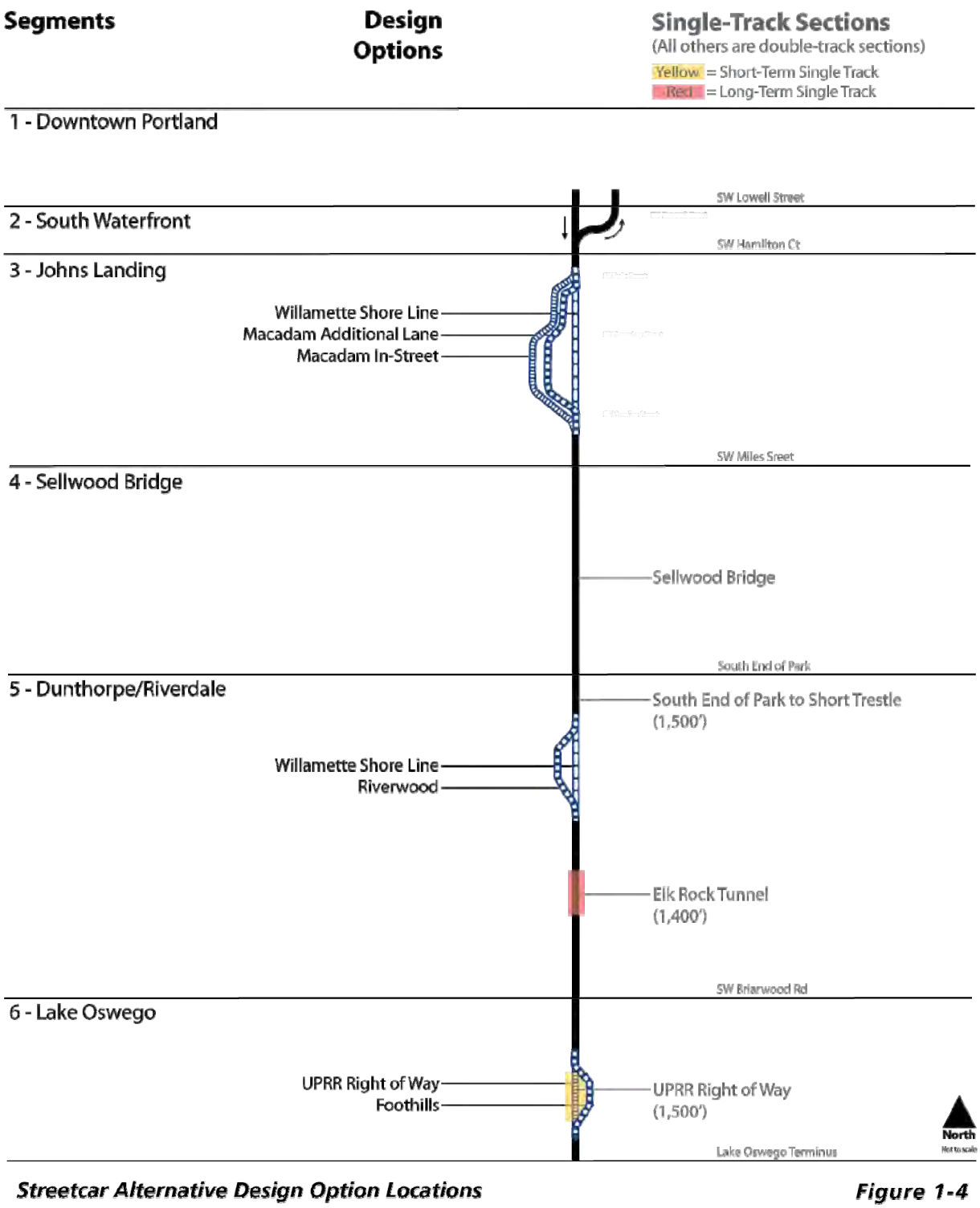


FIGURE 1-4 STREETCAR ALTERNATIVE DESIGN OPTION LOCATIONS

c. ***The Macadam Additional Lane Design Option*** would be similar to the Macadam In-Street Design Option, except that the new northbound streetcar tracks would be located within a new traffic lane just east of the existing general purpose lanes – streetcars would share the new lane with right-turning vehicles. Between approximately SW Julia and Boundary streets, the streetcar alignment would be within the right of way of SW Landing Drive, which would be converted from a private to a public street. There would be three new streetcar stations (Boundary, Carolina, and Nevada stations). An optional station at Pendleton Street is also under consideration.

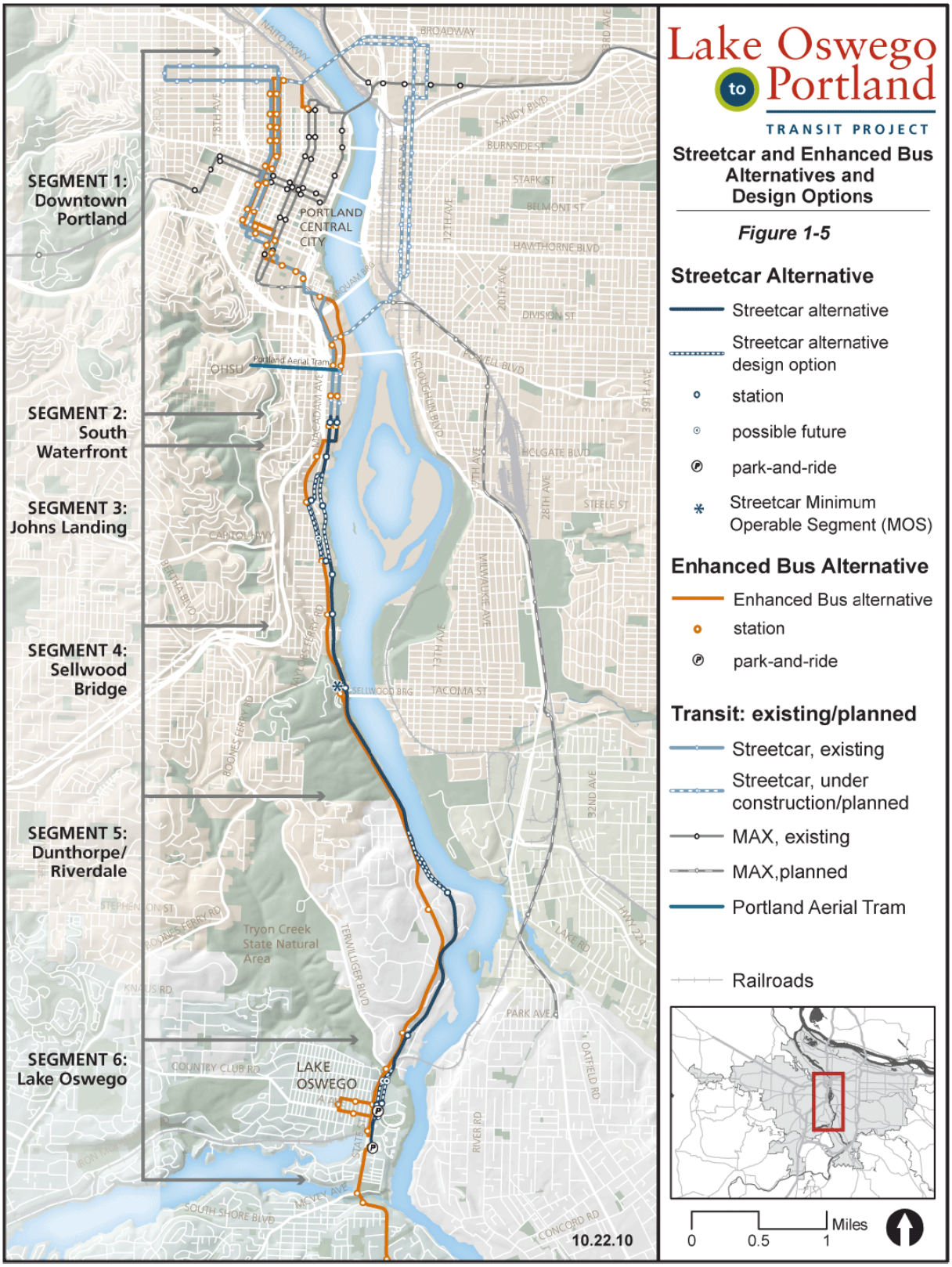


FIGURE 1-5 STREETCAR AND ENHANCED BUS ALTERNATIVES AND DESIGN OPTIONS

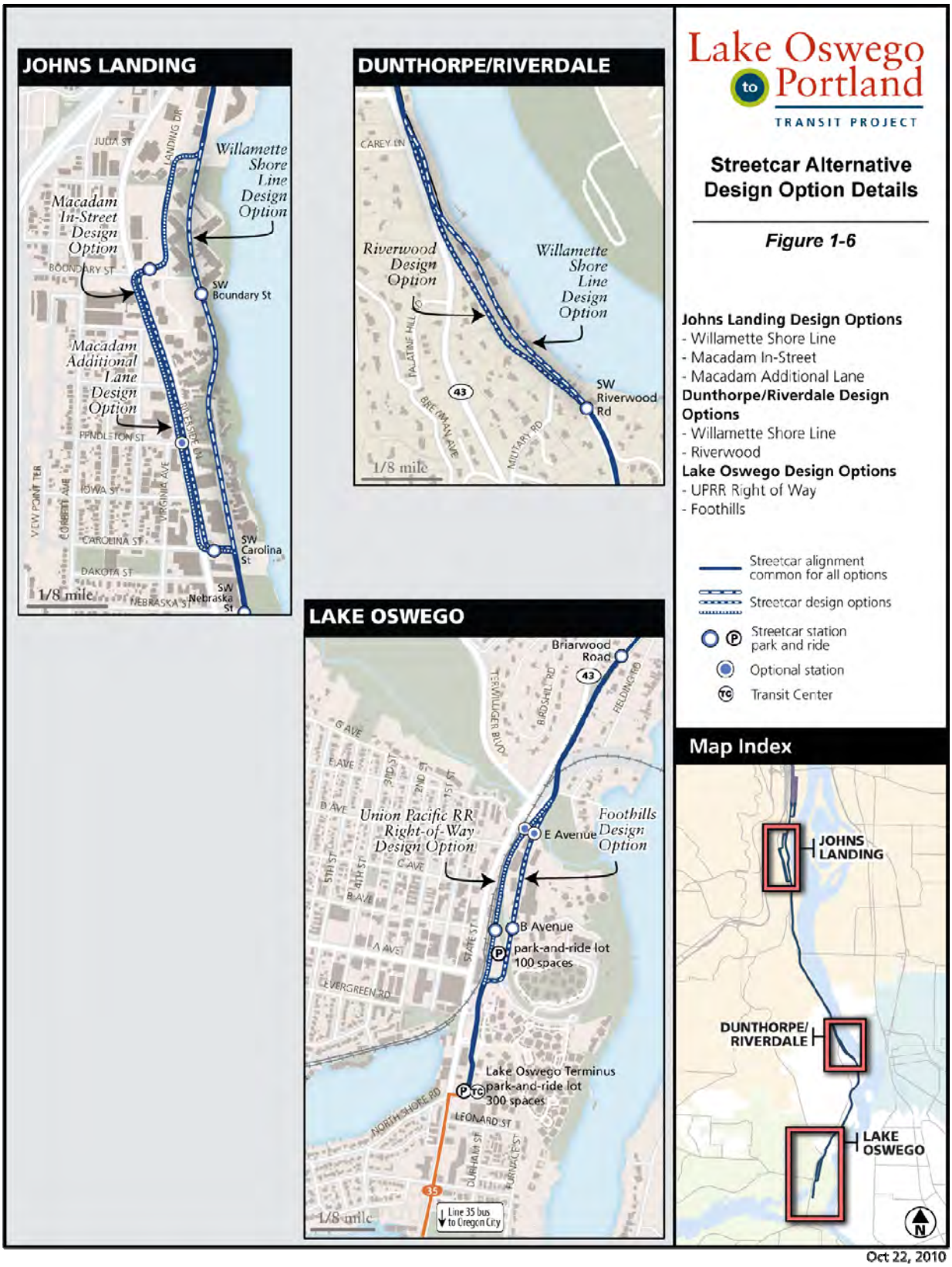


FIGURE 1-6 STREETCAR ALTERNATIVES DESIGN OPTIONS DETAILS

4. Sellwood Bridge Segment. The Sellwood Bridge Segment extends from Miles Street to the southern end of Powers Marine Park. Generally, the streetcar alignment would be located in the Willamette Shore Line right of way, except for the area between Stephens Creek and approximately 1,200 feet south of the Sellwood Bridge. In this area, the streetcar alignment would be constructed in conjunction with the planned west interchange improvements with the Sellwood Bridge (the streetcar would be located slightly east of the existing Willamette Shore Line right of way). The design and construction of the streetcar alignment under this design option would be coordinated with the design and construction of the new interchange for the Sellwood Bridge. There would be one new streetcar station within this segment (Sellwood Bridge Station).

