Volume 2 of the Final Environmental Impact Statement
Portland-Milwaukie Light Rail Project

This volume, Volume 2, includes the appendices to the Final Environmental Impact Statement (FEIS) of the Portland-Milwaukie Light Rail Project – except Appendix P, Public Comments and Responses, printed as a separate Volume 3.

Volume 1 includes: Executive Summary; Purpose and Need; Alternatives; Environmental Analysis and Consequences; Transportation; Financial Analysis and Evaluation of Alternatives; Community Participation, Agency Coordination, and Required Permits; and Public Comment Summary

Project Abstract:

TriMet proposes to construct and operate 7.3 miles of light rail transit and related facilities between downtown Portland, Oregon, the City of Milwaukie, and north Clackamas County. The Portland-Milwaukie Light Rail Project Final Environmental Impact Statement (FEIS) updates information contained in the Portland-Milwaukie Light Rail Project Supplemental Draft Environmental Impact Statement (SDEIS). It also considers findings from the South Corridor SDEIS published in December 2002, and the South/North Corridor Project Draft Environmental Impact Statement published in February 1998. This FEIS also examines a No-Build Alternative, which is compared to the project’s Locally Preferred Alternative (LPA) and its related facilities and options, includes a new Willamette River bridge, a maintenance base expansion, bus and streetcar connections, up to 11 stations and two park-and-rides, modified roadway improvements, and an interim terminus. The LPA was identified in 2008 by the Metro Council after the publication of the South Corridor SDEIS, and its 45-day public review and comment period. The FEIS analysis and mitigation address long-term, short-term, and cumulative effects on transit service, ridership, accessibility, traffic, regional and local roadways, freight movements, acquisitions and displacements, land use, economics, neighborhoods, visual and aesthetic resources, ecosystems, water quality and hydrology, geology and seismology, air quality, hazardous materials, noise and vibration, energy, hazardous materials, parklands, safety and security, utilities, historic and cultural resources, and public services. The analysis also considers the financial feasibility of the LPA and its options.

Following the publication of this FEIS, the Federal Transit Administration (FTA) will issue a Record of Decision.
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APPENDIX A. AGENCY COORDINATION AND CORRESPONDENCE

This appendix lists coordination and correspondence with tribal representatives, and federal, state, and local agencies.

A.1 AGENCY AND TRIBAL COORDINATION

A.1.1 Agency Coordination

Cooperating agencies are those agencies that have jurisdiction or special expertise with respect to some aspect of a project and that have agreed to formally coordinate. Cooperating agencies at the federal level for the Portland-Milwaukie Light Rail Project included:

- U.S. Coast Guard
- U.S. Army Corps of Engineers, Portland District
- Federal Highway Administration

Each of these agencies, as well as the Environmental Protection Agency and the Federal Rail Administration, were provided an administrative review draft of this FEIS in advance of publication for review and comment. Comments were provided and incorporated into this document.

In addition, there were coordinating meetings held to address various issues relating to the project and agency responsibilities. The following is a list of meetings held with other key agencies.

Natural Resource Tours (which focused on waterways, wetland and threatened and endangered species. These tours included local jurisdiction representatives, as well as federal and state agency representatives from National Marine Fisheries Service, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, Oregon Department of Environmental Quality, Oregon Department of Fish and Wildlife, and Oregon Department of State Lands)

June 17, 2009; July 15, 2009

National Marine Fisheries Service Meetings

September 23, 2008; November 4, 2008; December 8, 2008; December 15, 2008; June 1, 2009; August 18, 2009; February 3, 2010; March 11, 2010; March 22, 2010; May 10, 2010

U.S. Army Corps of Engineers

September 30, 2008; April 27, 2010

Portland Streamlining Committee (which includes federal and state agency representatives from National Marine Fisheries Service, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, Oregon Department of Fish and Wildlife, Oregon Department of Transportation, and Oregon Department of State Lands)

February 3, 2010; May 10, 2010

Environmental Protection Agency Meetings

September 3, 2008; December 9, 2008; April 2, 2009; May 5, 2009; August 18, 2009; November 22, 2009; December 9, 2009; March 17, 2010; April 29, 2010; May 28, 2010
A.1.2 Tribal Coordination

The following summarizes the project’s coordination with tribes.

1. June 2009 – sent invitation to attend Portland-Milwaukie Light Rail Project natural resource tour;

2. June 17, 2009 - held natural resource tour (attended by Mike Karnosh, Grand Ronde Tribe);

3. June 26, 2009 - email received from Mike Karnosh, Grand Ronde Tribe, commenting on proposed native plant list;

4. July 29, 2009 - email received from Robert Kentta, Siletz Tribe, commenting on proposed native plant list;

5. September 1, 2009 – sent letters from FTA concerning Area of Potential Effect and archaeological methods (attached);

6. October 20, 2009 - made calls to all tribes about timing and location of shovel testing, with the following comments:
   - Chinook Tribe, Tony Johnson. Mr. Johnson had no comment on the methodology. Since the majority of the work is being done outside of their general tribal area of concern he is deferring his involvement to the Grand Ronde tribe.
   - Confederated Tribes of Warm Springs Tribe, Bobby Brunoe. Mr. Brunoe Requested a copy of the letter, reconnaissance report and the SDEIS. For cultural information he mentioned we need to speak to Sally Bird. Called Sally Bird and left message.
   - Siletz Tribe, Robert Kentta. Mr. Kentta stated that at this time the Tribe has no outstanding concerns about the shovel testing. They do want to make sure with the archeological permit that if anything is found that they be contacted.
   - Confederated Tribes of the Grand Ronde, Mr. Eirik Thorsgard asked for a copy of the letter and reconnaissance report, and these were emailed to him.
   - Other tribes were left voice messages.

7. October 20, 2009 – sent email to Grand Ronde with electronic copy of the reconnaissance report;

8. October 20, 2009 - sent information to Warm Springs (shovel testing methodology, the reconnaissance report, and an electronic copy of the Portland-Milwaukie Light Rail Project SDEIS);
9. December 28, 2009 - sent letters from FTA concerning availability of the Biological Assessment (attached);

10. February 17, 2010 - sent letters from Metro about draft Memorandum of Agreement and inviting tribes to February 26, 2010 meeting to discuss with FTA, SHPO, local project partners (attached);

11. February 26, 2010 - held meeting with SHPO concerning draft MOA, attended by Eirik Thorsgard, Confederated Tribes of the Grand Ronde and Dave Burlingame (via phone) of the Cowlitz Tribe. The two tribal representatives concluded that there was not a need for their tribes to be sign the MOA, but that they wanted to be notified when excavation occurred for monitoring;

12. April 15, 2010 – sent letters from FTA including an attached bound paper copy of administrative draft of the project FEIS sent to tribal chairs with copies of letter and compact disk of CDs sent to tribal natural resource and cultural resource managers (attached);

13. May 7, 2010 – sent email to natural resource and cultural resource managers noting draft FEIS and requesting comments; and

14. May 7, 2010 – email received from Michael Karnosh, Confederated Tribes of the Grand Ronde, noting that his tribe had made comments earlier (see February 26, 2010 notation and June 26, 2009 notation) and had no further comments.

A.2 AGENCY AND TRIBAL CORRESPONDENCE

Below is a list of state and federal agency letters relating to coordination for the Portland-Milwaukie Light Rail Project. The following pages contain copies of this correspondence or indicate where in the FEIS the correspondence is included.

1. U.S. Department of Transportation – February 29, 2008, Air Quality Conformity Determination for the 2035 Regional Transportation Plan (RTP) and Metropolitan Transportation Improvement Program (MTIP).

2. Oregon State Historic Preservation Office – April 25, 2008, letter to Metro conditionally approving survey project contingent on successful resolution of adverse effects to 17 properties.

3. U.S. Environmental Protection Agency – June 23, 2008, letter stating that in their review of the SDEIS, the agency had environmental concerns because of insufficient information (an April 15, 2010, response letter from FTA is also included).


7. Oregon Parks and Recreation Department, State Historic Preservation Office – February 5, 2010, cover form stating SHPO concurrence concerning historic resources, eligibility and no adverse effect.

8. Advisory Council on Historic Preservation (ACHP) – March 3, 2010 letter indicating that their regulations do not apply to this project.


10. Oregon Natural Heritage Information Center (ORNHIC)—April 9, 2010 letter citing the provided information concerning rare, threatened, and endangered plant and animal records.

11. U.S. Coast Guard - April 29, 2010 letter to FTA concluding that the FEIS is adequate for NEPA purposes for their upcoming Willamette River bridge permitting process.

12. Memorandum of Agreement (MOA) between SHPO, FTA and TriMet concerning historic properties (Appendix N).


In addition, copies of correspondence for Section 4(f) properties are provided as attachments to Appendix K.
Mr. David Bragdon  
President  
Metro Council  
600 N.E. Grand Avenue  
Portland, Oregon 97232-2736

RE: Conformity Determination for the 2035 Regional Transportation Plan (RTP) and  
Re-determination for the 2008-2011 Metropolitan Transportation Improvement Program  
(MTIP)

Dear Mr. Bragdon:

The Portland metropolitan area is designated maintenance for carbon monoxide. On  
January 24, 2008, the Environmental Protection Agency (EPA) published a Federal Register  
otice approving Portland’s second carbon monoxide maintenance plan, with an effective date of  
February 23, 2008.

The Clean Air Act of 1990, as amended, requires that transportation plans, programs and projects  
cannot create new National Ambient Air Quality Standards (NAAQS) violations, increase the  
frequency or severity of existing NAAQS violations or delay attainment of the NAAQS. The  
Metropolitan Planning Organization (MPO) and the U.S. Department of Transportation (Federal  
Highway Administration (FHWA) and Federal Transit Administration (FTA)) are required to  
make a transportation conformity determination in non-attainment and maintenance areas as  
outlined in 40 CFR Part 93.104, Frequency of Conformity Determinations. Transportation  
conformity ensures that Federal funding and approval are given to those transportation activities  
that are consistent with air quality goals, and do not worsen air quality or interfere with the  
purpose of the State Implementation Plan (SIP).

FHWA and FTA have completed our review of the Metro conformity determination for the 2035  
RTP and the re-determination for the 2008-2011 MTIP. A joint FHWA and FTA air quality  
conformity determination for the RTP, and a re-determination of the TIP is required by Section  
93.104 of the EPA’s Transportation Conformity Rule, 23 C.F.R. Parts 51 and 93, and the  
FHWA-FTA Metropolitan Planning Rule, 23 C.F.R. Part 450, as well as Oregon Administrative  
Rule (OAR) 340-252-0050. Our USDOT conformity determination is based upon the Metro  
conformity determination analysis and documentation submitted to our offices by your  
The Metro Council adopted the 2035 RTP and associated air quality conformity determination on February 28, 2008, through Resolution 08-3911. The conformity analysis provided by Metro indicates that all air quality conformity requirements have been met. Based on our review, we find that the 2035 RTP and the 2008-2011 TIP conforms to the SIP in accordance with the Transportation Conformity Rule and the Oregon conformity SIP. The federal conformity determination does not change the frequency requirement for new TIPs. This federal conformity determination was made after consultation with EPA Region 10, pursuant to the Transportation Conformity Rule.

This letter constitutes the joint FHWA and FTA air quality conformity determination for Metro's 2035 RTP and the re-determination of the 2008-2011 MTIP. If you have any questions regarding this conformity determination, please contact Michelle Erbaut, FHWA at (503) 187-4716 or Ned Conroy, FTA, at (206) 220-4318.

Sincerely,

Phillip A. Dittler
Division Administrator
Federal Highway Administration

R. F. Krochalis
Regional Administrator
Federal Transit Administration

cc:
EPA (Wayne Elson)
FTA (Ned Conroy)
ODOT (Jason Tell, Region 1 Manager)
    (Ryan Windsheimer, Region 1 Planning Manager)
    (Steve Leep, Program and Funding Services Manager)
    (Marina Orlando, Environmental Services)
Metro (Andy Cotugno)
    (Ted Leybold)
    (Mark Patiel)
ODEQ (Dave Nordberg)
April 25, 2008

Ms. Bridget Wieghart
Portland Metro
600 NE Grand Avenue
Portland, OR 97232-2736

RE: SHPO Concurrence
South Corridor Portland-Milwaukie Light Rail Project
Multiple Sites, Portland/Milwaukie, Multnomah/Clackamas

Dear Ms. Wieghart,

The State Historic Preservation Office (SHPO) has reviewed the materials submitted on the project referenced above. SHPO conditionally approves the survey project contingent upon successful resolution of any adverse effects noted on the 17 National Register eligible properties listed below and on the attached Cover Sheet. Also, we concur with the effect determinations of the following properties, also listed below and on the attached Cover Sheet:

- 2300 SE Harrison, Milwaukie Middle School, No Adverse Effect
- 2405 SE Harrison, Residence, No Adverse Effect
- 2326 SE Monroe St., Spanish Revival Residence, No Adverse Effect
- 2001 SE Holgate, Brooklyn Yard, No Adverse Effect
- 11205 SE McLoughlin Blvd., Kellogg Lake Outlet, No Effect
- 12006 SE McLoughlin Blvd., Birkemeyer-Sweetland Home, No Effect
- 2505 SE 11th Ave., Ford Motor Assembly Plant, No Effect
- 4784 SE 17th Ave., Iron Fireman Building, No Effect
- 2425 SE Bybee Blvd., Eastmoreland Golf Course, No Effect
- 7605 SE McLoughlin Blvd., Westmoreland Park, No Effect
- 1200 Naito Parkway, Hawthorne Bridge, No Effect
- 600 SE Powell Blvd., Ross Island Bridge, No Effect
- 9002 SE McLoughlin Blvd., ODOT Region Office, Adverse Effect with possible design refinements or mitigation options to reduce effect
- 2206 SE Washington, R. Derwey House, Adverse Effect with possible design refinements or mitigation options to reduce effect
- 2425 SE 8th Ave., Royal Foods, Adverse Effect, with possible design refinements or mitigation options to reduce effect
- 11200 SE McLoughlin Blvd., Oregon Pacific & Union Pacific Railroad/Trestle, No Adverse Effect to Railroad track/grade; Adverse Effect to Trestle with possible design refinements or mitigation options to reduce effect
- 2000 SW 5th Ave., Portland State School Building, No Adverse Effect (NP, however, due to acquisition of property, included for review)

Our response here is to assist you with your responsibilities under Section 106 of the National Historic Preservation Act (36 CFR Part 800). Please feel free to contact me if you have questions.

Sincerely,

[Signature]

Stephen P. Poyser, PhD
Sec. 106 Review & Compliance/Preservation Planner
503.986.0686 or stephen.poyser@state.or.us
Oregon Cover Sheet

for

Reconnaissance Level Surveys and 106 Compliance

Submit this Cover Sheet to SHPO along with all survey materials (see checklist below).

Survey Project Name: Portland - Milwaukie LRT
City: Portland
Survey Type: Selective Baseline
Survey Sponsor: Parametrix
Surveyor Name: Julie Osborne/Kimberli Fitzgerald
County: Multnomah

Acreage Surveyed: 110
# Contributing Properties: 17
# Non-contributing Properties: 64

The area surveyed is bounded on the west by SW 8th Ave and spans southeastward to Milwaukie along either side (north/south) of McLoughlin Blvd.

Survey Boundaries

Survey Summary

The selection of inventoried properties within the APE (one-half block within the Portland grid system, and 150 on either side of the alignment outside the grid system) was based on several factors: (1) It was to build on the information prepared for the 2002 SDEIS; (2) it included all properties along the transit line that will be affected to provide context for the resources that are potentially eligible; (3) and it included assessing properties built between 1957 and 1967 that may become eligible when they reach the 50-year age criterion.

106 Effect:
The effects to eligible historic resources are included in the database comments. Summarized they are:
- 2300 SE Harrison, Milwaukie Middle School, No Adverse Effect
- 2408 SE Morrison, Residence, No Adverse Effect
- 2326 SE Monroe St., Spanish Revival Residence, No Adverse Effect
- 2001 SE Holgate, Brooklyn Yard, No Adverse Effect
- 711205 SE McLoughlin Blvd., Kellogg Lake Outlet, No Effect
- 12005 SE McLoughlin Blvd., Birkemeier-Sweetland Home, No Effect
- 900 SE 11th Ave., Ford Motor Assembly Plant, No Effect
- 4784 SE 17th Ave., Iron Fireman Building, No Effect
- 2425 SE Bybee Blvd., Eastmoreland Golf Course, No Effect
- 765 SE McLoughlin Blvd., Westmoreland Park, No Effect
- 1200 Naito Parkway, Hawthorne Bridge, No Effect
- 600 SE Powell Blvd., Ross Island Bridge, No Effect
- 9002 SE McLoughlin Blvd., ODOT Region Office, Adverse Effect with possible design refinements or mitigation options to reduce effect
- 2205 SE Washington, R. Dervey House, Adverse Effect with possible design refinements or mitigation options to reduce effect
- 2426 SE 8th Ave., Royal Foods, Adverse Effect, with possible design refinements or mitigation options to reduce effect
- 711200 SE McLoughlin Blvd., Oregon Pacific & Union Pacific Railroad/Trestle, No Adverse Effect to Railroad track/grade; Adverse Effect to Trestle with possible design refinements or mitigation options to reduce effect
- 2000 SW 8th Ave., Portland State School Building, No Adverse Effect (NP, however, due to acquisition of property, included for review)

To Be Completed by SHPO Staff

SHPO Evaluation of Survey Project

Approved

\checkmark Conditionally Approved

\_ Returned for Corrections

SHPO Comment on Effect Determinations

\checkmark Concur

\_ Do Not Concur

\_ Return for Additional Data

SHPO Staff Signature:

Date: 4/22/08

Checklist of Required Items:

1. ___ *Research Design Completed Prior to Survey
2. ___ Property Marked Survey Map
3. ___ Copy of USGS Map Showing Location of Surveyed Area
4. ___ Completed Survey Forms (Field Forms)
5. ___ Survey Data Submitted in Electronic Format
6. ___ Properly Labeled Photos
7. ___ *Final Report, including outline of historic contexts and recommendations for future action
8. ___ Completed "Cover Sheet"
9. ___ Duplicates of everything: one for SHPO and one for the contracting community or agency.

Oregon State Historic Preservation Office, 725 Summer Street NE, Suite C, Salem OR 97301
Linda Gehlke, Deputy Regional Administrator
Federal Transit Administration
Jackson Federal Building, Suite 3142
915 Second Ave.
Seattle, WA 98174

June 23, 2008

Dear Ms. Gehlke,

The EPA has reviewed the Fourth Draft Supplemental Environmental Impact Statement (SDEIS) for the proposed South Corridor Portland-Milwaukee Light Rail Project (CEQ No. 20030180) in accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. Section 309 specifically directs EPA to review and comment on the environmental impacts associated with all major federal actions. Under our policies and procedures, we also evaluate the document's adequacy in meeting NEPA requirements.

The SDEIS evaluates potential environmental impacts of a proposal to develop a light rail transit system connecting downtown Portland, the City of Milwaukee, and North Clackamas and Multnomah Counties, OR, and Clark County, WA. Because of higher concentrations of population and facilities (public and private) within the project corridor, there is need to provide a dependable way for people to travel conveniently, safely, and economically in the area. When complete, the project will improve the quality of service and help to meet significant travel needs expected within the project corridor due to projected high population and employment growth in the near future. In South Portland area, for example, there will be 221% change in forecasted households from 2005 to 2030 (p. 1-11), and the percent change in employment will be 59% over the same period.

In analyzing the impacts of the Light Rail project, the Federal Transit Administration (FTA) and its partners, Metro and Tri-County Metropolitan Transportation District of Oregon, considered a No-Build Alternative and Light Rail Alternatives based on the Locally Preferred Alternative (LPA) that was identified in the 2003 SDEIS. In addition to the LPA, FTA developed two alternatives for Light Rail corridor alignments (Fig. 2-1-3), four Willamette River crossing alternatives (Fig. 2-1-2), and three bridge designs (Fig. 2-1-3). Data presented in the document and resulting public comments will be used to identify a Preferred Alternative for the proposed Portland-Milwaukee Light Rail project.
In general, EPA supports mass transit services that reduce pollution, conserve energy, and minimize environmental degradation, while ensuring safety and security, so we are generally supportive of the project. However, we have concerns about aspects that have potential to further degrade water quality, impact fisheries, and disturb and release pollutants from hazardous material sites and sites with contaminated sediments. We recommend selection of a bridge design with as few years as possible to minimize disturbance of potentially contaminated sediment and minimize the impact to fisheries. We encourage FTA and project partners to continue to work with the Oregon Department of Environmental Quality (ODEQ) to obtain the Clean Water Act Section 401 Certificate and assure that the state of Oregon water quality standards are met. FTA should also coordinate with ODEQ as contaminated sites in the project areas are identified and remedial actions are developed and implemented. Detailed comments are attached.

Because of concerns about water quality, hazardous materials and sites, and missing or unclear information, we have assigned a rating of EC-2 (Environmental Concerns - Insufficient Information) to the draft EIS. This rating and a summary of our comments will be published in the Federal Register. For your reference, a copy of our rating system used in conducting our review is enclosed.

EPA thanks FTA for working with a variety of stakeholders, coordinating with affected Tribes, establishing and working with a Citizen Advisory Committee for the project, and considering other public comments in developing and analyzing the impacts of the proposed project.

If you have questions or would like to discuss our comments in detail, please feel free to contact Theo Mazzoliye at (206) 553-6322 or me at (206) 553-1801.

Sincerely,

Christine Reichert, Manager
NEPA Review Unit

Enclosure

cc:
EPA Oregon Operations Office
The US Coast Guard in Portland, OR
Oregon Department of Environmental Quality
EPA Detailed Comments on the Proposed
Portland-Milwaukie Light Rail Project

Water quality and hydrology

Water quality degradation is one of EPA's primary concerns. Section 303(d) of the
Clean Water Act (CWA) requires States and Tribes with approved standards to identify water
bodies that do not meet water quality standards and to develop water quality restoration plans
to meet established water quality criteria and associated beneficial uses. The SDEIS indicates that
the project would cross up to eight waterways, including the Willamette River, Kellogg Lake
and, depending on the alignment option selected, six more creeks (p 3-121). Most of these
waterways are on the state of Oregon, most current EPA-approved 303(d) list of impaired
waterbodies due to their exceedances of water quality criteria such as temperature, mercury, and
bacteria. Nearly all the waterways in the project corridor support populations of anadromous and
residential fish species, some of which are listed as threatened under the Endangered Species Act
or are species of concern. For example, the Willamette River and Kellogg Lake creeks support both
Coho salmon and Steelhead, which are listed as threatened by the federal government and as
endangered by the state.

The project is expected to result in an increase of about 31-34 acres of impervious
surfaces and almost 2-3 acres of potential flowpath fill. Such an increase could result in greater
stormwater volumes and higher pollutant loading to 303(d)-listed streams. The project would
also create in-water new structures (piers and bridge footings). We are concerned that
construction of these structures could disturb and re-suspend contaminated sediment. We are
also concerned that the structures, once constructed, could serve as cover for predators of listed
fish species, thereby exacerbating threats to those species.

Recommendations

1. We encourage FTA to select options to minimize the extent of impervious surfaces and
consider use of Low Impact Development (LID) techniques that reduce the
volume of stormwater and mimic natural conditions as closely as possible
Information about LID practices can be found at
http://www.epa.gov/Stormwater/Tools/low_impact_development.pmd
and
http://www.epa.gov/Stormwater/Low_Impact_Development.html

2. We recommend selection of a bridge design with as few piles as possible to minimize
disturbance of potentially contaminated sediments and minimize the impact to
fisheries.

The final EIS should also include information about the status of the Clean Water Act
Section 401 Certification process, and if possible, specific requirements to meet state water
quality standards and Water Quality Monitoring Plan to address water quality problems. FTA
should also coordinate with ODEQ as the TVC1 for the Willamette River is implemented and
other plans to restore water quality in other water quality limited waterbodies are also developed
and implemented.
Hazardous Materials

The SDEIS indicates that construction of the Light Rail project may encounter 83-95 contaminated sites within the project corridor, of which 35-42 would be of high concern. During construction, petroleum products may be accidentally spilled to the ground and contaminate soils and groundwater. Paint, acids, solvents, asphalts, and other chemical pollutants may also be used at construction sites and be carried in stormwater runoff. Removal of structures containing contaminants such as lead, polychlorinated biphenyls (PCBs), and asbestos may also be necessary. Construction of river and stream crossings has the potential to stir up in-water sediments and riverbank soils contaminated with metals, PCBs, and polycyclic aromatic hydrocarbons. EPA is concerned about the project potential to mobilize contaminants currently in soils and sediments, impeding ongoing and planned remedial actions for the contaminated sites. As a result, the project would possibly exacerbate water quality problems within listed waterbodies, resulting in impacts to aquatic life and fish.