5. Dunthorpe/Riverdale Segment. The Dunthorpe/Riverdale Segment extends between the southern end of Powers Marine Park and SW Briarwood Road. There are two design options in this segment: Willamette Shore Line Design Option and Riverwood In-Street Design Option. Both options would share a common alignment within the Willamette Shore Line right of way, generally north of where SW Riverwood Road intersects with Highway 43 and generally south of the intersection of SW Military Road and SW Riverwood Road. One new streetcar station is proposed within this segment, generally common to both design options (Riverwood Station). Following is a description of how the design options would differ:

a. ***The Willamette Shore Line Design Option*** would generally locate the new streetcar alignment in the existing Willamette Shore Line right of way between the intersections of SW Riverwood Road and Highway 43 and SW Riverwood Road and SW Military Road.

b. ***The Riverwood Design Option*** would locate the new streetcar alignment generally adjacent to Highway 43, north of SW Riverwood Road, and within the right of way of SW Riverwood Road, generally between where it intersects with Highway 43 (that intersection would be closed) and where it intersects SW Military Road. Except for the closure of the Highway 43 and SW Riverwood Road intersection, SW Riverwood Road would remain open to traffic with joint operation with streetcars.

6. Lake Oswego Segment. The Lake Oswego Segment extends between SW Briarwood Road and the Lake Oswego Terminus Station. There are two design options within this segment: the UPRR ROW design option and the Foothills Design Option. Both options would generally be the same in two sections: 1) the new streetcar line alignment would extend south from SW Briarwood Road to where the alignment would cross under the existing UPRR tracks; and 2) the new streetcar alignment would be located within a new roadway that would extend south from SW A Avenue to the alignment's terminus near the intersection of N State Street and Northshore Road. Both options would provide for a new bicycle and pedestrian connection under the existing UPRR tracks. There would be two stations within this segment, one that would be common to the two design options (Lake Oswego Terminus Station). An optional station at E Avenue is also under consideration.

This segment would include two park-and-ride lots, both of which would be generally common to the two design options. Following is a description of how the design options would differ:

a. ***The UPRR ROW Design Option*** would extend the streetcar alignment south, generally in the UPRR right of way, from its under crossing of the existing UPRR tracks to SW A Avenue. The B Avenue Station would be located on the west side of the 100-space surface park-and-ride lot.

b. ***The Foothills Design Option*** would extend the streetcar alignment south from its under crossing of the UPRR tracks to SW A Avenue generally within the right of way of a new general purpose roadway (Foothills Road), which would be built as part of the Streetcar Alternative.

1.4.3.2 Transit Operations

This section describes transit operations under the Streetcar Alternative, generally compared to the No-Build Alternative (see Table 1-2). Figure 1-3 provides an illustration of the transit lines in the vicinity of the corridor under the Streetcar Alternative. There would be no difference in transit operations under any of the design options under consideration.

The Streetcar Alternative would extend the existing Portland Streetcar line from its current southern terminus at Lowell Street to the Lake Oswego Terminus Station in downtown Lake Oswego, expanding the streetcar length from 4 miles to 9.9 to 10 miles (depending on design option). The total round trip running time of the streetcar line between 23rd Avenue and downtown Lake Oswego (10 miles) in 2035 would be 105 or 112 minutes, excluding layover (based on the Willamette Shore Line and Macadam design options in the Johns Landing Segment, respectively). In comparison, under the No-Build Alternative the round trip running time for the streetcar line between 23rd Avenue and Lowell Street (4 miles) would be 68 minutes.

With the extension of streetcar service to Lake Oswego, Line 35 service between Lake Oswego and downtown Portland would be eliminated. The remainder of Line 35 between Oregon City and Lake Oswego would be combined with Line 78, in effect to create a new route between Oregon City and Beaverton. The new bus route and other TriMet transit routes serving downtown Lake Oswego would be rerouted to serve the relocated Lake Oswego Transit Center, which would be adjacent to Lake Oswego Terminus Station.

1.4.3.3 1.4.3.3 Construction Phasing Options

This section summarizes Streetcar Alternative construction phasing options currently under consideration – neither the No-Build Alternative nor the Enhanced Bus Alternative include construction phasing options. Currently, there are two types of construction phasing options or scenarios under consideration: 1) finance-related and 2) external project related. The Streetcar Alternative evaluated in this Technical Report and the DEIS is as Full-Project Construction. Should the Streetcar Alternative with phasing be selected as the Locally Preferred Alternative, during preliminary engineering (PE) additional analysis of environmental impacts resulting from the interim project alignment (as opposed to Full-Project Construction) will be conducted and additional opportunity for public review and comment may be required.

A. Finance-Related Phasing Options
Following is a description of the two finance-related phasing options currently under consideration.

- **Full-Project Construction.** Under the first construction phasing option, the project would be constructed and opened in its entirety as described within Section 2.2.2.

- **Sellwood Bridge Minimum Operable Segment (MOS).** Under the Sellwood Bridge MOS phasing option, the Streetcar Alternative would be initially constructed between SW Lowell Street and the Sellwood Bridge, with a second construction phase between the Sellwood Bridge and the Lake Oswego Terminus Station occurring prior to 2035. Under this construction phasing option, there would be no additional park-and-ride facilities in the corridor, compared to existing conditions. Under this phasing option, Line 35 would operate between Oregon City and the Nevada Street Station; frequencies would be adjusted to meet demand. Service and bus stops served exclusively by Line 35 would be deleted between the Nevada Station and downtown Portland.

B. External Project Coordination Related Phasing Options
Following is a description of phasing options related to the coordination of the Streetcar Alternative, if it is selected as the LPA, and other external projects. These external project coordination related phasing options represent interim steps in the construction process that would be taken to implement the Streetcar Alternative.

- **South Waterfront Segment Phasing Options.** If the planned and programmed South Portal roadway improvements are not in place or would not be constructed concurrently with the Streetcar Alternative, there would be two options for proceeding with construction of the streetcar alignment in the segment: 1) a different streetcar alignment using the Willamette Shore Line right of way would be initially constructed within the South Waterfront Segment; or 2) the streetcar alignment and its required infrastructure improvements would be constructed consistent with the alignment under the Full-Project Construction phasing option, but other non-project roadway improvements would be constructed at a later date by others. If the Willamette Shore Line right of way were to be used, then, when the South Portal roadway improvements were made, the streetcar alignment would be reconstructed consistent. The transit operating characteristics of the Streetcar Alternative would not be affected by this phasing option.

- **Sellwood Bridge Segment Phasing Options**. The Sellwood Bridge Segment includes two phasing options for the Streetcar Alternative that reflect two potential phasing options or scenarios for construction of the project in relationship to construction of a proposed new interchange that is planned to occur with the Sellwood Bridge replacement project. If the new interchange is constructed prior to or concurrently with the Streetcar Alternative, the initial and long-term streetcar alignment would be based on the new interchange design. The new interchange design is the basis for the analysis in this technical report and the DEIS. If the proposed interchange is constructed after the Streetcar Alternative, then the initial streetcar alignment to be constructed would be in the Willamette Shore Line right of way. Subsequently, when the proposed interchange is constructed, the Sellwood Bridge replacement project would relocate the streetcar alignment with the new interchange design.

Therefore, the long-term streetcar alignment would be the new interchange and the Willamette Shore Line phasing option would only be implemented as an interim alignment. Therefore, the two design options in this segment do not constitute a choice of alignments – instead they represent two construction phasing scenarios, dependent upon how external conditions transpire.

- The Foothills Design Option. The Foothills design option of the Streetcar Alternative is based on roadway improvements that would occur under the City of Lake Oswego's Foothills redevelopment project. If those roadway improvements are not constructed prior to or concurrently with construction of the streetcar alignment, then the Lake Oswego to Portland Transit Project would construct the streetcar alignment and required infrastructure improvements using the same alignment and the roadway improvements would be added at a later date by others.

2 EVALUATION METHODS

2.1 Related Laws and Regulations

Federal, state, and local plans and policies that encourage the protection of visual and aesthetic resources were examined as they relate to the proposed project.

A. Federal regulations and plans that determine under what conditions visual quality and aesthetics are to be considered include:

- Regulations for Implementing NEPA, Council on Environmental Quality (CEQ), 40 Code of Federal Regulations (CFR) 1500-1508.
- Visual Impact Assessment for Highway Projects, U.S. Department of Transportation, Federal Highway Administration (FHWA), Office of Environmental Policy, FHWA-HI-88-054, 1981, reprinted 1989.
- Environmental Impact and Related Procedures, FHWA, 23 CFR 771, 1965.
- Aesthetics and Visual Quality Guidance Information, FHWA, August 18, 1986.
- Intermodal Surface Transportation Act (ISTEA).

B. State regulations and plans that influence or determine under what conditions visual quality and aesthetics are to be considered include the following:

- Oregon Administrative Rule (OAR) 660-015-0000, Oregon Statewide Planning Goal 5, Natural Resources, Scenic and Historic Areas, and Open Spaces, Oregon's Statewide Planning Goals and Guidelines, amendments effective August 30, 1996.
- Procedures and Requirements for Complying with Goal 5, OAR 660-15-0000 (5), Department of Land Conservation and Development (DLCD).
- Oregon Transportation Plan (OTP), 2006.
- Roadside Development Design Manual, Oregon Department of Transportation (ODOT), 2005.

C. Local plans, ordinances, and manuals identify visual and aesthetic values that help determine how communities may react to changes resulting from the project. Local plans to be considered include:

1. City of Portland Comprehensive Plan, Goals and Policies, Goal 8 and Goal 12, 2004.

    - Goal 8: Policy 8.14, Objectives F, G, H, J, K – Conserve significant natural and scenic resource sites and values.
    - Goal 12: Enhance Portland as a livable city, attractive in its setting and dynamic in its urban character by preserving its history and building a substantial legacy of quality private developments and public improvements for future generations. Provides guidelines for urban design.

2. City of Portland Title 33, Planning and Zoning, 1994.

- Section 400s – Overlay Zones: Design Overlay Zone (d), Greenway Overlay Zones (g), (n), and (r), and Scenic Resources Overlay Zone (s).
- Section 500s – Plan Districts: Central City Plan District and Macadam Plan District.

3. City of Portland Design Guidelines and Policy Direction: Southwest Community Plan, 2003; South Waterfront Plan, 2004; South Waterfront Design Guidelines and Greenway Design Guidelines, 2002; Corbett, Terwilliger, and Lair Hill Policy Plan, 1977; Macadam Corridor Design Guidelines (South Macadam), 1985; and Macadam Corridor Design Guidelines (North Macadam), 1992.

4. City of Portland Scenic Resources Protection Plan, 1991.

5. Multnomah County Comprehensive Framework Plan, Natural Environment Policies, 2009.

    1. Policy 15: Willamette River Greenway. A cooperative management effort between the state and local jurisdictions for the development and maintenance of a natural, scenic, historical, and recreational "greenway" along the Willamette River.
    2. Policy16-F: Scenic Views and Sites. The county's policy to conserve scenic resources and protect their aesthetic appearance for the enjoyment of future generations.

6. Multnomah County Zoning Ordinance. Special Districts: Willamette River Greenway (WRG) and Heritage Preservation (HP), 2009.