Recommendations:

1. FTA should coordinate with ODEQ as contaminated sites are identified; and cleanup plans are developed and implemented to minimize impacts resulting from possible release of hazardous materials in the environment and disturbance of contaminated sites.

2. The final EIS should include detailed information regarding specific measures that will be taken to reduce impacts of potential release of hazardous materials in the environment and disturbance of contaminated sites by the project. As an example, the final EIS should include information addressing Spill Prevention, Control, and Countermeasure (SPCC) plans for the project.

Monitoring

The proposed project has the potential to impact a variety of resources for an extended period of time. As a result, we recommend that the project be designed to include an environmental inspection and mitigation monitoring program to ensure compliance with all mitigation measures and assess their effectiveness. The EIS document should describe the monitoring program and how it will be used as an effective feedback mechanism so that any needed adjustments can be made to the project to meet environmental objectives during the project operation and maintenance.
April 15, 2010

Ms. Christine Reichgott, Manager
United States Environmental Protection Agency
Region 16
1230 Sixth Avenue, Suite 930
Seattle, WA 98101-3149

Re: EPTA 088; Ref: 98-028-FTPA (Portland to Milwaukie Light Rail Transit Project)

Dear Ms. Reichgott,

Thank you for your letter dated June 23, 2008 that provided the Federal Transit Administration with your comments on the Draft Supplemented Environmental Impact Statement for the South Corridor Portland-Milwaukie Light Rail Project.

Since receiving your letter, the Project has completed sufficient engineering and analysis in order to address your comments and concerns. Attached is a more detailed response to your concerns. Briefly, however, we believe that the Project has been responsive in the following ways:

- **Water Quality:** The Project design minimizes impact areas and will use the standards of the 2008 City of Portland Stormwater Manual throughout the full extent of the Project. These are the best water quality standards in the region.
- **Impact and In-brow:** The Project design was revised to minimize its impacts to fish including Willamette River bridges, alignment, reduction in the number of in-water piles and revised construction methods. Other water crossing impacts were also reduced.
- **Hazardous Material:** The Project has designed methods to address the existing contaminated sediments in the Willamette River so as not to disturb them. In addition, the Project has designed the hazardous material handling requirements that will be followed during construction and transit operation. The Project has also coordinated with the Oregon DEQ as recommended by EPA.
- **Monitoring:** The Project has agreed to include a number of monitoring activities to address compliance with mitigation measures, in-water noise, vibration levels, monitoring of emissions that may be in proximity to potential cultural resources and monitoring of riparian planting and barrier installation and spill prevention programs.

Further, we have enclosed a copy of the administrative review draft of the South Corridor Portland Milwaukie Light Rail Project Final Environmental Impact Statement.
We would appreciate your review of this draft FEIS and welcome any further comments that you may have about this document and project. We request you provide any additional comments by April 30, 2010. If you are unable to complete your review within this timeframe, please provide a date when we can anticipate comments. If you have any questions, please contact James (Steve) Saxton at 206-220-4311, or via email at james.saxton@dot.gov.

Please do not hesitate to contact Steve Saxton at FTA at 206-220-4311 if you have any questions.

Thank you.

Sincerely,

Steve Saxton
Deputy Regional Administrator

cc: Steve Saxton, FTA
    Bridget Wiegand, Memo
    Dave Urschel, Trillium
Attachment 1 of 1 for FTA letter to EPA

April 12, 2018

Detailed Response of the Federal Transit Administration, Region X, to the June 23, 2016 EPA comments concerning the Supplemental Draft Environmental Impact Statement for the Portland-Milwaukie Light Rail

Water Quality

The first Project approach to stormwater runoff was to limit the amount of additional impervious surfaces. Wherever tie and ballast system design could be used (outside of structures and some urban areas where local officials urged, for urban design reasons, paved track design), the LRT track is pervious and allows stormwater to percolate into the ground. Similarly, where park and ride lots are needed, structured parking which reduces the amount of impervious surface to number of parking spaces was used in all instances.

For those elements of the project where impervious surfaces are required, the Project is applying the City of Portland Stormwater Manual (2008) as a standard for treating all stormwater runoff from the project (in Ruby Junction the City of Gresham stormwater requirements are used and those requirements are equal to City of Portland requirements.) Accordingly, the Project will treat stormwater runoff from the paved track and structures, including bridges, directing water to bioswales and other stormwater treatment designs prior to connection to municipal stormwater facilities sealing into water bodies.

In addition, the Project will submit an application for a Clean Water Act Section 401 Certificate to demonstrate Project compliance with the Clean Water Act and related regulations and standards.

Impact to Fisheries

The potential impact of the project to fisheries was addressed in a number of ways and is addressed according to the seven water body crossings.

Willamette River Bridges

Extensive Project revisions were made to address potential impacts to fish. These included:

- Reduced the number of in water piers from as many as four to the final design which has two in-water piers;
- Revised the bridge design by relocating the west piers to reduce the impact on scarce shallow water habitat;
- Revised the in-water construction periods to conform with Oregon Department of Fish and Wildlife in-water work window eliminating all in-water work other than during the period July 1 to October 31 of any year so that fish passage, rearing and other fish activities are not disturbed;
- Reconfigured construction method, to use caissons with sheet piling situated rather than pile driven into place (though rooming with bubble curtains would be needed) and
drilled shafts, rather than placing shafts that are pile driven to greatly reduce underwater noise and vibrations that can be injurious to fish and other aquatic species.

- Provided shoreline restoration with native plantings from the ordinary low water point landward to points between 45 and 100 feet land side of the top of bank.
- Designed mitigation to place sand and cobble to improve fish habitat and reduce the impact of pile and caisson drive spall. Protection intended to secure existing hazardous materials on the river bottom.
- Removed derelict remnant pilings that leak contaminants and which can provide fish predator cover.
- Agreed to adhere to best management practices, including SLOPES IV, to minimize the chance of contaminant spills or other adverse impacts to water or habitat important to fish.

Crystal Springs Creek
In order to avoid disturbance of existing conditions on this Creek, the project was designed to bridge this Creek - that is currently within a culvert. This design would allow future culvert removal or rebuilding to more fish friendly design. Nearby wetlands that will be impacted by the project are mitigated through offsite wetland restoration of equal value.

Johnson Creek
In association with this crossing, the project has redesigned the crossing by bridge the Creek so that there is no in-water work as well as to narrow the footprint of the structure crossing the Creeks as well as determined that floodplain enhancement and wetland streambank restoration will be provided.

Crystal Creek
The Project will replant areas disturbed during construction with native plantings that provide shade. Habitat for species that fish feed on and which improve water quality thereby improving fish habitat.

Spring Creek
The Project has designed the crossing of the culvert containing Spring Creek so that disturbance of fish passage and all the existing culvert is keep to a minimum.

Sockeye Lake
The Project has created a design which limits in-water work to one set of in-water piers and will include streambank restoration to improve the fish habitat.

Cottage Creek
Because the Creek has been directed into a culvert about 50 feet below existing grade, the Project has limited ability to improve fish habitat with this crossing. However, stormwater generated from the Project at this site, including the park and road structure as well as stormwater from adjacent properties and streets will be directed to an on-site stormwater bio-dike that will be planted with native plants and which will slow water flows, reduce contaminants in the water and end the water pollution actions that help promote better fish habitat.
Hazardous Materials/Contaminated Sediments
Overall Approach

In regard to the EPA concerns noted in this paragraph about hazardous materials, the project investigated earlier samples as well as completed additional samplings at the Willamette River bottom. These samples indicated that there are sites with varying contaminants and varying levels of contamination in the vicinity of the Project. The PMLR project design recognizes these existing conditions and has designed its structure and construction methods to contain these hazardous materials in place. Prior to construction, geotechnical borings were completed in the Willamette River. In order to address disturbing hazardous materials, boring holes will be sealed with bentonite approximately five feet below the mudline.

Further, the temporary work bridge on the west bank has been redesigned to span the hazardous material containment area to be constructed by the property owner (Zidell). This design reduces the number of temporary piers. In addition, the Project will be placing a layer of one foot of sand over this area as well as over the location of the west bank temporary work bridge so that settling the temporary piers does not disturb existing sediments and contaminants (called the Sediment Management Area by Oregon Department of Environmental Quality).

For the permanent piers, a design was selected that reduced the number of in-water piers from as many as four to the final design which has only two in-water piers. Further, one foot layer of sand will be laid on the river bottom to contain any hazardous materials and then a cofferdam composed of vibrated in sheet piles will be constructed. A scour analysis was completed assessing the potential river bottom scour that could occur as a result of placing the cofferdam and permanent piers. Scour protection for the piers (placed on top of the sand layer) was designed to protect against the 500-year flood event for the permanent piers and the ten year event for the temporary structure to ensure that existing hazardous materials are not re-suspended into the water or otherwise transported as a result of Project actions.

On the west bank land side, the Project has coordinated with Oregon Department of Environmental Quality as well as the property owner (Zidell), who is under court order to complete site remediation as well as other contaminated sites that the Project will construct upon. The PMLR project redesigned the IRT alignment to avoid more of the identified hazardous material sites and will conduct its construction consistent with the knowledge of hazardous materials and best management practices. (See specific hazardous material handling response)

The SDFIS and Water Quality & Hydrology Results Report discuss the 303(d) listings and the species known or suspected to occur at the streams affected by the project. Locally Preferred Alternatives would cross the Willamette River, Kellogg Lake and five additional waterways. The Minimum Operable Segment would not cross Kellogg Lake or Courtyard Spring Creek. The project would also expand the Ruby Junction Operations and Maintenance Facility in Oregon and the 100-year floodplain of Fairview Creek. Stormwater treatment for the LRT alignment is following City of Portland requirements, which should address increased stormwater volumes and pollutant loadings into project area streams. Where feasible, low-impact development (LID) is being integrated into the design. The Willamette River bridge and the Kellogg Lake bridge will have piers installed in the water column. The number and size of the piers have been reduced to cost practicable while still providing structural integrity.
Investigations into effects to known in-water contaminants are still being conducted. Further information on effects and minimization measures are discussed in Section 3.6 Ecosystems of the FEIS and the Biological Assessment for the project.

The FEIS provides an update on the permitting requirements and processes, including the Section 401 WQ certification. Communication with DEQ water quality staff has occurred during the preliminary design and NEPA stages, and will continue to occur through advanced design, NEPA, and permitting efforts.

Technical Responses: Accidental Spills, Removal of Structures, River and Stream Crossings

Regarding accidental spills and stormwater runoff during construction, the PMLR project team acknowledges that project construction activities can have an adverse effect on environmental media such as soil, sediment, surface water, and groundwater from the release of hazardous substances and petroleum products. Construction activities will be conducted in a manner that is consistent with State of Oregon Revised Statutes (ORS) Chapter 466, the City of Portland Charter and Code (CPC) Chapters 71 and 21, and other relevant or applicable rules or regulations. Actions would include preparing the site-specific spill control and prevention plans (SCPP), construction stormwater control and pollution prevention plan (SWPPP), health and safety plans (HASP), and implementing best management practices (BMPs).

Regarding removal of structures, buildings and structures that have lead or asbestos containing materials (ACMs) will need to have proper abatement conducted prior to any demolition, renovation, or repair activities. Abatement must follow state guidelines and be conducted by licensed abatement firms (Oregon Administrative Rules [OAR] 226). Abatement materials must be properly disposed of at authorized solid waste facilities. In general, buildings and structures that were built prior to 1980 have a higher likelihood of containing asbestos. EPA issued a ban and phase out rule of asbestos in 1989.

Regarding river and stream crossing impacts, the PMLR project team recognizes that potential adverse impacts to the environment could occur from the installation of the Willamette River Crossing. The project team has been and continues to discuss these issues with Keith Johnson at Oregon Department of Environmental Quality (ODEQ), the City of Portland, and other potentially responsible parties (PRPs) including Zidell Realty Company (ZRC) (ESCNo 698), Portland General Electric (PGE) Station L (ESCNo 51) and Oregon Health and Science University (OHSU) Former Schrader Property (ESCNo 375) that are undergoing cleanup. This discussion will help in the determination of avoidance, minimization and mitigation strategies. These strategies will be developed as the remedial actions at these sites are finalized and the preliminary design for the crossing is completed.