7. City of Lake Oswego Comprehensive Plan, Goals 2, 5, and 15 – Section 2, 1994.
    - Goal 2 – Section 2: The City shall maintain and enhance the appearance and design quality of Lake Oswego.
    - Goal 5 – Section 2: The City shall protect and restore the community's wooded character and vegetation resources.
    - Goal 5 – Section 6: The City shall protect, enhance, maintain and expand a network of open space areas and scenic resources within and adjacent to the Urban Services Boundary.
    - Goal 5 – Section 8: The City shall preserve the historical, archaeological and cultural resources of the community.
    - Goal 15 – Section 1: The City shall protect, conserve, enhance and maintain the natural, scenic, historic, economic, and recreational qualities of the Willamette River Greenway.

8. City of Lake Oswego Community Development Code, 2009.
    - East End Design District and Old Town Design District.

9. Clackamas County Comprehensive Plan, Natural Environment Policies, 2009.
    - Wildlife Habitats and Distinctive Resource areas are intended to protect the scenic landscapes and natural beauty of Clackamas County. Provide an urban environment

where trees and landscape plantings abound and where significant features of the natural landscape are retained.

10. TriMet, Design Criteria Manual.

2.2 Data Collection

This report utilizes the following data:

A. Site characteristics from survey data, Metro's Regional Land Information System Geographic Information System (GIS) files, and published maps including:

- Aerial photo(s) of the study corridor
- Tax lot boundaries
- Neighborhood boundaries
- City and county boundaries
- Locations of schools, parks, and other public facilities (libraries, community centers, etc.)
- Existing building footprints
- Topography
- Natural waterways
- Zoning (plan districts, overlay zones, view corridors, and other regulatory provisions with geographic specificity)

B. Project plans including conceptual engineering drawings with elevations and plan details.

C. Public involvement input from the public involvement team on important neighborhood features and facilities and appropriate neighborhood boundaries.

D. Findings from other technical reports prepared for this project. Visual quality and aesthetic conditions are influenced by all of the factors that shape an environment, such as the presence of parks, natural features, or historic and cultural features. Therefore, the other technical assessment reports contain a great deal of information pertinent to the existing and future visual quality and aesthetics of the viewshed (as defined below). Technical reports that were reviewed include:

- Ecosystems Technical Report
- Historic, Archaeological and Cultural Resources Technical Report
- Land Use and Planning Technical Report
- Parks and Recreation Areas Technical Report

E. Visual simulations were prepared to illustrate likely change in visual quality of views and viewpoints due to the proposed alternatives. The simulations include a photograph of an existing view within the corridor, and then the same location is shown in a photo simulation that illustrates how the proposed project improvements could change the view. These simulations are illustrative of the design and are reflective of the conceptual level of design that has been developed so far. Simulations are shown in Figures 5-1 through 5-5.

2.2.1 General Methods

Data collection and assessment methods follow FHWA visual quality and aesthetics assessment methodology (FHWA 1989), because the FTA has not issued specific guidance on the visual quality and assessment methodology. This FHWA methodology was developed on behalf of communities adjacent to proposed transportation projects as a way to adequately and objectively consider the potential visual impacts resulting from highway projects. FHWA methodology has become an accepted framework for describing and analyzing a transportation project's subjective visual experience and for developing the social and physical contexts for visual impact analyses. The evaluation sequence is as follows:

1. Establish the project's visual limits ("viewshed") and define the inherently distinctive subareas in the project area ("landscape unit") by visiting the project area and using GIS maps.
2. Determine who has views of and from the project ("viewers") using project maps and the understanding gained in the previous step, and by reviewing relevant planning documents.
3. Describe and assess the built and natural environments that exist before the project ("affected environment").
4. Select evaluation viewpoints in the project area and assess the views from the viewpoints as they exist before and as they are likely to be after the project.
5. Select views to be used for graphical simulations that illustrate likely changes due to the project and/or substantial numbers of sensitive viewers of representative features of the proposed alternatives, and/or of high quality views.
6. Describe the likely changes in visual quality that will result from the proposed alternatives.

The first three steps establish baseline or existing conditions and the extent of the project's visual context. Steps 4 and 5 are the basis for determining the level of changes in and impacts to the visual character or quality of the project area, which are then determined in Step 6.

Evaluation viewpoints and simulation views (Steps 4 and 5) are places where substantial numbers of sensitive viewers have views of representative or typical features of the proposed alternatives, or of high quality views. Evaluating visual quality from these viewpoints is a useful way of understanding existing conditions and potential visual impacts. Photographs from many of the viewpoints are used in Step 3, to help portray existing conditions.

Viewpoints and issues of concern were identified through consultation with the City of Portland, City of Lake Oswego, Multnomah County, Clackamas County, and TriMet, and other advisors as necessary. Local and regional plans, policies, and regulations were taken into account with regard to aesthetic and historic resources. The results of the Historic, Archaeological and Cultural Resources, Land Use and Planning, Parks and Recreation Areas Technical Reports also informed the selection of the assessment views and identification of visual resources. Photographs of the views were used for computer-generated simulations of the "after" conditions. Photographs approximate a normal viewing angle and provide a representation of the relative scales of structures seen from the viewpoint.

Selection criteria for the simulations are:

- The view is a "typical" view that represents similar landscape types in the project area and is a location with many viewers of at least moderate sensitivity.
- The view is a location of potential high visual impact and has a significant number of viewers with high sensitivity.

2.2.2 Effects Guidelines

Impacts to the visual and aesthetic environment are changes to existing conditions resulting from construction and operation of the study alternatives and design options. Changes may detract from or enhance the visual environment. The degree of changes, coupled with viewer sensitivity, would define the extent of the visual impact. For project-related changes, the analysis also considers the sensitivity of the viewer to these changes. "Viewer sensitivity" is the preferences, values, and opinions of different groups of viewers. This includes considerations of the length of time for which the project is seen, the distance of the viewer from the project, and the type of viewer (e.g., neighborhood resident or traveler on a highway). In most cases, greater contrast and incompatibility with existing character and pattern, along with higher levels of viewer sensitivity, would increase visual impacts.

Because visual impacts rely on subjective criteria, this assessment focuses on those changes to the visual environment that may be measured as high, moderate, or low degrees of change. Table 2-1 describes how proposed project elements could alter existing visual resources and the thresholds for high, moderate, or low levels of change. This analysis is coupled with viewer sensitivity to determine the overall visual impact.

Table 2-1 Characteristics of High, Moderate, and Low Levels of Visual Change

High Level of Visual Change[1]	Moderate Level of Visual Change[1]	Low Level of Visual Change[1]
Significant new elevated structure	Moderate new grade separation	At-grade/below-grade
Significant displacement of structures	Moderate displacement of structures	Low displacement of structures
Significant new parking	Moderate new parking	Limited new parking
Significant view disruption	Moderate view disruption	Low view disruption
Removal of existing screening to residential uses	Partial removal of existing screening to residential uses	Minor removal of existing screening to residential uses
Significant visual change to public parkland	Moderate visual change to public parkland	Minor visual change to public parkland
Blocks significant scenic feature	Disrupts significant scenic feature	Limited change to significant scenic feature
Significant removal of vegetation	Removal of some vegetation	Limited removal of vegetation
Significant changes to streetscape character	Moderate changes to streetscape character	Limited changes to streetscape character
Significant changes to National Register of Historic Places (NRHP)-eligible historic site	Significant or moderate changes to NRHP-eligible historic site	Limited changes to NRHP-eligible site
Significant new night lighting and associated glare	Moderate new night lighting and associated glare	Low new night lighting and associated glare

[1] Some changes associated with transportation projects, such as screening, landscaping, lighting, sound walls, pedestrian and bike improvements, etc., can be a positive improvement compared to existing conditions.

2.2.3 Terminology

Visual quality assessment has an accepted vocabulary that includes familiar, everyday words used as technical terms. Since this can be confusing, the key terms and parameters that are used for visual quality assessment are defined below.

Views are what can be seen from the project area and what can be seen of the project area from the surrounding areas. Views are defined by geography and built and natural features, and are described or assessed from a given vantage point, called the **viewpoint**. All the views visible combine to form the **viewshed**. The viewshed is determined through GIS mapping and site visits. Viewers are the people who have views of or from the project. **Viewers** are discussed in terms of general categories of activities, such as resident, boater, jogger, or motorist, and in terms of their sensitivity to views.

Within a viewshed there are usually smaller areas defined by distinctive boundaries and characteristics called **landscape units**. A landscape unit is a subset of the project area and is a helpful tool for gaining a thorough understanding of the project area. The criteria for determining the limits of a landscape unit are that each landscape unit has a distinctive landscape character, has a specific geographic location, and has some degree of clear views within the unit.

The visual quality and aesthetics assessment describe and evaluate these three composite factors summarized below: **Visual Character, Visual Quality,** and **Viewer Response**.

Visual Character is defined by the nature of existing visual resources and elements and the relationships between them. These relationships are typically described in terms of dominance, scale, diversity, and continuity. Character-defining visual resources and elements include:

- Landforms: type, gradient, and scale
- Vegetation: type, size, maturity, and continuity
- Land uses: size, scale, and character of associated buildings and ancillary site uses
- Transportation facilities (including streetcar stops): type, size, scale, and directional orientation
- Overhead utility structures and lighting (including overhead catenaries and substations): type, size, and scale
- Open space: type (e.g., parks, reserves, greenbelts, and undeveloped land), extent, and continuity
- Viewpoints and views to visual resources
- Water bodies, historic structures, and downtown skylines
- Apparent grain or texture (e.g., the size and alternation of structures and unbuilt properties or open spaces of the landscape)
- Apparent upkeep and maintenance

Visual Quality is the assessed value of the existing visual experience and the likely value after the project is built. The assessment assigns a numeric value to three parameters that rank the existing visual quality and that which exists after the project. The three parameters are the memorability or distinctiveness of the landscape (vividness), the degree to which the landscape is

a harmonious mix of elements (unity), and the degree to which the landscape is free of eyesores or elements that do not fit with the overall landscape (intactness).

Viewer Response is a combination of **viewer exposure** and **viewer sensitivity**. Viewer exposure considers the combined effect of the physical location of viewer groups, the number of people exposed to a view, and the duration of their view. This includes both transit users and people in the surrounding area. Viewer sensitivity is the degree to which a viewer expects a particular visual character and the extent to which that character is important to the viewer. Viewer sensitivity is the combined effect of the activities a viewer is engaged in, the visual context, and the values, expectations, and interests of a group of persons or a person involved in a particular activity or context.

2.2.4 Worksheets

In order to maintain the highest possible level of objectivity when evaluating a largely subjective experience, visual quality and visual character are assessed using descriptive text and numeric worksheets. The descriptive text identifies visual resources and objects in the viewshed and landscape units. The numeric worksheets assign numeric values to before and after conditions of selected evaluation viewpoints according to accepted, predefined significance thresholds (defined in Table 2-1). Impacts are assessed by comparing the difference in significance thresholds and changes in the overall quality and character. The worksheet template is based on the FHWA Visual Impact Assessment for Highway Projects. One descriptive and one numeric threshold-based evaluation was conducted. Views were chosen according to the criteria discussed in Section 2.5.1.

Results for viewpoint evaluations are presented in tabular form and identify the project alternative or option (see Appendix A: Visual Quality Evaluation Worksheets). Key viewpoints for the landscape units are summarized, indicating the limits of the unit, and visual character and quality ranks. Visual impacts were determined and ranked according to the significance thresholds and viewer sensitivity.

2.3 Impact Assessment Analysis Methods

2.3.1 Long-Term Operational Impacts Approach

Long-term adverse and beneficial impacts to the visual and aesthetic environment were assessed using the methodology described in the previous sections. Impacts can result from the permanent addition of new elements; the displacement, alteration, or removal of existing elements; or the introduction of new light and glare sources. Impact levels are based on anticipated pedestrian or motorist experience of, or reaction to, the changed visual character due to the project; the presence of and attitudes toward panoramic or scenic views; changes to the overall visual quality and character of the area; and the degree of change in scale, contrast, or character between existing elements in the area and new elements created by the project.

2.3.2 Short-Term Construction Impact Analysis Approach

Short-term construction impacts were evaluated by reviewing project construction plans for locations or situations where temporary installations of fences, equipment, barriers, signage, lighting, and other construction-related objects would or could occur. Temporary impacts to

neighborhoods, parks and trails, landscaping, and vegetation were evaluated in consultation with the relevant technical reports.

2.3.3 Indirect and Cumulative Impact Analysis Approach

Indirect impacts are those effects caused by the project that occur later in time or farther in distance from the project area, but are still reasonably foreseeable. Indirect effects could include changes in the pattern of land use, population density or growth rate, and related effects on visual resources.

Cumulative impacts may occur when a project's effects are combined with those from past, present, and reasonably foreseeable future projects. They can also result from individually small, but collectively significant, actions that occur over a long period of time. An overall framework for addressing indirect and cumulative effects were defined for the project and applied for this analysis.

2.4 Mitigation Measures

Potential mitigation measures for adverse visual and aesthetic impacts were identified during the evaluation process and in coordination with other disciplines, including natural and built environment disciplines. Locations where impacts occur and the degree and nature of the impacts are noted. For these locations, possible mitigation options that could be considered include:

- Selecting and/or modifying routes
- Using interdisciplinary design teams to create aesthetic guidelines and standards in the design of project elements
- Integrating facilities with area redevelopment plans
- Minimizing clearing for construction and operation
- Planting appropriate vegetation in and adjoining the project right-of-way
- Replanting remainder parcels
- Using source shielding in exterior lighting at stations and ancillary facilities

Determination of final mitigation measures to be included in the project were made after impacts were identified. Mitigation measures are the product of coordination with other disciplines and overall project goals to ensure that the measures are feasible and integrated with the entire mitigation program.

2.5 Documentation

This visual quality and aesthetics technical report documents the analysis methods, coordination, data collection, inventory of the existing environment, analysis of potential impacts, and any avoidance recommendations. The report is summarized in the DEIS.

3 COORDINATION AND CONSULTATION

As part of the investigation of visual quality and aesthetic impacts pertaining to the LOPT, the analysis included coordination with the project team, including the visual simulation and public outreach consultants. In addition, staff gathered information from and/or coordinated with the following federal, state, and local government agencies:

A. Federal Agencies

- Federal Transit Administration (FTA)
- FHWA

B. State Agencies

- DLCD
- ODOT

C. Local Agencies

- Metro
- City of Portland
- City of Lake Oswego
- Clackamas County
- Multnomah County
- TriMet

4 AFFECTED ENVIRONMENT

4.1 Introduction

The affected environment describes the overall existing landscape character of the area and identifies important views, landscapes, or landmarks that serve as character-defining elements of the project area. The visual resources identified include major public views, as well as dominant and recognized visual features (based on accepted practice in the field of visual analysis). Locations with notable views have also been identified through public feedback. The analysis also considers features or views identified in local plans or ordinances. Figure 4-1 shows a map of the project area, the landscape units, and the project segments.

4.1.1 Project Context

The project area is in the urbanized northern portion of the Willamette River Valley. The Cascade Mountains, including Mt. Hood, provide a distant backdrop in the east; the Tualatin Mountains, also known as the West Hills, frame the western edge of the viewshed. The study corridor generally runs along the west bank of the Willamette River between downtown Portland and downtown Lake Oswego.

Urban development of the Portland region began in the mid-1800s. Early development was tied to a dense network of streetcars and interurban rail lines. A narrow gauge railroad built in 1886 connected Portland to Lake Oswego. From 1914 to 1929, interurban trains ran on the line from Portland to Lake Oswego and extended to Corvallis. The trains stimulated residential development in the 1920s and 1930s. After passenger service was terminated, freight service continued on the railroad tracks until the 1980s, when the line was purchased by a consortium of government agencies to preserve the right-of-way for future transit service. Beginning in 1987 the Willamette Shore Trolley began an excursion-type operation (primarily in summer) between Lake Oswego and Portland.

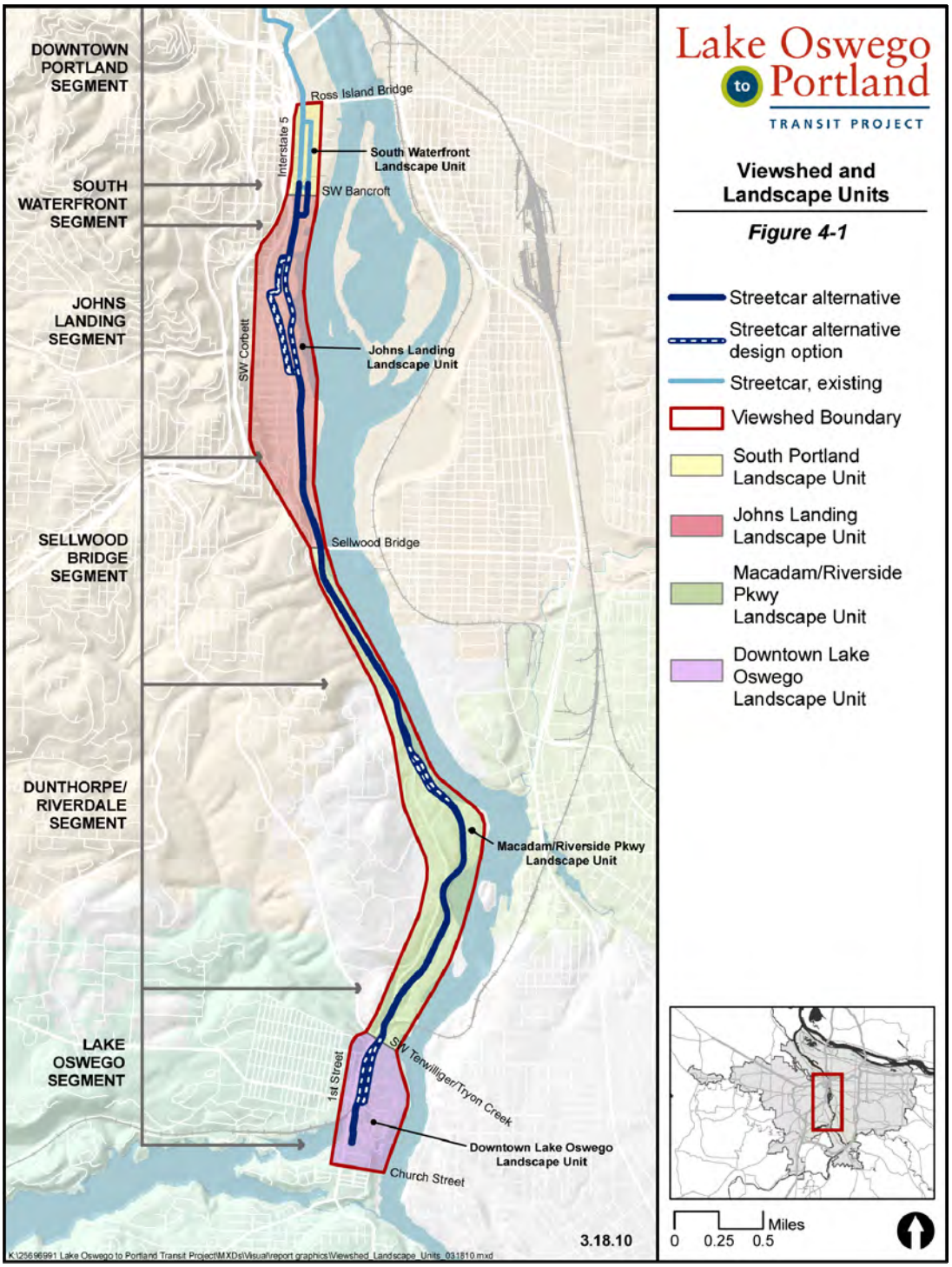


FIGURE 4-1: VIEWSHED AND LANDSCAPE UNITVIEWSHED

The analysis area for visual quality assessment is called a "viewshed." A viewshed is the aggregate landscape that can be seen from the project area and that has views of the project area. The viewshed analysis area is delineated by surrounding topography, vegetation, and built environment, including the scale of the development in relationship to the surrounding area.

4.1.2 Landscape Units and Project Segments

This report describes the Existing Visual Environment in terms of landscape units. To describe the existing visual environment and understand the level of visual changes that would occur with the project alternatives and design options, five "landscape units" have been identified. The landscape units are illustrated on Figure 4-1 and defined in more detail below[2]. Each landscape unit is a subset of the project area that has a distinctive visual character and a specific geographic location. For each landscape unit, the applicable project segments are noted. The five landscape units include Downtown Portland, South Waterfront, Johns Landing, Macadam/Riverside

Parkway, and Downtown Lake Oswego. The landscape units are not the same as the project segments. For each landscape unit, the applicable project segments are noted.

- The visual attributes and resources that helped define the landscape units were:
- Existing development: building scale/massing, development texture, and land use pattern;
- Topography (land form), vegetation, open space, and water patterns;
- Street grid patterns;
- Parks, trails, and other recreation areas;
- Areas of special visual or aesthetic character; and
- Buildings, landmarks, or development clusters that are important in defining the visual character and uses of an area.

This project describes Environmental Consequences, or project-related effects, by project segment. The project segments do not match the landscape units; however, in most cases the landscape units and project segments have similar north-south boundaries. Project segments are based on project functional or operational factors. Figure 4-1 illustrates the boundaries of the landscape units and the segments

4.1.2.1 Downtown Portland Landscape Unit

The Downtown Portland landscape unit extends north from the Ross Island Bridge and includes parts of downtown Portland along the existing Streetcar alignment. It is located entirely in Segment 1, the Downtown Portland segment.

4.1.2.1.1 Visual Character

The Downtown Portland landscape unit is an urban environment with medium- to large-scale buildings and a small-grid street system. There is a mix of older buildings, modern high-rise buildings, urban parks and plazas, and well-established ornamental landscaping. Much of the

[2] The Downtown Landscape Unit is not shown on Figure 4-1 because there are no changes proposed within Segment 1.

street system is a standard 200-foot block pattern, except where it is disrupted by topographical changes and major transportation features such as I-5, I-405, and the Willamette River.

Dominant visual features within the Downtown Portland landscape unit include streetscape and architectural views, the skyline of downtown Portland, views of the Willamette River, and downtown bridges. Throughout the unit, the West Hills form the western edge of the viewshed and Mt. Hood and the Cascade Mountains can be seen to the east. Buildings, street signs, street trees, and the miscellaneous furnishings typical of an urban core are in the foreground and middle ground of most views. *The City of Portland Scenic Views, Sites, and Corridors* (City of Portland, 1991) formally identifies numerous view corridors and viewpoints throughout the landscape unit.

4.1.2.1.2 Visual Quality

Vividness and unity are high for this landscape unit because of the continuity and stylistic coherence of the downtown area. Views along streets tend to be a harmonious mix of similar scale buildings, street trees, and urban activity centers. Vividness is high because there are memorable and dramatic features that create noteworthy views both within the landscape unit and beyond. Intactness is moderate due to the dynamic nature of an urban environment including elements caused by building construction, road and public work projects, and signage.

4.1.2.2 South Waterfront Landscape Unit

The South Waterfront landscape unit lies between the Ross Island Bridge and SW Bancroft Street. It is defined on the east by the Willamette River and on the west by SW Macadam Avenue and I-5. It is located in Segments 1 and 2, the South Waterfront and Johns Landing segments.

4.1.2.2.1 Visual Character

The forested canopy of the West Hills and structures associated with Oregon Health & Science University (OHSU) are visible to the west above I-5. Ross Island, Willamette River riparian vegetation, distant foothills, and the Cascade Mountain range are visible in the middle and background views to the east. The Ross Island and Marquam bridges and associated on- and off-ramps are visible to the north, primarily along public streets. The Portland Aerial Tram is also visible to the north. Most visual features to the south are blocked by existing structures. It is a dynamic, urban environment on the edge of the downtown core.

The visual character of this unit is an emerging urban area with a combination of modern high-rise buildings and older industrial uses. Surface parking lots and undeveloped sites are interspersed with formal landscaping, urban parks, and urban street furnishings. Currently, the area has a limited but growing street network. SW Moody and SW Bond contain the existing Portland Streetcar.

FIGURE 4-2: EXISTING PHOTOS IN THE SOUTH WATERFRONT LANDSCAPE UNIT

The *City of Portland Central City 2035 Subdistrict Profiles* (2010) designates minor viewpoints in the South Waterfront landscape unit along the Willamette River at SW Gaines, SW Gibbs, and approximately midway between the Marquam Bridge and the Ross Island Bridge in alignment with the City of Portland's proposed street network. Several view corridors are also designated along SW Gaines, SW Gibbs, and approximately SW Meade from I-5 toward the Willamette River. *Scenic Views, Sites, and Corridors* (City of Portland, 1991) identifies public viewpoints along SW Terwilliger, but vegetation and trees in the green space below SW Terwilliger obscure most views of the South Waterfront landscape unit.