EPA Recommendations

EPA recommends that EPA should coordinate with ODEQ as contaminated sites are identified, and clean up plans are developed and implemented to minimize impacts resulting from possible release of hazardous materials in the environment and disturbance of contaminated sites.
The PMLR project team has coordinated with ODEQ, especially on the existing hazardous materials located on the Zidell property and on the Willamette River bottom, as well as the hazardous waste users and known contaminated sites along the alignment. The Project will continue to coordinate through Project construction, and believes this will result in further protection to the environment and potential savings to the project in terms of costs and schedule.

EPA Recommendation: The final EIS should include detailed information regarding specific measures that will be taken to reduce impacts of potential releases of hazardous materials in the environment and disturbances of contaminated sites by the project.

The PMLR project team agrees with EPA's recommendation. The EIS contains a number of detailed avoidance, minimization and mitigation strategies to reduce adverse effects to the environment noted in Chapter 3.13. These include, but are not limited to a contaminated media management plan (CMMP), phase 1 and phase 2 environmental site assessments, SCPP, SWCSP, HASP, and NROES permitting.

Monitoring
Following are the monitoring activities that the PMLR Project will be completing:

- The Federal Transit Administration will be monitoring compliance with the list of project mitigation measures so that all mitigation is completed prior to commencement of Project operation;
- The Project has agreed to monitor both land and limited in-water site profiling for underwater noise and vibration levels and to promptly report to the National Marine Fisheries Service;
- The Project has an Inadvertent Discovery agreement with the State Office of Historic Preservation so that if any underground historic or prehistoric resources are discovered there are agreed-upon procedures for next steps, including possible preservation;
- The Project has agreed to provide for Native American tribal monitoring of below ground excavation;
- The Project has agreed with the State Office of Historic Preservation through a Memorandum of Understanding, that the Project will coordinate with the SHPO or yet to be determined design details for treatments in the immediate vicinity of historic resources to ensure compatibility;
- The Project has agreed to monitor the health of all native plantings and streambank restoration areas for a period of five years to ensure that such plantings are well established;
- The Project has agreed to monitoring of all LRT bridges crossing water bodies to ensure that stormwater runoff systems and TriMet maintenance and operations methods successfully manage the potential for spills and surface water contamination.
From: "Yballe, Corrine P NWP <CorrineP.Yballe@usace.army.mil>
To: "Bridge Wagner <wagnerm@woody.et.usa> , "Mark Turel <turel-m@am>
CC: "Canfield, Sheryl A NWP <SherylA.Canfield@usace.army.mil>

Date: 02/23/2008 3:23 PM
Subject: FW, Comments for South Corridor of Portland-Milwaukie Light Rail Project

Good Afternoon,

Comments from Corps regulatory included in this e-mail. Thank you.

Corrine Yballe
CENWP-D-3
P.O. Box 2946
Portland, Oregon 97208-2946
Office: 503-406-4992
Fax: 503-406-1373

Original Message:
From: Holm, James A NWP
Sent Monday, June 23, 2008 3:29 PM
To: Yballe, Corrine P NWP
Subject: Comments for South Corridor of Portland-Milwaukie Light Rail Project

Mr. Yballe,

I am interested in the project because I am the Corps Regulatory Project Manager for Multnomah and Clackamas Counties and this project includes both of those counties. My first comment has to do with the configuration for another bridge across this section of the Willamette River. This would result in a fourth major river crossing in less than one mile. Surely, it is possible to be one of the existing three bridges to cross the water body.

My second comment is the height restriction on navigation of the Willamette River. Any new crossing for bridge roadway should not lower the height of vessels using the river. The new bridge elevation should be 120 feet or greater, as it is the Ross Island and Morrison Bridges.

Please feel free to contact me for clarification of the two comments.

James A. Holm
Project Manager, Regulatory Branch
U.S. Army Corps of Engineers - Portland District
333 S.W. 4th Avenue
Portland, OR 97204
Tel: 503-808-4388
Fax: 503-808-4373
james.a.holm@usace.army.mil

SDEIS Public Comment Report
April 15, 2010

Mr. James Holm, Project Manager
United States Army, Corps of Engineers
Portland District
133 Southwest First Avenue
Portland, Oregon 97204

Dear Mr. Holm,

Thank you for your email dated June 23, 2008 that provided the Federal Transit Administration with your comments on the Draft Supplemental Environmental Impact Statement for the South Corridor Portland-Milwaukie Light Rail Project.

We believe that the two comments that you raised have been addressed by the Project, in part through a meeting with you and Sheryl Carlin on September 30, 2008.

Your first comment concerned the justification of another bridge across the Willamette River. We provided documentation that use of existing bridges, including the Hawthorne Bridge, the Ross Island Bridge, and the Morrison Bridge, would result in substantially poorer travel service than a new bridge. (This information is included in Appendix I of the DEIS and FEIS, as well as work referenced in these appendices.) It is our understanding that after your consideration of this information that you concluded that this comment was addressed.

Your second comment was a concern that the bridge height should not lower the height of vessels using the River. There was discussion, including Project partners, with comments from the US Coast Guard. At the end of this discussion, it is our understanding that you concluded that you had been provided sufficient justification for the bridge height, especially given that the US Coast Guard would be conducting separate proceedings that would include bridge height permitting.

We have enclosed a copy of the administrative review draft of the South Corridor, Portland-Milwaukie Light Rail Project Final Environmental Impact Statement. We would appreciate your review of this draft FEIS and welcome any further comments that you may have about this document and project. If you are unable to complete your review within this timeframe, please provide a date when we can anticipate comments. If you have any questions, please contact James (Steve) Saxton at 206-220-4321, or via email at james.saxton@dot.gov.

Sincerely,

[Signature]

Lisa Botte
Deputy Regional Administrator

cc: Bridge Wightman, Metro
     Dave Hytch, TriMet

Enclosure
September 1, 2009

Dennis Griffin, Ph.D.
State Historic Preservation Office
725 Summer Street NE, Suite C
Salem, OR 97301-1271

Re: Portland to Milwaukee Light Rail Transit Project - Final EIS—Archaeological Study

Dear Dr. Griffin,

This letter is to inform you of current archaeological study for the proposed Portland-Milwaukee Light Rail Transit project. Metro has been assisting the Federal Transit Administration in completing an Environmental Impact Statement (EIS) for the proposed Portland-Milwaukee Light Rail project. Metro is the project’s local lead agency, working in cooperation with the Tri-County Metropolitan Transportation District (TriMet). The Supplemental Draft EIS, which was sent to your office in April 2008, examined a proposal to develop light rail transit between downtown Portland, the City of Milwaukee, and north Clackamas County. This SDEIS was prepared in compliance with the National Environmental Policy Act, and the cultural resource studies were also prepared in compliance with Section 106 of the National Historic Preservation Act. The purpose of the SDEIS was to present details of the proposed alternatives and their environmental and transportation performance to decision-makers and the public to help them identify a preferred alternative. Portions of the Portland-Milwaukee Light Rail Project have been studied as part of earlier transit projects, including the South Corridor Transit Study in 2002.

Additional archaeological tasks to complete the inventory phase of study for the preferred alternative will begin during the summer of 2009. Archaeological Investigations Northwest, Inc. (AINW), will be conducting the remaining tasks, and will provide a report of the archaeological study for your office to review. If public lands may need to be shovel tested, AINW will submit permit applications for those lands.

As noted in the SDEIS, the Area of Potential Effect (APE) that has been studied for cultural resources is one-half block on each side of the alignments within the defined street grid, 150 feet in each direction from the study alternatives outside of areas where there is a street grid; and is substantially larger at the proposed crossing of the Willamette River. The archaeological resources section of the SDEIS noted that portions of the alternatives were considered to have some likelihood of retaining archaeological sites. Those areas were noted as high or moderate probability areas; these areas will be surveyed and, if possible given the existing conditions, probed by shovel testing to determine whether significant archaeological resources are present.

A map is attached showing these areas identified for the additional work; they are noted as HPA-1 through HPA-8 and Moderate Area. In addition to a pedestrian survey and shovel testing...
(where feasible) along the probability areas, AIW will be monitoring geotechnical probes that are planned in the probability areas.

Shovel tests will be done following the State Historic Preservation Office (SHPO) guidelines, and will measure 30 to 50 cm (12 to 20 in) at the surface and will be excavated to a minimum depth of 50 cm (20 in). Auger tests may be used to extend shovel tests and will be a minimum of 15 cm (6 in) in diameter. Excavations will extend to a depth of two 10 cm (4 in) levels below intact archaeological deposits. Sediments will be excavated manually and screened through nested 6.4 and 3.2 millimeter (¼ and ¼ in) mesh hardware cloth. Artifacts from the shovel tests will be collected, if excavations are on public lands, and taken to the AIW laboratory for analysis and processing. The artifacts and records will subsequently be curated at the Oregon Museum of Natural and Cultural History (OMNCH) at the University of Oregon.

At the time the SDEIS was completed, no archaeological sites were recorded within the APE. Subsequent to that time, resources archeological investigations for a separate project, the Trolley Trail, have identified resources in at least one area near Milwaukie. The records of the SHPO will be checked to determine whether additional archaeological resources have been identified in the project APE since the time the SDEIS was completed.

Metro has been coordinating with the State Historic Preservation Office, Confederated Tribes of the Grand Ronde Community of Oregon, Confederated Tribes of the Siletz Indians, Confederated Tribes of Warm Springs Reservation, and Cowlitz and the Chinook Tribes and will continue to do so throughout the project. I have appreciated your interest and the time your office has spent attending meetings on the project and providing comments and information. I look forward to hearing from you regarding any questions, and I would be happy to meet with you and your staff to discuss the project, if you would like.

Sincerely,

[Signature]

R.J. Krochalski
Regional Administrator

Cc: Bridget Wioghan, Metro (electronic)
    David Unsworth, TriMet (electronic)
    Ross Kindley, AIW (electronic)

Enclosure
Figure 1. Project location with proposed light rail alignment, station area, full displacement parcel, and archaeological probability area locations.
September 1, 2009

Ms. Delores Pigsley, Tribal Council Chairman
The Confederated Tribes of Siletz Indians
P.O. Box 549
Siletz, OR 97380

Re: Portland to Milwaukee Light Rail Transit project - Final EIS—Archaeological Study

The Honorable Delores Pigsley:

This letter is to inform you of current archaeological study for the proposed Portland-Milwaukee Light Rail Transit project. Metro has been assisting the Federal Transit Administration in completing an Environmental Impact Statement (EIS) for the proposed Portland-Milwaukee Light Rail project. Metro is the project's lead agency, working in cooperation with the Tri-County Metropolitan Transportation District (TriMet). The Supplemental Draft EIS, which was sent to your office in April 2008, examined a proposal to develop light rail transit between downtown Portland, the City of Milwaukee, and north Clackamas County. This SDEIS was prepared in compliance with the National Environmental Policy Act, and the cultural resource studies were also prepared in compliance with Section 106 of the National Historic Preservation Act. The purpose of the SDEIS was to present details of the proposed alternatives and their environmental and transportation performance to decision-makers and the public to help them identify a preferred alternative. Portions of the Portland-Milwaukee Light Rail project have been studied as part of earlier transit projects, including the South Corridor Transit Study in 2002.

Additional archaeological tasks to complete the inventory phase of study for the preferred alternative will begin during the summer of 2009. Archaeological Investigations Northwest, Inc. (AINW), will be conducting the remaining tasks, and will provide a report of the archaeological study for your office to review. If public lands may need to be shovel tested, AINW will submit permit applications for those lands.

As noted in the SDEIS, the Area of Potential Effect (APE) that has been studied for cultural resources is one-half block on each side of the alignments within the defined street grid; 150 feet in each direction from the study alternatives outside of areas where there is a street grid; and is substantially larger at the proposed crossing of the Willamette River. The archaeological resources section of the SDEIS noted that portions of the alternatives were considered to have some likelihood of retaining archaeological sites. Those areas were noted as high or moderate probability areas; these areas will be surveyed and, if possible given the existing conditions, probed by shovel testing to determine whether significant archaeological resources are present. A map is attached showing these areas identified for the additional work; they are noted as HPA-1 through HPA-8 and Moderate Area. In addition to a pedestrian survey and shovel testing...
(where feasible) along the probability areas. AI NW will be monitoring geotechnical probes that are planned in the probability areas.

Shovel tests will be done following the State Historic Preservation Office (SHPO) guidelines, and will measure 30 to 50 cm (12 to 20 in) at the surface and will be excavated to a minimum depth of 50 cm (20 in). Auger tests may be used to extend shovel tests and will be a minimum of 15 cm (6 in) in diameter. Excavations will extend to a depth of two 10 cm (4 in) levels below intact archaeological deposits. Sediments will be excavated manually and screened through nested 6.4 and 3.2 millimeter (¼ and ⅛ in) mesh hardware cloth. Artifacts from the shovel tests will be collected, if excavations are on public lands, and taken to the AI NW laboratory for analysis and processing. The artifacts and records will subsequently be curated at the Oregon Museum of Natural and Cultural History (OMNCH) at the University of Oregon.