4.1.2.2.2 Visual Quality

Within this landscape unit, intactness and unity are low to moderate because so much of the area is in transition from warehouse and light industrial uses to a high density urban development pattern. There are currently very few elements that are harmonious with one another. Because of the amount of construction occurring in the landscape unit, there are also numerous elements that do not fit in the overall landscape. Vividness is generally low, though from some viewpoints vividness is higher because of views of the aerial tram, the distant bridge structures, and the massing of distant vegetation along the river's edge, Ross Island, and distant hills.

4.1.2.3 Johns Landing Landscape Unit

The Johns Landing landscape is defined by SW Bancroft on the north, the Willamette River on the east, the Sellwood Bridge on the south and I-5/SW Corbett on the west. This landscape unit includes a small portion of Segment 2 (South Waterfront segment), all of Segment 3 (Johns Landing segment), and some of Segment 4 (Sellwood Bridge segment).

4.1.2.3.1 Visual Character

The visual character of this landscape unit is dominated by SW Macadam, a four-lane state highway (Highway 43) with a boulevard-type streetscape that divides the area. In the northern half of the unit SW Macadam has auto-oriented commercial, office, and industrial uses on both sides, mixed with medium- and low-density housing and segments of mature landscaping. SW Macadam is a busy street that serves as a barrier between the western and eastern parts of the

landscape unit. On the west behind the commercial uses is an older, predominately single-family neighborhood with a grid street system and smaller block sizes. The commercial and retail uses on the west side of SW Macadam are generally smaller parcels and more pedestrian-oriented than the buildings and landscaping east of SW Macadam Avenue.

On the east side of SW Macadam, the parcels are larger and the streets are irregular, and both relate more to the Willamette River. The Willamette River Greenway Trail, a significant public feature, runs parallel to the river. Large parcel sizes create visual similarity with structures that are primarily three- to four-story office campus buildings or residential condominiums, and industrial and/or river-related sites, and public open space. The existing railroad tracks run north and south through this area between SW Macadam and the Willamette River. Many buildings between the railroad tracks and the Willamette River are oriented toward the river, but many commercial buildings along SW Macadam are oriented toward SW Macadam. Many buildings between the existing railroad tracks and SW Macadam include surface parking lots adjacent to the buildings.

The southern half of this landscape unit includes a small residential neighborhood and several parks on the east side of SW Macadam along with the existing railroad tracks and the Willamette River Greenway Trail, both running north and south, parallel to SW Macadam.

FIGURE 4-3: EXISTING PHOTOS IN THE JOHNS LANDING LANDSCAPE UNIT

Visual features within the Johns Landing landscape unit include views of the Willamette River and associated bridges, boats, marinas, and houseboats; Willamette Park; Ross Island; the Willamette River Greenway Trail, the Willamette Shore Line railroad right-of-way, and distant foothills and the Cascade Mountains to the east. The downtown Portland, Lloyd District, and South Waterfront skylines, including the Portland Aerial Tram, are visible in background views to the north. The tree-covered West Hills, the Willamette River, and the Sellwood Bridge are visible to the south and west.

The City of Portland Macadam Plan District identifies view corridors along SW Richardson, SW Pendleton, SW Carolina, SW Nebraska, SW Vermont, SW California, SW Nevada, and SW

Miles streets. Viewpoints are identified along the Willamette River at locations north of SW Boundary and at SW Florida. A minor viewpoint is identified between SW Bancroft and SW Hamilton. Scenic resources are protected by the Willamette Greenway Overlay Zones and the Design Overlay Zones that apply to many properties in the area. *Scenic Views, Sites, and Corridors* identifies two scenic viewpoints on the west side of the Willamette River near the Sellwood Bridge.

4.1.2.3.2 Visual Quality

Visual quality is varied in this landscape unit. On the east side of SW Macadam, vividness is generally higher than on the west side of SW Macadam, and it ranges from average to moderately high depending on the viewpoint and visual access to the river, Ross Island, downtown Portland, and the distant mountains and hills. The uses and scales are more harmonious with the natural and scenic character of the river. East of SW Macadam, intactness and unity are also generally higher due to the scale, architectural character, and uses of the properties. Along SW Macadam, the mature landscaping provides some unity, though it is generally low to moderate due to the auto-oriented nature and mix of building scales, setbacks, and activities. Intactness is low to moderate. Unity is moderate on the west side of SW Macadam because of smaller lot sizes and the mix of uses. Vividness is low to moderate on the west side, depending on the viewpoint, because there are no memorable or dramatic features that create noteworthy views.

4.1.2.4 Highway 43/SW Riverside Drive Landscape Unit

The Highway 43/SW Riverside Drive landscape unit is defined on the north by the Sellwood Bridge, on the east by the Willamette River, on the west by the natural bluff above Highway 43/SW Riverside Drive, and on the south by SW Terwilliger and Tryon Creek. This landscape unit includes almost half of Segment 4 (Sellwood Bridge segment), all of Segment 5 (Dunthorpe/Riverdale segment), and a portion of Segment 6 (Lake Oswego segment).

4.1.2.4.1 Visual Character

The Highway 43/SW Riverside Drive landscape unit is predominately a heavily forested intercity transportation corridor with park and recreational features along the Willamette River, creeks and tributaries running west to east, and large-lot residential neighborhoods. Mixed deciduous and conifer tree canopy, significant grade changes to the east and west, and curvatures in the roadway limit views in all directions along Highway 43/SW Riverside Drive. Occasional tree openings to the east provide short duration, middle ground and background views to the Willamette River and farther east. There are a limited number of roads connecting SW Macadam/SW Riverside to the adjacent neighborhoods. The existing railroad corridor runs parallel to SW Macadam/SW Riverside, but in most cases is significantly below the roadway grade and blocked from view by existing vegetation and structures. On the northern end of the landscape unit, Powers Marine Park, a long, linear park, flanks the bank of the Willamette River. This park is natural in character and includes a waterfront trail, native landscaping, and access to the river. South of Powers Marine Park marks the beginning of the Riverdale/Dunthorpe neighborhoods. The area has large lots, narrow, curvilinear roads, private driveways without curbs and sidewalks, and mature vegetation. Many of the structures orient to the east with views of the Willamette River. The existing railroad corridor often delineates parcel boundaries. Most

parcels abutting the railroad corridor have significant landscaping, walls, or fences that buffer views and access to the railroad corridor. Structures located on parcels to the west are generally located above the railroad corridor due to topography changes. Structures on parcels to the east of the railroad corridor are generally oriented toward the river with their "backs" toward the railroad corridor.

FIGURE 4-4: EXISTING PHOTOS IN THE HIGHWAY 43/SW RIVERSIDE DRIVE LANDSCAPE UNIT

Protected visual resources in the Highway 43/SW Riverside Drive landscape unit include the SW Macadam/Terwilliger Scenic Corridor (SD38-27) and the Willamette River Corridor (SD01-04), as identified in *Scenic Views, Sites, and Corridors.* The Macadam/Terwilliger Scenic Corridor runs along SW Macadam from SW Terwilliger to the Portland city limits. This area is protected by the *Scenic Overlay Zone* (33.480). The Willamette River Corridor runs the length of the Willamette River in the City of Portland and unincorporated Multnomah County and is protected though the *Environmental Overlay Zones* (33.430) and *Willamette River Greenway Overlay Zones* (33.440). South of the City of Portland in unincorporated Multnomah County, the SW Riverside corridor and areas extending east to the Willamette River are identified as "Scenic Corridor Resource Site 117A" in the *Inventory of Natural, Scenic, and Open Space Resources for Multnomah County Unincorporated Areas* (City of Portland and Adolfson Associates, 2001). Lastly, the Elk Rock Gardens is located in the Dunthorpe area. Designed by John Olmstead and open to the public, this site is designed as a scenic site in the *Inventory of Natural, Scenic, and Open Space Resources for Multnomah County Unincorporated Areas*.

4.1.2.4.2 Visual Quality

Vividness in the Macadam/Riverside Parkway landscape unit ranges from low to high because of the proximity and elevation of the viewpoints in relation to the Willamette River and the mature vegetation. Some areas have dramatic and expansive views toward the river and beyond, while other areas have low memorability or distinctiveness of the landscape. The landscape unit also ranges in unity and intactness from low to moderately high. SW Macadam/SW Riverside has moderate unity and intactness due to the mature vegetation that spans the roadway and creates a consistent, vegetated corridor. The neighborhoods and parks have moderate unity and intactness depending on the proximity of the viewpoints to the existing railroad corridor.

4.1.2.5 Downtown Lake Oswego Landscape Unit

The Downtown Lake Oswego landscape unit is defined on the north by SW Terwilliger (west of N State Street) and Tryon Creek (east of N State Street), on the east by the Willamette River, on the south by Church Street, and on the west by 1st Street. This landscape unit is entirely within Segment 6 (Lake Oswego segment).

4.1.2.5.1 Visual Character

The visual character of this unit is a small, well-established downtown city to the west and an evolving industrial, office park, and open space area to the east. N State Street is the main north-south arterial through downtown and clearly differentiates the two areas both visually and physically. West of N State Street, the area has a one- to four-story, mixed-use, pedestrian environment with a perpendicular street system. The streetscape furnishings, high quality materials, and consistent landscaping provide strong visual continuity.

East of N State Street, the grade is more steeply sloped toward the Willamette River. A narrow row of storefront buildings on the east side of N State Street limit views from downtown toward the river and also provide a strong visual edge to N State Street. Access east of N State Street is limited. In the north, the area has large lots with heavy industrial uses. A public park, very different in visual character from the adjacent industrial uses, borders the Willamette River to the east. An office campus, residential community, and auto-oriented retail uses stretch to the southeast. The area is physically defined on the north by Tryon Creek and the retaining structures associated with the railroad tracks. The area lacks the visual continuity present west of N State Street.

FIGURE 4-5: EXISTING PHOTOS IN THE DOWNTOWN LAKE OSWEGO LANDSCAPE UNIT

Visual resources in the Downtown Lake Oswego landscape unit include view corridors along A, B, and D avenues, and unobstructed view sites at intersections of A, B, C, and D avenues and N State Street, as identified in the *Foothills District Refinement Plan Alternatives Evaluation and Refinement Report* (City of Lake Oswego and OTAK, 2005). The City of Lake Oswego's Willamette Greenway Overlay extends 150 feet shoreward from the ordinary low waterline of the Willamette River, and includes provisions protecting and enhancing significant natural and scenic areas, viewpoints, and vistas.

4.1.2.5.2 Visual Quality

West of N State Street, unity and intactness are high in this landscape unit because of the continuity and coherence of the downtown area. Views along streets tend to be a harmonious mix of similar scale buildings, street trees, landscaping, and street furnishings including lighting and hanging baskets. East of N State Street, unity and intactness are generally low because of the mix of land uses, differences in building scale and orientation, and incorporation of industrial uses, fencing, railroad tracks, and electrical structures. Memorable or distinctive landscapes are low to moderate depending on the viewpoint.

5 ENVIRONMENTAL CONSEQUENCES

Project-related effects to the visual and aesthetic environment include changes that would be brought about by construction and operation of the study alternatives and design options. These changes may detract from or enhance the visual environment.

As described in Section 2.5.2, the assessment of visual impacts relies on subjective criteria. This assessment focuses on changes to the visual environment measured as high, moderate, or low degrees of change as shown in Table 2-1. The assessment considers a variety of factors, including the level of visual change anticipated, the context and scale of the surrounding area, effects on major public views, the sensitivity of viewers, and the potential benefit of the project-related changes in the area. As noted above, the ratings for the sensitivity of viewers can be more subjective than the other factors, but they consider the expectations of a viewer, the length of exposure he or she would have to the changed view, and the viewpoint, including proximity. For example, residential viewers would be considered more highly sensitive to major changes of view and setting nearby because they would encounter the change on a daily basis. People at an established viewpoint, such as a public park, would also be more sensitive to change. Viewers in workplaces, particularly industrial areas, are expected to be less sensitive to changes in views than residential viewers. Motorists traveling through a corridor would be less sensitive to localized changes, but they would still notice major changes in views.

5.1 Direct Visual Impacts by Alternative

Potential long-term direct visual impacts by alternative are summarized in Table 4-1 below, and more detail is provided in Sections 4.1.1 through 4.1.4.

Table 5-1 Summary of Visual Impacts by No-Build, Enhanced Bus, and Streetcar Alternatives

Project Segment	No-Build Alternative	Enhanced Bus Alternative	Streetcar Alternative[1]
Downtown Portland	NA	L	L
South Waterfront	NA	L	L
Johns Landing	NA	NA	M
Sellwood Bridge	NA	NA	L-M
Dunthorpe/Riverdale	NA	NA	M-H
Lake Oswego	NA	L	M

Source: Lake Oswego to Portland Transit Project: Visual and Aesthetics Technical Report, DEA, August 2010.
Notes: H = High; M = Moderate; L = Low.
NA - Improvements not within the landscape unit or not applicable.
[1]Ranges are the result of various combinations of design options under study. See Table 4-2 for details on visual impacts by design option.

5.1.1 No-Build Alternative

The No-Build Alternative would include transportation improvements as defined in the Regional Transportation Plan Financially Constrained network. Other projects and additional development or redevelopment changes within the project area would have an effect on existing visual resources but would likely tend to be gradual and localized and not affect the length of the project area. The No-Build Alternative would not include new transit project-related changes that would significantly alter the visual environment in the project area.

5.1.2 Enhanced Bus Alternative

In addition to the changes noted with the No-Build Alternative, visual changes with the Enhanced Bus Alternative would be limited. In the Lake Oswego project segment, construction of a new 300-space park-and-ride structure and new two-lane roadway to connect the park and ride with SW Foothills would result in moderate visual changes to the existing environment; however, they would generally be compatible with the existing urban nature of the area. Overall visual impacts with the Enhanced Bus Alternative would be low.

5.1.3 Streetcar Alternative

Implementation of the Streetcar Alternative would result in the addition of a variety of streetcar-related elements that would cause visual changes in the corridor. Improvements would include extension of the Portland Streetcar system for approximately 5.9 miles from South Portland to downtown Lake Oswego, generally within the existing railroad right-of-way, except as described for various design options. Related Streetcar Alternative improvements would include trackway upgrades, generally replacing existing single tracks with double tracks (including some new retaining walls below and above the trackway), addition of ten passenger stations between SW Bancroft and Lake Oswego, addition of overhead catenary lines to power the streetcars, and associated features such as crossings, signals, and lighting.

Potential long-term impacts resulting from the Streetcar Alternative improvements to the existing visual and aesthetic environment are discussed in Section 4.2. Table 4-2, at the end of Section 4.2, provides detail on viewer sensitivity, degree of change, and overall visual impacts by project segment and design option. A narrative description, which includes some visual simulations that are intended to assist the reader in understanding the types of changes that could occur with various design options, is also provided in Section 4.2.

5.1.4 Sellwood Bridge Minimum Operable Segment (MOS)

The visual impacts for the Sellwood Bridge MOS would be the same as the Streetcar Alternative in all landscape units, except the project would terminate at the Sellwood Bridge. No visual impacts would occur in the Dunthorpe/Riverdale segment or the Lake Oswego segment. Impacts are summarized in Table 4-1.

5.2 Direct Visual Impacts of Streetcar Alternative Design Options by Project Segment

Potential long-term impacts resulting from the Streetcar Alternative improvements to the existing visual and aesthetic environment are summarized in Table 4-2 and described in more detail below.

5.2.1 Downtown Portland Segment

Visual changes resulting from the Streetcar Alternative in this segment would be insignificant and include a streetcar turnaround at Portland State University. The overall visual impacts within this segment would be low.

Table 5-2: Viewer Sensitivity, Degree of Change, and Overall Visual Impact Score for the Streetcar Alternative by Segment and Design Option

Segment/ Design Option	Visual Impacts			Changing Features (in addition to new trackway and catenary system)
	Viewer Sensitivity	Degree of Change	Overall Score[1]	
1 – Downtown Portland	L	L	L	New turnaround at Portland State University.
2 – South Waterfront[2]	L	L	L	New stations, relocate existing trolley station, intersection improvements, and new public access from SW Macadam to station. (Building removal, retaining walls, and new roadway connections done by others as part of South Portland Circulation Study).[2]
3 – Johns Landing				
Willamette Shore Line	L-H	M	M	New stations, retaining walls, regrading, and potential fencing. SW Boundary widening and improvements. Modifications to existing carport and parking lot. Removal of Jones Trestle. Potential vegetation removal in various locations including in Willamette Park. New pedestrian improvements and crossings.
Macadam In-Street	M	M	M	New stations and retaining walls. SW Landing widening. Modifications to parking lots. SW Boundary reconfiguration, intersection improvements, widening of SW Macadam at SW Carolina, and SW Carolina reconfiguration. Potential vegetation removal in various locations including in Willamette Park. New pedestrian improvements and crossings.
Macadam Additional Lane	M	M-H	M	New stations and retaining walls. SW Landing widening. Modifications to parking lots. SW Boundary reconfiguration, widening of SW Macadam from SW Boundary to SW Carolina, and SW Carolina reconfiguration. Building removal. Vegetation removal in various locations including in Willamette Park and along SW Macadam. New pedestrian improvements and crossings.
4 – Sellwood Bridge[3]	L-M	L-M	L-M	New stations and retaining walls. Potential vegetation removal and regrading. (Bridge, associated interchange, and driveway relocation are part of the Sellwood Bridge Project).
5 – Dunthorpe/Riverdale				
Willamette Shore Line	L-H	L-H	M	New retaining walls, fences, stations, and SW Briarwood overcrossing. Driveway reconfiguration, intersection improvements, and replaced trestles. Potential vegetation removal.
Riverwood In-Street	L-H	L-H	M-H	New retaining walls, fences, station, and SW Briarwood overcrossing. Replace two trestles with one long trestle. Close intersection of SW Riverwood Road and SW Riverside Drive. Widen SW Riverwood Road. Significant regrading. Building and potential vegetation removal.
6 – Lake Oswego				
UPRR Right-of-Way	L-M	M	M	New retaining walls, pedestrian and bike connection from SW Fielding, freight undercrossing, trestle over Tryon Creek, stations, and stairway connection from SW B. New surface parking lots and parking structure. Roadway widening and reconfiguration, Stampher Road at-grade crossing, UPRR track shifted 15 feet west, intersection improvements, parking and driveway relocation, and regrading. Potential vegetation removal.
Foothills	L-M	M-H	M	New retaining walls, pedestrian and bike connection from SW Fielding, freight undercrossing, trestle over Tryon Creek, stations, and stairway connection from SW B. New surface parking lots and parking structure. Stampher Road reconfiguration and extension, SW Foothills realignment and reconfiguration, intersection improvements, parking and driveway relocation, and regrading. Building (up to 11 structures) and potential vegetation removal.

Source: Lake Oswego to Portland Transit Project: Visual and Aesthetics Technical Report, DEA, August 2010.
Note: H = High; M = Moderate; L = Low. MOS = minimum operable segment.
1. Overall score is the degree of change plus viewer sensitivity.
2. The South Waterfront Segment contains potential construction phasing options associated with the Streetcar alignments. The Willamette Shore Line and Moody/Bond Couplet are considered phasing options rather than design options.
3. The Sellwood Bridge Segment contains potential construction phasing options associated with the Streetcar alignments. The Willamette Shore Line and New Interchange are considered phasing options rather than design options.

5.2.2 South Waterfront Segment

Viewers in the South Waterfront segment include motorists, streetcar riders, pedestrians, bicyclists, tourists, OHSU patients and students, employees/business people, industrial workers, construction workers, residents, and recreationists. This segment is a dynamic, urban environment on the edge of the downtown core. Most viewers anticipate changes to the visual environment east of SW Naito Parkway where land has been rapidly developing. Viewers from residential units in the area anticipate changes to the evolving environment. Businesses adjacent to the existing railroad tracks would have foreground and middle ground filtered and short duration views because of building orientation. Their sensitivity would be low to moderate. Commuters would have low sensitivity to the visual changes due to the speed at which they would be traveling, grade differentiation, and the short duration they would be exposed to the tracks. The overall viewer sensitivity would be low.

Visual changes in the area would include new stations, intersection improvements, and new public access from SW Macadam to the stations. These features would be added in existing road or railroad right-of-way. Because of topography, building orientation, and regional transportation corridors, these features would not block existing views to the Willamette River or other scenic resources. New features and associated development would assist in visually uniting and enhancing intactness as the area evolves into an urban setting. The overall degree of change would be low.

Other visual changes would be associated with the *Moody/Bond Couplet*, and include building removal, retaining walls, and new roadway connections. These visual changes would be evaluated as part of that project. The overall visual impacts within this segment would be low.

5.2.3 Johns Landing Segment

Willamette Shore Line Design Option

Viewers in the Johns Landing segment near the Willamette Shore Line design option would include pedestrians, bicyclists, boaters, tourists, employees/business people, and residents. Neighborhood residents would have foreground and middle ground views of the project and moderate to high sensitivity depending on their proximity to the project area. People at adjacent businesses would have foreground and middle ground views and low to moderate sensitivity. Recreational users at Willamette Park would have moderate to high sensitivity depending on their proximity to the project area. The overall viewer sensitivity would range from low to high depending on proximity to the project area.

Visual changes in the area would include new stations, retaining walls up to 9 feet in height, regrading, and, potentially, fencing. SW Boundary Street would be widened and improved to include sidewalks. The Jones Trestle would be removed, and the trackway would be lowered. Vegetation would be removed in various locations, including adjacent to Willamette Park. Visual changes would be higher in some locations where the project would be constructed between residential structures and the Willamette River, as shown in Figure 5-1. Significant views would be partially disrupted by fencing and other project components, including catenary wires and support structures, formal landscaping would be removed, and lighting near stations and pedestrian crossings would alter the current visual environment. As shown in Figure 5-2, visual changes near Willamette Park would occur adjacent to the western boundary. In most areas the

visual changes would be obscured by existing vegetation, and would not detract from existing views toward the Willamette River. The visual changes could also improve the visual continuity of the western edge of the park by replacing the view of the back sides of industrial structures and building service areas (garbage, recycling, loading areas) with more active visually intact views. The overall degree of change for the segment as a whole would be moderate.

Overall visual impacts with this design option would be moderate. Mitigation could include screening where appropriate, selecting lighting components that shielding station and reduce impacts from glare; and designing the facilities to complement or blend with the surrounding landscapes and communities.

Macadam In-Street Design Option

Viewers in proximity to the Macadam In-Street design option would include motorists, transit riders, pedestrians, bicyclists, employees/business people, shoppers, industrial workers, and residents. Neighborhood residents would have foreground and middle ground views of the project and moderate sensitivity depending on their proximity to the project area. Business people and employees who are adjacent to SW Landing Drive and SW Macadam would have foreground and middle ground views and low to moderate sensitivity. Commuters would have low to moderate sensitivity to the visual changes due to the speed at which they would be traveling and the short duration they would be exposed to them. The overall viewer sensitivity would be moderate.

As shown in Figures 5-3 and 5-4, visual changes include new stations and retaining walls up to 6½ feet in height. SW Landing would be widened and improved with sidewalks, street lighting, and vegetation. Portions of existing surface parking lots would be converted to street improvements. SW Boundary would be reconfigured. SW Macadam would be widened at SW Carolina. Existing vegetation would be removed in various locations, including areas within Willamette Park. Many of the visual changes associated with this design option would occur within existing road right-of-way. Although improvements to SW Landing are near residential structures, the new features do not block or obscure views toward the Willamette River. Many of the residential structures are oriented away from SW Landing in order to capitalize on the scenic views toward the river. The adjacent uses along the west side of SW Landing are primarily surface parking lots. Converting surface parking lots to streetcar and roadway infrastructure is not a significant visual change. Visual change along SW Macadam would be low due to the existing nature of SW Macadam as a transportation corridor. Landscape screening would be maintained between the adjacent businesses and the roadway. The streetcar could add an additional visual buffer between the pedestrians and the fast-moving vehicles along SW Macadam. The overall degree of change would be moderate. Mitigation could include screening where appropriate, minimizing project width where appropriate; selecting lighting components that shielding station and reduce impacts from glare; and designing the facilities to complement or blend with the surrounding landscapes and communities.