At the time the SDEIS was completed, no archaeological sites were recorded within the APE. Subsequent to that time, resources archaeological investigations for a separate project, the Trolley Trail, have identified resources in at least one area near Milwaukee. The records of the SHPO will be checked to determine whether additional archaeological resources have been identified in the project APE since the time the SDEIS was completed.

Metro has been coordinating with the State Historic Preservation Office, Confederated Tribes of the Grand Ronde Community of Oregon, Confederated Tribes of the Siletz Indians, Confederated Tribes of Warm Springs Reservation, and Cowlitz and the Chinook Tribes and will continue to do so throughout the project. I have appreciated your interest and the time your office has spent attending meetings on the project and providing comments and information. I look forward to hearing from you regarding any questions, and I would be happy to meet with you and your staff to discuss the project, if you would like.

Sincerely,

[Signature]
R.F. Krochalis
Regional Administrator

Cc: Mike Kennedy, Natural Resources Manager
    Robert Kennata, Cultural Resources Manager
    Dennis Griffin Ph.D., Oregon State Historic Preservation Office
    Bridget Wiegman, Metro (electronic)
    David Unsworth, TriMet (electronic)
    Russ Kimelley, AI NW (electronic)
Figure 1. Project location with proposed light rail alignment, station area, full displacement parcel, and archaeological probability area locations.
September 1, 2009

Ms. Cheryl Kennedy, Tribal Council Chairwoman
Confederate Tribes of the Grand Ronde
9613 Grand Ronde
Grand Ronde, OR 97347

Re: Portland to Milwaukee Light Rail Transit Project - Final EIS—Archaeological Study

The Honorable Cheryl Kennedy:

This letter is to inform you of current archeological study for the proposed Portland-Milwaukee Light Rail Transit project. Metro has been assisting the Federal Transit Administration in completing an Environmental Impact Statement (EIS) for the proposed Portland-Milwaukee Light Rail project. Metro is the project’s lead agency, working in cooperation with the Tri-County Metropolitan Transportation District (TriMet). The Supplemental Draft EIS, which was sent to your office in April 2008, examined a proposal to develop light rail transit between downtown Portland, the City of Milwaukee, and north Clackamas County. This SD/EIS was prepared in compliance with the National Environmental Policy Act, and the cultural resource studies were also prepared in compliance with Section 106 of the National Historic Preservation Act. The purpose of the SD/EIS was to present details of the proposed alternatives and their environmental and transportation performance to decision-makers and the public to help them identify a preferred alternative. Portions of the Portland-Milwaukee Light Rail project have been studied as part of earlier transit projects, including the South Corridor Transit Study in 2002.

Additional archaeological tasks to complete the inventory phase of study for the preferred alternative will begin during the summer of 2009. Archaeological Investigations Northwest, Inc. (AINW), will be conducting the remaining tasks, and will provide a report of the archaeological study for your office to review. If public lands may need to be shovel tested, AINW will submit permit applications for those lands.

As noted in the SD/EIS, the Area of Potential Effect (APE) that has been studied for cultural resources is one-half block on each side of the alignments within the defined street grid: 150 feet in each direction from the study alternatives outside of areas where there is a street grid; and is substantially larger at the proposed crossing of the Willamette River. The archaeological resources section of the SD/EIS noted that portions of the alternatives were considered to have some likelihood of retaining archaeological sites. Those areas were noted as high or moderate probability areas; these areas will be surveyed and, if possible given the existing conditions, probed by shovel testing to determine whether significant archaeological resources are present. A map is attached showing those areas identified for the additional work; they are noted as HPA-1 through HPA-8 and Moderate Area. In addition to a pedestrian survey and shovel testing.
(where feasible) along the probability areas, ALNW will be monitoring geotechnical probes that are planned in the probability areas.

Shovel tests will be done following the State Historic Preservation Office (SHPO) guidelines, and will measure 30 to 50 cm (12 to 20 in) at the surface and will be excavated to a minimum depth of 50 cm (20 in). Auger tests may be used to extend shovel tests and will be a minimum of 15 cm (6 in) in diameter. Excavations will extend to a depth of two 10 cm (4 in) levels below intact archaeological deposits. Sediments will be excavated manually and screened through nested 0.4 and 3.2 millimeter (¼ and ⅛ in) mesh hardware cloth. Artifacts from the shovel tests will be collected, if excavations are on public lands, and taken to the ALNW laboratory for analysis and processing. The artifacts and records will subsequently be curated at the Oregon Museum of Natural and Cultural History (OMNCH) at the University of Oregon.

At the time the SDEIS was completed, no archaeological sites were recorded within the APE. Subsequent to that time, resources archeological investigations for separate project, the Trolley Trail, have identified resources in at least one area near Milwaukie. The records of the SHPO will be checked to determine whether additional archaeological resources have been identified in the project APE since the time the SDEIS was completed.

Metro has been coordinating with the State Historic Preservation Office, Confederated Tribes of the Grand Ronde Community of Oregon, Confederated Tribes of the Siletz Indians, Confederated Tribes of Warm Springs Reservation, and Cowiche and the Chinook Tribes and will continue to do so throughout the project. I have appreciated your interest and the time your office has spent attending meetings on the project and providing comments and information. I look forward to hearing from you regarding any questions, and I would be happy to meet with you and your staff to discuss the project, if you would like.

Sincerely,

[Signature]

R.F. Krautkalis
Regional Administrator

Cc: David Lewis, Cultural Resources Manager
    Mike Wilson, Natural Resources Manager
    Mike Karnook, Natural Resources
    Dennis Griffin Ph.D., Oregon State Historic Preservation Office
    Bridget Wiehner, Metro (electronic)
    David Usaworth, TriMet (electronic)
    Ross Kimeley, ALNW (electronic)

Enclosure
Figure 1. Project location with proposed light rail alignment, station area, full displacement parcel, and archaeological probability area locations.
September 1, 2009

Mr. John Barnett, Tribal Council Chairman
Cowichan Indian Tribe
1055 9th Avenue, Suite B
Longview, WA 98632

Re: Portland to Milwaukie Light Rail Transit project - Final EIS—Archaeological Study

The Honorable John Barnett:

This letter is to inform you of current archaeological study for the proposed Portland-Milwaukie Light Rail Transit project. Metro has been assisting the Federal Transit Administration in completing an Environmental Impact Statement (EIS) for the proposed Portland-Milwaukie Light Rail project. Metro is the project’s local lead agency, working in cooperation with the Tri-County Metropolitan Transportation District (TriMet). The Supplemental Draft EIS, which was sent to your office in April 2008, examined a proposal to develop light rail transit between downtown Portland, the City of Milwaukie, and north Clackamas County. This SDEIS was prepared in compliance with the National Environmental Policy Act, and the cultural resource studies were also prepared in compliance with Section 106 of the National Historic Preservation Act. The purpose of the SDEIS was to present details of the proposed alternatives and their environmental and transportation performance to decision-makers and the public to help them identify a preferred alternative. Portions of the Portland-Milwaukie Light Rail project have been studied as part of earlier transit projects, including the South Corridor Transit Study in 2002.

Additional archaeological tasks to complete the inventory phase of study for the preferred alternative will begin during the summer of 2009. Archaeological Investigators Northwest, Inc. (AINW), will be conducting the remaining tasks, and will provide a report of the archaeological study for your office to review. If public lands may need to be shovel tested, AINW will submit permit applications for those lands.

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Metc has been coordinating with the State Historic Preservation Office, Confederated Tribes of the Grand Ronde Community of Oregon, Confederated Tribes of the Siletz Indians, Confederated Tribes of Warm Springs Reservation, and Cowlitz and the Chinook Tribes and will continue to do so throughout the project. I have appreciated your interest and the time your office has spent attending meetings on the project and providing comments and information. I look forward to hearing from you regarding any questions, and I would be happy to meet with you and your staff to discuss the project, if you would like.

Sincerely,

[Signature]

R.F. Kroshalis
Regional Administrator

Cc: David Burlingame, Cultural Resources Manager
   Nathan Reynolds, Lead Biologist, Natural Resources Department
   Dennis Griffin Ph.D., Oregon State Historic Preservation Office
   Bridget Wiegand, Metc (electronic)
   David Unsworth, TriMet (electronic)
   Ross Kimeley, AINW (electronic)

Enclosure
September 1, 2009

Mr. Ray Gardner, Tribal Council Chairman  
Chinook Tribe  
PO Box 228  
Chinook, WA 98614

Re: Portland to Milwaukee Light Rail Transit project - Final EIS—Archaeological Study

The Honorable Ray Gardner:

This letter is to inform you of current archaeological study for the proposed Portland-Milwaukee Light Rail Transit project. Metro has been assisting the Federal Transit Administration in completing an Environmental Impact Statement (EIS) for the proposed Portland-Milwaukee Light Rail project. Metro is the project’s local lead agency, working in cooperation with the Tri-County Metropolitan Transportation District (TriMet). The Supplemental Draft EIS, which was sent to your office in April 2008, examined a proposal to develop light rail transit between downtown Portland, the City of Milwaukee, and north Clackamas County. This SDEIS was prepared in compliance with the National Environmental Policy Act, and the cultural resource studies were also prepared in compliance with Section 106 of the National Historic Preservation Act. The purpose of the SDEIS was to present details of the proposed alternatives and their environmental and transportation performance to decision-makers and the public to help them identify a preferred alternative. Portions of the Portland-Milwaukee Light Rail project have been studied as part of earlier transit projects, including the South Corridor Transit Study in 2002.

Additional archaeological tasks to complete the inventory phase of study for the preferred alternative will begin during the summer of 2009. Archaeological Investigations Northwest, Inc. (AINW), will be conducting the remaining tasks, and will provide a report of the archaeological study for your office to review. If public lands may need to be shovel tested, AINW will submit permit applications for these lands.

As noted in the SDEIS, the Area of Potential Effect (APE) that has been studied for cultural resources is one-half block on each side of the alignments within the defined street grid. 150 feet in each direction from the study alternatives outside of areas where there is a street grid, and is substantially larger at the proposed crossing of the Willamette River. The archaeological resources section of the SDEIS noted that portions of the alternatives were considered to have a high likelihood of retaining archaeological sites. These areas were noted as high or moderate probability areas; these areas will be surveyed and, if possible given the existing conditions, probed by shovel testing to determine whether significant archaeological resources are present. A map is attached showing those areas identified for the additional work; they are noted as HPA-1 through HPA-8 and Moderate Area. In addition to a pedestrian survey and shovel testing
(where feasible) along the probability areas, AINW will be monitoring geotechnical probes that are planned in the probability areas.

Shovel tests will be done following the State Historic Preservation Office (SHPO) guidelines, and will measure 30 to 50 cm (12 to 20 in) at the surface and will be excavated to a minimum depth of 50 cm (20 in). Auger tests may be used to extend shovel tests and will be a minimum of 15 cm (6 in) in diameter. Excavations will extend to a depth of two 10 cm (4 in) levels below intact archaeological deposits. Sediments will be excavated manually and screened through nested 6.4 and 3.2 millimeter (¼ and ⅛ in) mesh hardware cloth. Artifacts from the shovel tests will be collected, if excavations are on public lands, and taken to the AINW laboratory for analysis and processing. The artifacts and records will subsequently be curated at the Oregon Museum of Natural and Cultural History (OMNCH) at the University of Oregon.

At the time the SDEIS was completed, no archaeological sites were recorded within the APL. Subsequent to that time, resources archeological investigations for a separate project, the Trolley Trail, have identified resources in at least one area near Milwaukie. The records of the SHPO will be checked to determine whether additional archaeological resources have been identified in the project APE since the time the SDEIS was completed.

Metro has been coordinating with the State Historic Preservation Office, Confederated Tribes of the Grand Ronde Community of Oregon, Confederated Tribes of the Siletz Indians, Confederated Tribes of Warm Springs Reservation, and Cowlitz and the Chinook Tribes and will continue to do so throughout the project. I have appreciated your interest and the time your office has spent attending meetings on the project and providing comments and information. I look forward to hearing from you regarding any questions, and I would be happy to meet with you and your staff to discuss the project, if you would like.