A - Existing view looking north from near SW Richardson Street.

B - Future view looking north from near SW Richardson Street with Streetcar Alternative (Willamette Shore Line design option).

2.23.10

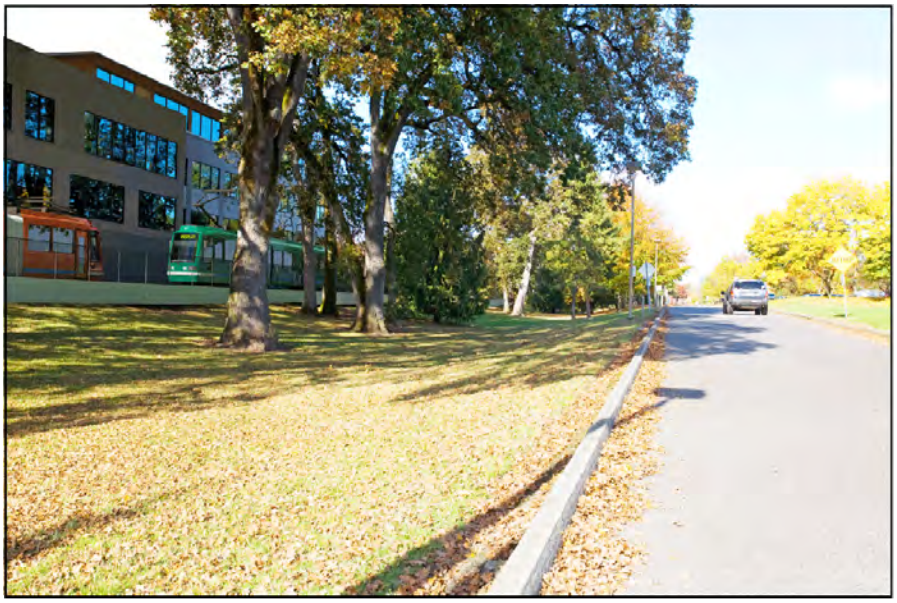
Lake Oswego to Portland TRANSIT PROJECT

Existing View and Visual Simulation from Heron Pointe Condominiums

Figure 5-1

FIGURE 5-1 EXISTING VIEW AND VISUAL SIMULATION FROM HERON POINTE CONDOMINIUMS

A - Existing view looking north from Willamette Park.



B - Future view looking north from Willamette Park with Streetcar Alternative (all design options).

5.6.10

Lake Oswego to Portland TRANSIT PROJECT

Existing View and Visual Simulation from Willamette Park

Figure 5-2

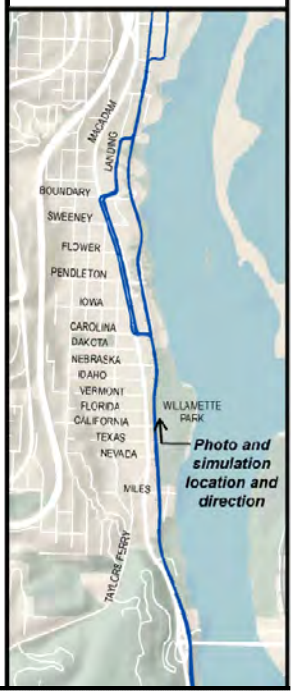


FIGURE 5-2: EXISTING VIEW AND VISUAL SIMULATION FROM WILLAMETTE PARK

A - Existing view looking north from SW Boundary Street.

B - Future view looking north from SW Boundary Street with Streetcar Alternative (Macadam In-Street or Macadam Additional Lane design option).

5.6.10

Lake Oswego to Portland TRANSIT PROJECT

Existing View and Visual Simulation along SW Landing Drive

Figure 5-3

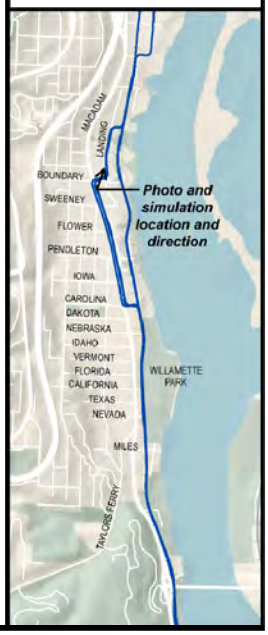


FIGURE 5-3: EXISTING VIEW AND VISUAL SIMULATION ALONG SW LANDING DRIVE

A - Existing view looking north from south of SW Flower Street.

B - Future view looking north from south of SW Flower Street with Streetcar Alternative (Macadam In-Street design option).

5.6.10

Lake Oswego to Portland TRANSIT PROJECT

Existing View and Visual Simulation along SW Macadam Avenue

Figure 5-4

FIGURE 5-4: EXISTING VIEW AND VISUAL SIMULATION ALONG SW MACADAM AVENUE

MACADAM ADDITIONAL LANE DESIGN OPTION

Viewers in proximity to the Macadam Additional Lane design option are the same as the Macadam In-Street design option. The overall viewer sensitivity would be moderate. However, the viewer sensitivity may be higher directly in a portion of the segment where the residential development is adjacent to the proposed additional lane, because this option that would eliminate the existing screening between the residences and the street.

As shown in Figures 5-3 and 5-5, visual changes would be similar to the Macadam In-Street design option but would also include widening of SW Macadam between SW Boundary and SW Carolina, removing existing vegetation, (including areas within Willamette Park,) and reconfiguring adjacent parking areas. Removing the mature vegetation on the east side of the roadway would reduce visual screening between adjacent businesses and residential structures and SW Macadam. A small building would be removed at the corner of SW Macadam and SW Carolina, thus widening the transportation corridor slightly. The overall degree of change would be moderate to high.

Overall visual impacts with this design option would be moderate. Mitigation could include screening where appropriate, minimizing project width where appropriate; selecting lighting components that shielding station and reduce impacts from glare; and designing the facilities to complement or blend with the surrounding landscapes and communities.

5.2.4 Sellwood Bridge Segment

Viewers in the Sellwood Bridge segment would include motorists, transit riders, park users, recreationalists, residents, and employees of adjacent businesses. Motorists would have short duration and filtered views of the project because much of the project associated with this design option either would occur below the view from SW Macadam, or would be blocked by existing buildings. The project would run behind a number of residences on SW Miles. Residents would have moderate to high sensitivity due to the proximity and duration of visual changes, but the project could improve the visual unity and intactness by enhancing screening. Powers Marine Park and Butterfly Park users would have low to moderate sensitivity due to the location of the project in relation to the parks. The project would occur on the western boundaries of the parks and would not block park users' views to the Willamette River or interfere with park functions. Businesses in the area would have low to moderate sensitivity depending on their proximity to the project. The overall viewer sensitivity would be low to moderate.

Visual changes would include new stations, retaining walls varying in height, a new structure over Stephens Creek, fencing, and a pedestrian overpass to Powers Marine Park. Existing vegetation would be removed in multiple locations. These visual changes would occur due to the Sellwood Bridge project, and have been evaluated as part of that project. The overall degree of change associated with this design option would be low to moderate.

Overall visual impacts within this segment would be low to moderate.

A - Existing view looking north from south of SW Flower Street.

B - Future view looking north from south of SW Flower Street with Streetcar Alternative (Macadam Additional Lane design option).

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Lake Oswego to Portland TRANSIT PROJECT

Existing View and Visual Simulation along SW Macadam Avenue

Figure 5-5

FIGURE 5-5: EXISTING VIEW AND VISUAL SIMULATION ALONG SW MACADAM AVENUE

5.2.4.1 Willamette Shore Line Design Option

Viewers in the Dunthorpe/Riverdale segment in proximity to the Willamette Shore Line design option include residents, visitors, and motorists. Neighborhood residents would have foreground and middle ground views of the project and moderate to high sensitivity depending on their proximity to the project area. Motorists would have low sensitivity to the visual impacts due to elevation differences, the speed at which they would be traveling, and the short duration they would be exposed to it. The overall viewer sensitivity would range from low to high depending on the viewer's proximity to the project area.

Visual changes would include trackway improvements, new stations, retaining walls up to 15 feet in height, fences, lighting around the stations, and a new SW Briarwood overcrossing. Intersection improvements would occur, and existing trestles would be replaced. Existing vegetation and landscaping would be removed in various locations. The area is predominately a residential neighborhood, and while topography reduces the visual impacts for properties on the west side of the project, the project could potentially disrupt views toward the Willamette River. The removal of vegetation could reduce the visual buffering between the existing railroad corridor and the adjacent residences. Introducing streetcar stations and related infrastructure would be a departure from the existing visual character of the neighborhood. The overall degree of change would range from low to high.

Overall visual impacts with this design option would be moderate. Mitigation in areas with higher visual impacts could include enhanced screening and use of vegetation to soften visual impacts of retaining walls; shielding station lighting to reduce impacts from glare; minimizing project width where appropriate; and designing the facilities to complement or blend with the surrounding landscapes and communities.

5.2.4.2 Riverwood In-Street Design Option

Viewers in proximity to the Riverwood In-Street design option would be the same as those for the Willamette Shore Line design option. The overall viewer sensitivity would range from low to high depending on the viewer's proximity to the project area.

Visual changes in the area include trackway improvements, a new trestle, new stations, retaining walls up to 21 feet in height, fences, lighting around the stations, and a new SW Briarwood overcrossing. The intersection of SW Riverwood Road and Highway 43 (SW Riverside Drive) would be closed. SW Riverwood Road would be widened and regraded. One house would be removed. Existing vegetation and landscaping would be removed in various locations. Visual changes would occur primarily in and adjacent to the existing road right-of-way, but the changes would alter the visual character of the street. Retaining walls would be built on the downhill side of SW Riverwood Road, removing mature vegetation and screening between the roadway and the adjacent residences. The visual character of the road would change from a meandering unimproved residential street to a more urban roadway with sidewalks, curbs, and bike lanes. Introducing streetcar stations and related infrastructure could be a departure from the visual character of the neighborhood. The overall degree of change would range from low to high.

Overall visual impacts with this design option would be moderate to high. Mitigation could include enhanced screening and use of vegetation to soften visual impacts of retaining walls;

shielding station lighting to reduce impacts from glare; minimizing project width and street standards where appropriate; and designing the facilities to complement or blend with the surrounding landscapes and communities.

5.2.5 Lake Oswego Segment

5.2.5.1 UPRR Right-of-Way Design Option

Viewers in the Lake Oswego segment in proximity to the Union Pacific Railroad (UPRR) Right-of-Way Design Option include motorists, residents, pedestrians, bicyclists, employees/business people, industrial workers, and shoppers. Neighborhood residents would have foreground and middle ground views of the project and moderate sensitivity depending on their proximity to the project area. Business people, industrial workers, and shoppers adjacent to the design option would have foreground and middle ground views and low to moderate sensitivity. Commuters would have low sensitivity. Recreationalists would have moderate sensitivity. The overall viewer sensitivity would be low to moderate.

Visual changes in the area would include new retaining walls up to 24 feet in height, a pedestrian and bike connection from SW Fielding, a freight undercrossing, a trestle over Tryon Creek, new stations, a stairway connection from SW B Avenue, new surface parking lots, and a new parking structure. The roadway would be widened and reconfigured. The UPRR track would shift 15 feet to the west. Existing vegetation would be removed. The visual impacts from the project would occur primarily in the existing railroad corridor adjacent to industrial uses. Much of the project would be lower in elevation from N State Street and behind existing buildings, thus maintaining the existing visual character of downtown Lake Oswego. Visual changes associated with the project could help unify the east and west sides of N State Street and promote stronger visual and physical connections to the Willamette River. The moderate to high degree of change near the parking structure would be mitigated through design development with the City of Lake Oswego. Given the visual benefit the project could have on the area, the overall degree of change would be moderate.

Overall visual impacts with this design option would be moderate.

5.2.5.2 Foothills Design Option

Viewers in proximity to the Foothills Design Option would be the same as those for the UPRR ROW Design Option. The overall viewer sensitivity would be low to moderate.