Sincerely,

Linda M. Lehne

R F. Krochalis
Regional Administrator

Cc: Tony Johnson, Cultural Resources Manager
    Dennis Griffin Ph.D., Oregon State Historic Preservation Office
    Bridget Wiegaart, Metro (electronic)
    David Unsworth, TriMet (electronic)
    Ross Kimley, AINW (electronic)

Enclosure
Figure 1. Project location with proposed light rail alignment, station area, full displacement parcel, and archaeological probability area locations.
September 1, 2009

Mc. Ron Suppah, Tribal Council Chairman  
The Confederated Tribes of Warm Springs  
1233 Veterans Street  
Warm Springs, OR 97751

Re: Portland to Milwaukee Light Rail Transit project - Final EIS—Archaeological Study

The Honorable Ron Suppah:

This letter is to inform you of current archaeological study for the proposed Portland-Milwaukee Light Rail Transit project. Metro has been assisting the Federal Transit Administration in completing an Environmental Impact Statement (EIS) for the proposed Portland-Milwaukee Light Rail project. Metro is the project's local lead agency, working in cooperation with the Tri-County Metropolitan Transportation District (TriMet). The Supplemental Draft EIS, which was sent to your office in April 2008, examined a proposal to develop light rail transit between downtown Portland, the City of Milwaukee, and north Clackamas County. This SDEIS was prepared in compliance with the National Environmental Policy Act, and the cultural resource studies were also prepared in compliance with Section 106 of the National Historic Preservation Act. The purpose of the SDEIS was to present details of the proposed alternatives and their environmental and transportation performance to decision-makers and the public to help them identify a preferred alternative. Portions of the Portland-Milwaukee Light Rail project have been studied as part of earlier transit projects, including the South Corridor Transit Study in 2002.

Additional archaeological tasks to complete the inventory phase of study for the preferred alternative will begin during the summer of 2009. Archaeological Investigations Northwest, Inc. (AINW), will be conducting the remaining tasks and will provide a report of the archaeological study for your office to review. If public lands may need to be shovel tested, AINW will submit permit applications for those lands.

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Metro has been coordinating with the State Historic Preservation Office, Confederated Tribes of the Grand Ronde Community of Oregon, Confederated Tribes of the Siletz Indians, Confederated Tribes of Warm Springs Reservation, and Cowwall and the Chinook Tribes and will continue to do so throughout the project. I have appreciated your interest and the time your office has spent attending meetings on the project and providing comments and information. I look forward to hearing from you regarding any questions, and I would be happy to meet with you and your staff to discuss the project, if you would like.

Sincerely,

[Signature]
R.F. Krachalis
Regional Administrator

Cc: Robert Brune, Director of Natural Resources
    Dennis Griffin Ph.D., Oregon State Historic Preservation Office
    Bridget Wieghan, Metro (electronic)
    Daniel Unsworth, Trimet (electronic)
    Ross Kimeley, AINW (electronic)

Enclosure
Figure 1. Project location with proposed light rail alignment, station area, full displacement parcel, and archaeological probability area locations.
October 13, 2009

Jon Meyer, Branch Manager
NOAA National Marine Fisheries
Willamette Basin Habitat Branch
1201 NE Lloyd Blvd, Suite 1100
Portland, OR 97232

Re: Biological Assessment for the Portland-Milwaukee Light Rail Project

Dear Mr. Meyer,

Attached for your review is the Biological Assessment for the Portland-Milwaukee Light Rail Project submitted by the Federal Transit Administration (FTA), in cooperation with Metro and the Tri-County Metropolitan Transportation District of Oregon (TriMet). The proposed project is the second phase of the South Corridor Light Rail project and would extend the light rail from the Portland Mall to a terminus south of the City of Milwaukee in Clackamas County. The purpose of the project is to implement a major transit program that maintains livability in the metropolitan region, supports land use goals, optimizes the transportation system, is environmentally sensitive, reflects community values, and is fiscally responsible.

This Biological Assessment, pursuant to Section 7 of the Endangered Species Act of 1973, addresses the proposed action's potential impact to the following evolvable distinctly significant units (ESUs) or distinct population segments (DPSes):

- Green Sturgeon, Southern DPS;
- Chinook Salmon, Columbia River ESU;
- Coho Salmon, Lower Columbia River ESU;
- Steelhead, Lower Columbia River DPS;
- Steelhead, Upper Willamette River DPS;
- Chinook Salmon, Lower Columbia River ESU, and
- Chinook Salmon, Upper Willamette River ESU

The new light rail alignment proposes to cross seven streams, the Lower Willamette River, Crystal Springs Creek, Johnson Creek, Crystal Creek, Spring Creek, Kellogg Lake and Courney Springs Creek. Several of these streams are designated critical habitat for the following ESUs/DPSes:

- Steelhead, LCR DPS
- Steelhead, UFR DPS
* Chinook salmon, LCR ESU
* Chinook Salmon, UWR ESU
* Green Sturgeon, southern LCR (Pool 860)

Tri-Met, Metro, and FTA have participated in early coordination with the NOAA Fisheries in an effort to ensure that this document will meet NOAA Fisheries expectations and requirements.

If you have questions regarding this request for review, please contact Steve Sander at 206-220-4311.

Sincerely,

[Signature]

R F. Krocha
ger Regional Administrator

Cc: Paul Henson, USFWS
    Chrisly Tallas, NOAA

Enclosure
October 29, 2009

Mark Turpel
Metro
800 NE Grand Avenue
Portland, OR 97232-2736

Re: Wetland Delineation Report for Portions of the Portland to Milwaukie Light Rail Project Corridor, Multnomah and Clackamas Counties, T1S R1E and T2S R1E, Portions of Multiple Sections and Tax Lots; WD #C9-0285

Dear Mr. Turpel:

The Department of State Lands has reviewed the wetland delineation report prepared by David Evans and Associates, Inc. for the site referenced above. Based upon our review and additional information submitted upon request, we concur with their delineation and conclusions. Within the focused study area, 6 wetlands (totaling 3.12 acres) and segments of seven waterways, including the Willamette River, Johnson Creek, Crystal Springs Creek, Kellogg Creek, Crystal Creek, Spring Creek, and Courtney Springs Creek (also referred to as Lindor Creek), were identified. All these wetlands and waterways are subject to the permit requirements of the state Removal-Fill Law. Under current regulations, a state permit is required for cumulative fill or annual excavation of 50 cubic yards or more in wetlands or below the ordinary high water line (OHWL) of a waterway (or the 2 year recurrence interval flood elevation if OHWL cannot be determined). However, the Willamette River, Johnson Creek, Crystal Springs Creek, and Kellogg Creek are all essential salmonid streams and therefore fill or removal of any amount of material below the OHWL, or within any hydrologically-connected wetlands, may require a state permit.

In addition, due to access issues, Wetland FM 5b was mapped using on-site wetland determination methods including observations from adjacent properties and interpretation of aerial photographs. Because on-site determination methods are not suitable for removal-fill permitting, it will be necessary to use onsite methods and delineate these areas prior to project construction. If the subsequent onsite wetland delineation changes the areas of wetland and wetland impact appreciably, the Department may require an addendum wetland report and a revised permit application.

This concurrence is for purposes of the state Removal-Fill Law only. Federal or local permit requirements may apply as well. This concurrence is based on information provided to the agency. The jurisdictional determination is valid for five years from the
date of this letter, unless new information necessitates a revision. Circumstances under which the Department may change a determination are found in OAR 141-090-0045 (available on our web site or upon request). In addition, laws enacted by the legislature and/or rules adopted by the Department may result in a change in jurisdiction; individuals and applicants are subject to the regulations that are in effect at the time of the removal-fill activity or complete permit application. The applicant, landowner, or agent may submit a request for reconsideration of this determination in writing within six months of the date of this letter.

Thank you for having the site evaluated. Please phone me at (503) 936-5232 if you have any questions.

Sincerely,

[Signature]

Peter Ryan, PWS
Wetland Specialist

Approved by [Signature]

Janet C. Morlan, PWS
Wetlands Program Manager

Enclosures

Tom Taylor, Corps of Engineers
Mike McCabe, DSL
December 28, 2009

Shannon E. Wills, Lead Biologist
Cowlitz Indian Tribe
Natural Resource Department
1055 9th Avenue, Suite B
Longview, WA 98632

Re: Portland to Milwaukie Light Rail Transit Project - Biological Assessment

Dear Ms. Wills:

Attached please find a copy of the Biological Assessment for the Portland-Milwaukie Light Rail Project (PMLR). The FTA, along with project partners, TriMet and Metro, are sponsoring the Portland-Milwaukie Project that proposes to construct a new 7.3 mile light rail line from downtown Portland to the east side of the city of Milwaukie. The light rail would cross the Willamette River on a new bridge, and cross six other bodies of water.

We have provided the National Marine Fisheries Service with copies and have initiated consultation with them. We have transmitted this BA to the Grande Ronde, the Siletz, Warm Springs, Chinook, and Cowlitz Tribes.

As you will see with this Biological Assessment, substantial efforts have been made to avoid or minimize the impacts of this project. For example the project has:

- Scheduled and designed construction to observe the in-water work window;
  - Designed all but two crossings to clear span water crossings;
  - Revised the design of the Willamette River Transit Bridge to reduce the number of piers in the water, and relocated the remaining piers to minimize the impact on shallow water;
- Located suitable sites for streambank and wetland restoration, as well as created balanced cut and fill designs in association with PMLR elements located in floodplains;
- Designed the crossing of Crystal Spring Creek to span the existing culvert so that the culvert can be more easily removed in the future;
- Proposed to meet City of Portland 2008 Stormwater Manual requirements for the entire alignment to help ensure that stormwater is effectively treated before entering surface water and streams along the alignment;

Should you have comments about this Biological Assessment, we would be happy to convey these to the National Marine Fisheries Service.

Please do not hesitate to contact Steve Saxton at FTA at 206-220-4311 if you have any questions.

Thank you.

[Signature]

Theda Gehrike
Deputy Regional Administrator

cc: Christine Guitlighly, Columbia River Inter-Tribal Fish Commission

Enclosure
December 28, 2009

Mr. Mike Kennedy, Natural Resources Manager
Confederate Tribes of the Siletz Reservation
PO Box 549
Siletz, OR 97387

Re: Portland to Milwaukie Light Rail Transit Project – Biological Assessment

Dear Mr. Kennedy:

Attached please find a copy of the Biological Assessment for the Portland-Milwaukie Light Rail Project (PMLR). The FTA, along with project partners, TriMet and Metro, are sponsoring the Portland-Milwaukie Project that proposes to construct a new 7.3 mile light rail from downtown Portland to south of the city of Milwaukie. The light rail would cross the Willamette River on a new bridge, and cross six other bodies of water.

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- Proposed to meet City of Portland 2008 Stormwater Manual requirements for the entire alignment to help ensure that stormwater is effectively treated before entering surface water and streams along the alignment.

Should you have comments about this Biological Assessment, we would be happy to convey these to the National Marine Fisheries Service.

Please do not hesitate to contact Steve Saxton at FTA at 206-230-4311 if you have any questions.

Thank you.

Linda Gehrk
Deputy Regional Administrator

cc: Christine Golightly, Columbia River Inter-Tribal Fish Commission

Enclosure
December 28, 2009

Mr. Bobby Brunoe, Natural Resources
The Confederated Tribes of The Warm Springs Reservation of Oregon
1233 Veterans Street
Warm Springs, OR 97761

Re: Portland to Milwaukie Light Rail Transit Project - Biological Assessment

Dear Mr. Brunoe:

Attached please find a copy of the Biological Assessment for the Portland-Milwaukie Light Rail Project (PMLR). The FTA, along with project partners, TriMet and Metro, are sponsoring the Portland-Milwaukie Project that proposes to construct a new 7.3 mile light rail from downtown Portland to south of the city of Milwaukie. The light rail would cross the Willamette River on a new bridge, and cross six other bodies of water.

We have provided the National Marine Fisheries Service with copies and have initiated consultation with them. We have transmitted this BA to the Grande Ronde, the Siletz, Warm Springs, Chinook, and Cowlitz Tribes.

As you will see with this Biological Assessment, substantial efforts have been made to avoid or minimize the impacts of this project. For example the project has:

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Should you have comments about this Biological Assessment, we would be happy to convey these to the National Marine Fisheries Service.

Please do not hesitate to contact Steve Saxton at FTA at 206-220-4311 if you have any questions.

Thank you.