Visual changes in the area would include new retaining walls up to 37 feet in height, a pedestrian and bike connection from SW Fielding Road, a freight undercrossing, a trestle over Tryon Creek, new stations, a new stairway connection from SW B Avenue, new surface parking lots, and a new parking structure. Stampher Road would be reconfigured and extended. SW Foothills Road would be realigned and reconfigured. Intersection improvements would be made. Seven buildings would be removed, in addition to existing vegetation. The visual changes from the project would occur primarily in an industrial part of the city. Many of the buildings removed would be below the view from N State Street. The new road connection would provide continuity in the future as redevelopment occurs. Visual changes associated with the project would help unify the east and west sides of N State Street and promote stronger visual and

physical connections to the Willamette River. The moderate to high degree of change near the parking structure would be mitigated through design development with the City of Lake Oswego. Given the visual benefit the project would have on the area, the overall degree of change would be moderate to high.

Overall visual impacts with this design option would be moderate.

5.3 Short-Term Effects

Short-term impacts are related to construction. Construction in the project corridor would occur in stages over a period of up to several years, although any one location would likely experience construction activities that would be shorter. Construction is conducted in stages but begins with utilities relocation, clearing and grading, and reconstruction. These actions could remove existing visual features and create visual clutter. Construction equipment, trailers, workers' parking, construction materials, debris, lighting, and signage also change visual conditions in a corridor under construction. To allow construction equipment and materials to be brought to the alignment, the areas that are affected may be larger than the permanent facility.

The Streetcar Alternative would have a higher level of construction visual effects than the Enhanced Bus Alternative.

5.4 Indirect Visual Effects

Indirect visual effects could include visual effects of development that may choose to locate close to the Streetcar Alternative for better access to transit at both ends of the corridor. Assuming that new development complies with local jurisdiction design review requirements, there would be no resulting indirect adverse visual effects. Indirect effects of the **No-Build** and **Enhanced Bus Alternatives** could result in lower levels of visual change than the Streetcar Alternative, but could include visual changes associated with increased congestion, and roadway and public works projects. With the **Streetcar Alternative** and design options, indirect effects could include redevelopment activities around the proposed stations, north and south ends only, as well as redevelopment of surplus land cleared during the construction of the project.

5.5 Cumulative Visual Effects

Cumulative visual effects could include the effects of the various alternatives and design options along with other reasonably foreseeable activities in the corridor that could affect the visual environment. Relative to cumulative effects, it is assumed that there will be slow to moderate new development and some redevelopment in the Portland Central City, in the South Waterfront area, in the Johns Landing/North Macadam area, and in the Lake Oswego Town Center. In the Lake Oswego Town Center area, the foothills area is likely to progress with a new street plan and some new development.

Selection of the **No-Build Alternative** would not result in any direct cumulative effects, and therefore it would not increase cumulative change to visual resources. Cumulative effects to visual resources would include effects from further development of the area, including increasing densities and the resulting changes to visual resources. However, with the No-Build Alternative,

there also would be less potential for project-related improvements to the visual environment from features such as improved pedestrian facilities and landscaping of project facilities.

For both the **Enhanced Bus** and **Streetcar Alternatives**, the cumulative effects would be similar. Redevelopment in the downtown Portland/South Waterfront area and Lake Oswego area would continue, regardless of the level of transit improvements. However, the cumulative effect from the Streetcar Alternative could be greater because the station areas within the South Waterfront, John's Landing, and Foothills it's a larger project could attract infill development or redevelopment of existing uses to take advantage of the streetcar station than what would occur under the Enhanced Bus Alternative. With this development, there would be greater potential for both negative and positive cumulative visual effects to occur. Other projects, such as the South Portland Circulation Study Project, the Sellwood Bridge, and the Foothills Redevelopment Plan would still be developed in areas that would alter the visual environment, with or without the transit project improvements.

6 POTENTIAL MITIGATION MEASURES

This mitigation section identifies a range of potential mitigation measures that could be incorporated. Actual mitigation would be identified if a build alternative is selected as the locally preferred alternative and during preliminary engineering and the final environmental impact statement phase. High-quality design and construction of the proposed transit facilities could help to ensure that the project improvements contribute positively to the visual environment of the corridor rather than detract from it.

The following techniques could be employed for any of the alternatives to improve the visual effects of the project improvements, depending on which option is selected as the locally preferred alternative and more specific impacts associated with that alternative:

- Planting vegetation, street trees, and landscaping in and around the project where appropriate;
- Giving special consideration to the design of alternatives in the vicinity of public parks, open spaces, and historic sites;
- Shielding station and roadway lighting to reduce impacts from glare;
- Minimizing project width where appropriate; and
- Designing the facilities to complement or blend with the surrounding landscapes and communities.

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List of Preparers.

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Appendix A: Visual Quality Evaluation

Lake Oswesgo to Portland Transit Project

1/22/10 **Prepared by: Suzanne Carey**

		Landscape Unit	South Waterfront			Johns Landing												
		Viewpoint Number	1.1			2.1			2.2			2.3			2.4		2.5	
		Viewpoint Description	SW Moody looking south			River Forum looking south			Landing Drive looking south			Macadam/Boundary looking north			RR ROW/SW Flower looking north		Willamette Park looking northwest	
		Existing (E) or Proposed (P)	E	P	P	E	P	P	E	P	P	E	P	P	E	P	E	P
		Design Options: WSL, MB, MAL, MIS, SNI, RW, FH, UPRR	E	WSL	MB*	E	WSL	MB*	E	MAL	MIS	E	MAL	MIS	E	WSL	E	WSL
Vividness memorability or distinctiveness of the landscape	**Foreground**	LAND	1	1	1	2	2	1	2	2	2	1	1	1	3	3	3	3
		WATER	1	1	1	1	1	1	1	1	1	1	1	1	5	4	1	1
		VEGETATION	2	1	1	4	1	1	4	2	2	3	2	3	4	2	5	5
		MAN-MADE	2	2	2	3	3	2	3	3	3	2	2	2	4	3	4	4
		Average	1.50	1.25	1.25	2.50	1.75	1.25	2.50	2.00	2.00	1.75	1.50	1.75	4.00	3.00	3.25	3.25
	Middleground	LAND	1	1	1	2	2	1	2	2	2	1	1	1	3	3	3	3
		WATER	1	1	1	1	1	1	1	1	1	1	1	1	5	4	1	1
		VEGETATION	3	3	2	4	1	1	4	2	2	3	2	3	5	2	5	4
		MAN-MADE	2	2	2	3	3	2	3	3	3	2	2	2	4	3	4	4
		Average	1.75	1.75	1.50	2.50	1.75	1.25	2.50	2.00	2.00	1.75	1.50	1.75	4.25	3.00	3.25	3.00
	Background	LAND	2	2	2	2	2	1	2	2	2	3	3	3	5	5	3	3
		WATER	1	1	1	1	1	1	1	1	1	1	1	1	5	5	1	1
		VEGETATION	3	3	1	4	1	1	4	2	2	3	3	3	3	3	5	4
		MAN-MADE	2	2	1	3	3	2	3	3	3	3	3	3	5	5	4	4
		Average	2.00	2.00	1.25	2.50	1.75	1.25	2.50	2.00	2.00	2.50	2.50	2.50	4.50	4.50	3.25	3.00
Unity degree to which the landscape is a harmonious mix of elements	**Foreground**	MAN-MADE	1	2	1	3	3	3	4	3	3	3	2	3	4	2	5	5
		NATURAL ENVIRONMENT	2	2	1	3	2	1	3	1	1	2	2	2	4	2	5	4
		Average	1.50	2.00	1.00	3.00	2.50	2.00	3.50	2.00	2.00	2.50	2.00	2.50	4.00	2.00	5.00	4.50
	Middleground	MAN-MADE	2	2	2	3	3	3	4	3	3	3	2	3	4	3	5	5
		NATURAL ENVIRONMENT	2	2	2	3	2	1	3	1	1	2	2	2	4	3	5	4
		Average	2.00	2.00	2.00	3.00	2.50	2.00	3.50	2.00	2.00	2.50	2.00	2.50	4.00	3.00	5.00	4.50
	Background	MAN-MADE	2	2	1	3	3	3	4	3	3	3	3	3	5	5	5	5
		NATURAL ENVIRONMENT	3	3	1	3	2	1	3	1	1	2	2	2	4	4	5	5
		Average	2.50	2.50	1.00	3.00	2.50	2.00	3.50	2.00	2.00	2.50	2.50	2.50	4.50	4.50	5.00	5.00
Intactness degree to which the landscape is free of eyesores or elements that do not fit with the overall landscape	**Foreground**	MAN-MADE	2	3	1	3	3	2	3	2	2	2	2	2	4	2	5	5
		NATURAL ENVIRONMENT	2	1	1	3	2	1	3	2	2	2	1	2	5	3	5	4
		Average	2.00	2.00	1.00	3.00	2.50	1.50	3.00	2.00	2.00	2.00	1.50	2.00	4.50	2.50	5.00	4.50
	Middleground	MAN-MADE	3	3	2	3	3	2	3	2	2	2	2	2	5	2	5	5
		NATURAL ENVIRONMENT	3	2	2	3	2	1	3	2	2	2	1	2	5	3	5	4
		Average	3.00	2.50	2.00	3.00	2.50	1.50	3.00	2.00	2.00	2.00	1.50	2.00	5.00	2.50	5.00	4.50
	Background	MAN-MADE	3	3	2	3	3	2	3	2	2	3	3	3	5	5	5	5
		NATURAL ENVIRONMENT	3	3	3	3	2	1	3	2	2	3	3	3	4	4	5	5
		Average	3.00	3.00	2.50	3.00	2.50	1.50	3.00	2.00	2.00	3.00	3.00	3.00	4.50	4.50	5.00	5.00
	AVERAGE	Foreground	1.67	1.75	1.08	2.83	2.25	1.58	3.00	2.00	2.00	2.08	1.67	2.08	4.17	2.50	4.42	4.08
		Middleground	2.25	2.08	1.83	2.83	2.25	1.58	3.00	2.00	2.00	2.08	1.67	2.08	4.42	2.83	4.42	4.00
		Background	2.50	2.50	1.58	2.83	2.25	1.58	3.00	2.00	2.00	2.67	2.67	2.67	4.50	4.50	4.42	4.33
	TOTAL VISUAL QUALITY		2.14	2.11	1.50	2.83	2.25	1.58	3.00	2.00	2.00	2.28	2.00	2.28	4.36	3.28	4.42	4.14

Evaluation Scale
6 = VERY HIGH
5 = HIGH
4 = MODERATELY HIGH
3 = AVERAGE
2 = MODERATELY LOW
1 = LOW TO NON-EXISTENT

Design Options
WSL = Willamette Shoreline
MB = Moody/Bond Couplet
MAL = Macadam Additional Lane
MIS = Macadam In-Street
SNI = Sellwood New Interchange
RW = Riverwood In-Street
FH = Foothills
UPRR = UPRR Right-of-Way

* Cumulative Impacts

VIEWPOINT 1.1: SOUTH WATERFRONT: SW MOODY LOOKING SOUTH

VIEWPOINT 2.1: JOHNS LANDING: RIVER FORUM LOOKING SOUTH

VIEWPOINT 2.2: JOHNS LANDING: LANDING DRIVE LOOKING SOUTH

VIEWPOINT 2.3: JOHNS LANDING: MACADAM/BOUNDARY LOOKING NORTH

VIEWPOINT 2.4: JOHNS LANDING: RR ROW/SW FLOWERS LOOKING NORTH

VIEWPOINT 2.5: JOHNS LANDING: WILLAMETTE PARK LOOKING NORTHEAST

VIEWPOINT 3.1: MACADAM RIVERSIDE PARKWAY: MARINE POWERS PARK LOOKING NORTH

VIEWPOINT 3.2: MACADAM RIVERSIDE PARKWAY: RIVERWOOD ROAD LOOKING SOUTH

VIEWPOINT 3.3: MACADAM RIVERSIDE PARKWAY: RIVERWOOD STATION LOOKING NORTH

VIEWPOINT 3.4: MACADAM RIVERSIDE PARKWAY: RR ROW LOOKING NORTH

VIEWPOINT 4.1: LAKE OSWEGO: STAMPHER TRESTLE LOOKING SOUTH

VIEWPOINT 4.2: LAKE OSWEGO: RR ROW/B AVENUE LOOKING SOUTH