Linda Gehrels
Deputy Regional Administrator

cc Christine Golightly, Columbia River Inter-Tribal Fish Commission

Enclosure
December 28, 2009

Mr. Mike Kamosh, Natural Resources
Confederate Tribes of The Grand Ronde Community of Oregon
9615 Grand Ronde
Grand Ronde, OR 97347

Re: Portland to Milwaukie Light Rail Transit Project – Biological Assessment

Dear Mr. Kamosh:

Attached please find a copy of the Biological Assessment for the Portland-Milwaukie Light Rail Project (PMLR). The FTA, along with project partners, TriMet and Metro, are sponsoring the Portland-Milwaukie Project that proposes to construct a new 7.3 mile light rail from downtown Portland to south of the city of Milwaukie. The light rail would cross the Willamette River on a new bridge, and cross six other bodies of water.

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Should you have comments about this Biological Assessment, we would be happy to convey these to the National Marine Fisheries Service.

Please do not hesitate to contact Steve Sexton at FTA at 206-220-4311 if you have any questions.

Thank you,

Linda Gehrke
Deputy Regional Administrator

cc: Christine Golightly, Columbia River Inter-Tribal Fish Commission

Enclosure
December 28, 2009

Mr. Tony Johnson, Natural Resources
Chinook Tribe
c/o Confederate Tribes of The Grand Ronde Community of Oregon
9615 Grand Ronde
Grand Ronde, OR 97347

Re: Portland to Milwaukie Light Rail Transit Project – Biological Assessment

Dear Mr. Johnson:

Attached please find a copy of the Biological Assessment for the Portland-Milwaukie Light Rail Project (PMLR). The FTA, along with project partners, TriMet and Metro, are sponsoring the Portland-Milwaukie Project that proposes to construct a new 7.3 mile light rail from downtown Portland to south of the city of Milwaukie. The light rail would cross the Willamette River on a new bridge, and cross six other bodies of water.

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Please do not hesitate to contact Steve Saxton at FTA at 206-220-4311 if you have any questions.

Thank you.

Linda Gehrke
Deputy Regional Administrator

cc: Christine Golightly, Columbia River Inter-Tribal Fish Commission

Incl

Enclosure
December 28, 2009

Christine Golightly  
Columbia River Inter-Tribal Fish Commission  
729 NE Oregon St., Ste. 200  
Portland, OR 97232

Re: Portland to Milwaukie Light Rail Transit Project - Biological Assessment

Dear Ms. Golightly:

Attached please find a copy of the Biological Assessment for the Portland-Milwaukie Light Rail Project (PMLR). The FTA, along with project partners, TriMet and Metro, are sponsoring the Portland-Milwaukie Project that proposes to construct a new 7.3 mile light rail from downtown Portland to south of the city of Milwaukie. The light rail would cross the Willamette River on a new bridge, and cross six other bodies of water.

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Please do not hesitate to contact Steve Saxton at FTA at 206-220-4311 if you have any questions.

Thank you.

Linda Gehrke  
Deputy Regional Administrator

Enclosure
**Cover Sheet**

for

"Section 106" Reconnaissance Level Surveys

Submit this Cover Sheet to the Oregon SHPO along with all survey materials (see checklist below).

<table>
<thead>
<tr>
<th>Survey Project Name</th>
<th>Portland - Willamette Light Rail</th>
<th>Survey Start Date</th>
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<td>County</td>
<td>Multnomah</td>
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<tr>
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<td>Year End Date</td>
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<td>9/2006</td>
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<td>Portland Kenney, Senior Cultural Resources Specialist, Parametrix</td>
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<td>Eligible properties</td>
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<td>ineligible properties</td>
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<td></td>
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</tr>
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</table>

**Survey Boundaries**
The survey was conducted on the west side of SW 12th Ave, in Portland and extend southeast to E 11th Ave along north side of SE Dunlap St to approximately 3121 SE McLoughlin Blvd

**Survey Summary**
The survey was conducted to review potentially historic properties in the proposed APE for the Feds which builds upon the APE used for the 3000 RIS (RLS and RISI Portland Airfield Willamette Light Rail) completed in 2003. The application is comprised of two Sections 106 process. The selection of potentially historic properties involved the evaluation of the site designated for the Portland project. The 3000 RIS (RLS and RISI Portland Airfield Willamette Light Rail) identified all properties in the vicinity of the proposed project. The survey was conducted to determine the results of the resources that may be potentially eligible for inclusion in the Section 106 process.

In addition to relying upon the eligibility of historic resources for the NHRP for eligibility under Section 106, the survey was conducted to determine the effects of the Section 106 process in determining whether or not there is a site of a historic resource in the following ways:

- If an alternative avoids a direct use of land from an historic site, but there is a finding of no adverse effect in the Section 106 process, a Section 404 (d) finding would result. If the results of an adverse effect in the Section 106 process, a Section 404(d) finding can be made.

**106 Eligibility Evaluations**

<table>
<thead>
<tr>
<th>106 Site</th>
<th>Eligibility Evaluation</th>
<th>Other Eligibility, Use, and Historic Resources</th>
<th>Effect Determination</th>
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</table>

**106 Comments**
The effects of eligible historic resources are included in the database comments. Summarized they say:

- 3626 Jackson St. SW, residence, Portland, 1894, no effect
- 914 Jackson St. SW, apartment, Portland, 1928, no effect
- 3804 SW 21st St, apartment, Portland, 1902, no effect
- 2920 12th Ave SW, apartment, Portland, 1930, no effect
- 3001 1st Ave SW Portland State Building, 1955, no effect
- 3111 SW Moody Ave, School, Portland, 1919, no adverse effect
- 3125 Moody Ave SW, school, Portland, 1950, no effect
- 31924 SE Division, Industrial, Portland, 1930, no effect
- 300 Carnegie and Winter Ave, Portland, CPR Switching Yard, Portland 1881-2006, no adverse effect
- 1772 Fairview Ave, residence, Portland, 1908, no effect
- 1758 Maple St SE, residence, Portland, 1913, no effect
- 1654 Maple St SE, residence, Portland, 1915, no effect
- 1538 16th Ave SE, residence, Portland, 1910, no adverse effect
- 1535 18th Ave SE, residence, Portland, 1910, no adverse effect
- 1530 18th Ave SE, residence, Portland, 1910, no adverse effect
- 1524 16th Ave SE, residence, Portland, 1910, no effect
- 1520 18th Ave SE, residence, Portland, 1910, no effect
- 1494 18th Ave SE, residence, Portland, 1910, no effect
- 1490 16th Ave SE, residence, Portland, 1910, no effect
- 1488 16th Ave SE, residence, Portland, 1910, no effect
Cover Sheet
for
"Section 106" Reconnaissance-Level Surveys

Submit this Cover Sheet to the Oregon SHPO along with all survey materials (see checklist below).

Checklist of Required Items:

1. Completed "Cover Sheet" (in online database and hard copy)
2. 106 Call List if applicable (item SHPO approved in letter)
3. Survey data submitted in electronic form
4. Properly labeled photos (digital photos incl. with date)
5. Appropriately marked survey report
6. Copy of UNGIS Map Showing Location of Surveyed Area

Optional Items:
- Research Design Completed Prior to Survey
- Completed Survey Forms (Field Forms)
- Final Report

SHPO Evaluation of Survey Project

Approved
Conditionally Approved
Returned for Corrections

SHPO Comment on NAAQT Eligibility Evaluations

Concur
Do Not Concur
Requested for Additional Data

SHPO Comment on Effect Determinations

Concur
Do Not Concur
Returned for Additional Data

SHPO Staff Signature

Comments:
February 17, 2010

Mr. David Bursligame, Cultural Resources Manager
Cowichan Indian Tribe
1855 9th Avenue, Suite B
Longview, WA 98632

Re: SHPO Case No. #09-1933, SHPO Case # 07-2748: Portland-Milwaukie Light Rail Project

Dear Mr. Bursligame:

To supplement a forthcoming formal invitation from the Federal Transit Administration, Metro staff (Jenn Tuverk) invited you and your tribe over the phone on February 11, 2010 to a meeting with the SHPO archaeologist, Dr. Dennis Griffin, and SHPO historian, Dr. Stephen Poyser, to discuss the draft MOA and final archaeological survey results will be held on February 26, 2010: 2:30 – 3:45 p.m. at Parks and Recreation Department, State Historic Preservation Office, 725 Summer Street NE, 5th C, Salem, OR 97301-1266. In that meeting, SHPO will review archaeological findings and begin the conversation about how to prepare a memorandum of agreement (MOA) for the historic and archeological portion of the Final Environmental Impact Statement (FEIS).

As part of the February 11, 2010 phone communication, materials for the meeting on February 26, 2010 were discussed. Accordingly, we have enclosed the following materials for discussion:

1. **Draft Agenda**

2. **Archeological Survey for the Portland-Milwaukie Light Rail Project, Multnomah and Clackamas Counties, Oregon** *(AINW Report No. 2451, February 12, 2010)*. This archaeological survey report prepared by AINW describes the survey findings for the project. In summary:
   - Six previously recorded sites are within the project APE. Of those sites, three are recommended not eligible for listing in the NRHP; one was completely removed by previous archaeological data recovery, one related to the Ruby Junction facility has been determined not eligible, and one will not be impact by project construction as currently designed.
   - One new archaeological resource, 07/1507-1, recorded within project area. It is recommended not eligible for listing in the NRHP due to lack of integrity.
   - Twenty-five (25) high probability areas are recommended for additional archeological work.

3. **Figures 1-13 within AINW Report No. 2451**. This set of maps shows the archaeological probability areas in relation to the most updated project APE, footprint and staging areas. Previous archaeological studies that have been conducted in the project area and recorded archaeological sites are also shown on the maps. Areas where shovel testing was conducted by AINW as part of the current project are shown.
4. Historic Sanborn Map Overlays, Appendix A in AINW Report No. 2451: These maps highlight historic-period land use in relation to the project. These maps aided in the delineation of archaeological probability areas.

5. GLO Overlays, Appendix B in AINW Report No. 2451. These maps highlight landforms and natural as well as cultural features that were present during early settlement of the area. These maps aided in the delineation of archaeological probability areas. These maps also show the locations of the possible 'Indian Camps' that were drawn onto the SHPO maps by Dr. Le Gilsen.

6. Discussion Draft Memo: Memorandum of Agreement (MOA): We will bring with us an updated version of this discussion draft memo.

We look forward to discussing the enclosed survey report, maps, discussion draft MOA language, and the most current project information in more detail with you when we meet February 26, 2010, from 2:30 p.m. to 3:45 p.m. If you or your tribe would prefer an individual meeting, we are also happy to meet with your tribe at a later date. To request a meeting or for more information, please contact me at 503.797.1864 or cristagardner@oregonmetro.gov.

Thank you,

Crista Gardner
Senior Transportation Planner

CC: Bridget Wieghart, Metro
    Dennis Griffin, SHPO
    Steve Poyser, SHPO
    Steve Saxton, FTA Region X
    Michele Punke and Jo Reese, AINW
February 17, 2010

Mr. Erik Thorsgard, Cultural Resource Manager
The Confederated Tribes of Grande Ronde
9615 Grand Ronde
Grand Ronde, OR 97347

Re: SHPO Case No. 09-1983, SHPO Case #2 748: Portland-Milwaukie Light Rail Project

Dear Mr. Thorsgard:

To supplement a forthcoming formal invitation from the Federal Transit Administration, Metro staff (Jenn Tuckr) invited you and your tribe over the phone on February 11, 2010, to a meeting with the SHPO archaeologist, Dr. Dennis Griffin, and SHPO historian, Dr. Stephen Poyser, to discuss the draft MOA and the final archeological survey results will be held on February 26, 2010, 2:30–3:45 p.m. at Parks and Recreation Department, State Historic Preservation Office, 723 Summer Street NE, Ste C, Salem, or 97301-1266. In that meeting, SHPO will review archeological findings and begin the conversation about how to prepare a memorandum of agreement (MOA) for the historic and archeological portion of the Final Environmental Impact Statement (FEIS).

As part of the February 11, 2010 phone communication, materials for the meeting on February 26, 2010, were discussed. Accordingly, we have enclosed the following materials for discussion:

1. Draft Agenda
2. Archeological Survey for the Portland-Milwaukie Light Rail Project, Multnomah and Clackamas Counties, Oregon (AINW Report No. 2451, February 12, 2010). This archeological survey report prepared by AINW describes the survey findings for the project. In summary:
   - Six previously record sites are within the project area. Of those sites, three are recommended not eligible for listing in the NHP, one was completely removed by previous archeological data recovery, one related to the Ruby Junction facility has been determined not eligible, and one will not be impacted by project construction as currently designed.
   - One new archeological resource, 0715001, recorded within the project area. It is recommended not eligible for listing in the NHP due to lack of integrity.
   - Twenty-five (25) high probability areas are recommended for additional archeological work.
3. Figures 1-13 within AINW Report No. 2451: This set of maps shows the archeological probability areas in relation to the most updated project area, footprint, and staging areas. Previous archeological studies that have been conducted in the project area and recorded archeological sites are also shown on the maps. Areas where shovel testing was conducted by AINW as part of the current project are shown.
4. **Historic Sanborn Map Overlays, Appendix A in AINW Report No. 2451**: These maps highlight historic-period land use in relation to the project. These maps aided in the delineation of archaeological probability areas.

5. **GLO Overlays, Appendix B in AINW Report No. 2451**: These maps highlight landforms and natural as well as cultural features that were present during early settlement of the area. These maps aided in the delineation of archaeological probability areas. These maps also show the locations of the possible "Indian Camps" that were drawn onto the SHPO maps by Dr. Le Gilsen.

6. **Discussion Draft Memo: Memorandum of Agreement (MOA)**: We will bring with us an updated version of this discussion draft memo.

We look forward to discussing the enclosed survey report, maps, discussion draft MOA language, and the most current project information in more detail with you when we meet February 26, 2010, from 2:30 p.m. to 3:45 p.m. If you or your tribe would prefer an individual meeting, we are also happy to meet with your tribe at a later date. To request a meeting or for more information, please contact me at 503.797.1864 or cristagardner@oregonmetro.gov.

Thank you,

Crista Gardner
Senior Transportation Planner

CC: Bridget Wieghart, Metro
    Dennis Griffin, SHPO
    Steve Payser, SHPO
    Steve Saxton, FTA Region X
    Michele Punke and Jo Reese, AINW
February 17, 2011

Mr. Robert Kentt, Director, Cultural Resources  
The Confederatite Tribes of Siletz  
PO Box 549  
Siletz, OR 97387

Re: SHPO Case No. #09-1983, SHPO Case # 07-2748: Portland-Milwaukie Light Rail Project

Dear Mr. Kentt,

To supplement a forthcoming formal invitation from the Federal Transit Administration, Metro staff [Jen Tuerk] invited you and your tribe over the phone on February 11, 2010 to a meeting with the SHPO archeologist, Dr. Dennis Griffin, and SHPO historian, Dr. Stephen Poyser, to discuss the draft MOA and final archeological survey results which will be held on February 26, 2010; 2:30 – 3:45 p.m. at Parks and Recreation Department, State Historic Preservation Office, 725 Summer Street NE, Ste C, Salem, OR 97301-1266. In that meeting, SHPO will review archeological findings and begin the conversation about how to prepare a memorandum of understanding (MOA) for the historic and archeological portion of the Final Environmental Impact Statement (EIS).

As part of the February 11, 2010 phone communication, materials for the meeting on February 26, 2010 were discussed. Accordingly, we have enclosed the following materials for discussion:

1. Draft Agenda
2. Archeological Survey for the Portland-Milwaukie Light Rail Project, Multnomah and Clackamas Counties, Oregon (AINW Report No. 2451, February 12, 2010). This archeological survey report prepared by AINW describes the survey findings for the project. In summary:
   - Six previously recorded sites in the project APE. Of those sites, three are recommended not eligible for listing in the NRHP. One was completely removed by previous archeological field recovery, one related to the Ruby junction facility has been determined not eligible, and one will not be impacted by project construction as currently designed.
   - One new archeological resource, 07/1507-1, recorded within project area. It is recommended not eligible for listing on the NRHP due to lack of integrity.
   - Twenty-five (25) high probability areas are recommended for additional archeological work.
3. Figures 1-13 within AINW Report No. 2451: This set of maps shows the archeological probability areas in relation to the most updated project APE, footprint, and staging areas. Previous archeological studies that have been conducted in the project area and recorded archeological sites are also shown on the maps. Areas where shovel testing was conducted by AINW as part of the current project are shown.
4. **Historic Sanborn Map Overlays, Appendix A in AINW Report No. 2451:** These maps highlight historic-period land use in relation to the project. These maps aided in the delineation of archaeological probability areas.

5. **GLO Overlays, Appendix B in AINW Report No. 2451:** These maps highlight landforms and natural as well as cultural features that were present during early settlement of the area. These maps aided in the delineation of archaeological probability areas. These maps also show the locations of the possible “Indian Camps” that were drawn onto the SHPO maps by Dr. Le Gilsen.

6. **Discussion Draft Memo: Memorandum of Agreement (MOA):** We will bring with us an updated version of this discussion draft memo.

We look forward to discussing the enclosed survey report, maps, discussion draft MOA language, and the most current project information in more detail with you when we meet February 26, 2010, from 2:30 p.m. to 3:45 p.m. If you or your tribe would prefer an individual meeting, we are also happy to meet with your tribe at a later date. To request a meeting or for more information, please contact me at 503.797.1864 or cristagardner@oregonmetro.gov.

Thank you,

[Signature]

Crista Gardner
Senior Transportation Planner

CC: Bridget Wieghart, Metro
    Dennis Griffin, SHPO
    Steve Poyser, SHPO
    Steve Saxton, PTA Region X
    Michele Punke and Jo Reese, AINW
February 17, 2010

Mr. Bobby Brune, General Manager, Natural Resources Department
The Confederacy Tribes of Warm Springs
P.O. Box C
Warm Springs, OR 97761

Re: SHPO Case No. #09-1983, SHPO Case # 07-2748: Portland-Milwaukie Light Rail Project

Dear Mr. Brune:

To supplement a forthcoming formal invitation from the Federal Transit Administration, Metro staff (Jean Tuerk) invited you and your tribe over the phone on February 11, 2010 to a meeting with the SHPO archaeologist, Dr. Dennis Griffin, and SHPO historian, Dr. Stephen Poyser, to discuss the draft MOA and final archeological survey results will be held on February 26, 2010. 2:30 - 3:45 p.m. at Parks and Recreation Department, State Historic Preservation Office, 725 Summer Street NE, 3rd Floor, Salem, OR 97301-1266. In that meeting, SHPO will review archeological findings and begin the conversation about how to prepare a memorandum of agreement (MOA) for the historic and archeological portion of the Final Environmental Impact Statement (FEIS).

As part of the February 11, 2010 phone communication, materials for the meeting on February 26, 2010 were discussed. Accordingly, we have enclosed the following materials for discussion.

1. Draft Agenda
   a. Archeological Survey for the Portland-Milwaukie Light Rail Project, Multnomah and Clackamas Counties, Oregon (AINW Report No. 2451: February 12, 2010). This archaeological survey report prepared by AINW describes the survey findings for the project. In summary:
      i. Six previously recorded sites are within the project APE. Of those sites, three are recommended not eligible for listing in the NRHP. One was completely removed by previous archaeological data recovery, one related to the Ruby Junction facility has been determined not eligible, and one will not be impacted by project construction as currently designed.
      ii. One new archaeological resource, 07/1507-1, recorded within project area. It is recommended not eligible for listing in the NRHP due to lack of integrity.
      iii. Twenty-five (25) high probability areas are recommended for additional archaeological work.
   b. Figures 1-13 within AINW Report No. 2451: This set of maps shows the archaeological probability areas in relation to the most updated project APE, footprint, and staging areas. Previous archaeological studies that have been conducted in the project area and recorded archaeological sites are also shown on the maps. Areas where shovel testing was conducted by AINW as part of the current project are shown.
4. **Historic Sanborn Map Overlays, Appendix A in AINW Report No. 2451:** These maps highlight historic-period land use in relation to the project. These maps aided in the delineation of archaeological probability areas.

5. **GLO Overlays, Appendix B in AINW Report No. 2451:** These maps highlight landforms and natural as well as cultural features that were present during early settlement of the area. These maps aided in the delineation of archaeological probability areas. These maps also show the locations of the possible "Indian Camps" that were drawn onto the SHPO maps by Dr. Le Gilsen.

6. **Discussion Draft Memo: Memorandum of Agreement (MOA):** We will bring with us an updated version of this discussion draft memo.

We look forward to discussing the enclosed survey report, maps, discussion draft MOA language, and the most current project information in more detail with you when we meet February 26, 2010, from 2:30 p.m. to 3:45 p.m. If you or your tribe would prefer an individual meeting, we are also happy to meet with your tribe at a later date. To request a meeting or for more information, please contact me at 503.797.1864 or cristagardner@oregonmetro.gov.

Thank you,

[Signature]

Crista Gardner
Senior Transportation Planner

CC: Sally Bird, Cultural Resources Manager
    Bridget Wieghart, Metro
    Dennis Griffin, SHPO
    Steve Poyser, SHPO
    Steve Saxton, FTA Region X
    Michele Punke and Jo Reese, AINW
February 17, 2010

Mr. Tony Johnson, Cultural Resources
Chinook Tribe
PO Box 228
Chinook, WA 98614

Re: SHPO Case No. 09-1983, SHPO Case # 07-2748: Portland-Milwaukie Light Rail Project

Dear Mr. Johnson:

To supplement a forthcoming formal invitation from the Federal Transit Administration, Metro staff (Elia Tuorik) invited you and your tribe over the phone on February 11, 2010 to a meeting with the SHPO archaeologist, Dr. Dennis Grillin, and SHPO historian, Dr. Stephen Payser, to discuss the draft MOA and final archaeological survey results will be held on February 26, 2010; 2:30 - 3:45 p.m. at Parks and Recreation Department, State Historic Preservation Office, 725 Summer Street NE, Ste C, Salem, OR 97301-1266. In that meeting, SHPO will review archeological findings and begin the conversation about how to prepare a memorandum of agreement (MOA) for the historic and archiologic portion of the Final Environmental Impact Statement (FEIS).

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   - Six previously record sites are within the project APIs. Of those sites, three are recommended not eligible for listing in the NRHP, one was completely removed by previous archaeological data recovery, one related to the Ruby Junction facility has been determined not eligible, and one will not be impact by project construction as currently designed.
   - One new archaeological resource, 07/1507-1, recorded within project area. It is recommended not eligible for listing in the NRHP due to lack of integrity.
   - Twenty-five (25) high probability areas are recommended for additional archeological work.
3. **Figures 1-13 within AINW Report No. 2451:** This set of maps shows the archaeological probability areas in relation to the most updated project APIs, footprint, and staging areas. Previous archeological studies that have been conducted in the project area and recorded archaeological sites are also shown on the maps. Areas where shovel testing was conducted by AINW as part of the current project are shown.
4. **Historic Sanborn Map Overlays, Appendix A in AINW Report No. 2451.** These maps highlight historic-period land use in relation to the project. These maps aided in the delineation of archaeological probability areas.

5. **GLO Overlays, Appendix B in AINW Report No. 2451:** These maps highlight landforms and natural as well as cultural features that were present during early settlement of the area. These maps aided in the delineation of archaeological probability areas. These maps also show the locations of the possible "Indian Camps" that were drawn onto the SHPO maps by Dr. Le Gilsen.

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Thank you,

Crista Gardner
Senior Transportation Planner

CC: Bridget Wieghart, Metro
Dennis Griffin, SHPO
Steve Poyser, SHPO
Steve Saxton, FTA Region X
Michele Punke and Jo Reese, AINW
March 3, 2010

Linda Gehrke
Deputy Regional Administrator
Federal Transit Administration, Region X
915 Second Avenue
Federal Bldg., Suite 3142
Seattle, WA 98174-1002

Ref: Proposed Portland to Milwaukie Light Rail Transit Project
Clackamas County, Oregon

Dear Ms. Gehrke:

On February 12, 2010, the Advisory Council on Historic Preservation (ACHP) received your notification and supporting documentation regarding the adverse effects of the referenced undertaking on a property or properties listed or eligible for listing in the National Register of Historic Places. Based upon the information you provided, we have concluded that Appendix A, Criteria for Council Involvement in Reviewing Individual Section 106 Cases, of our regulations, “Protection of Historic Properties” (36 CFR Part 800), does not apply to this undertaking. Accordingly, we do not believe that our participation in the consultation to resolve adverse effects is needed. However, if we receive a request for participation from the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer, affected Indian tribe, a consulting party, or other party, we may reconsider this decision. Additionally, should circumstances change, and you determine that our participation is needed to conclude the consultation process, please notify us.

Pursuant to 36 CFR §800.6(b)(1)(iv), you will need to file the final Memorandum of Agreement (MOA), developed in consultation with the Oregon State Historic Preservation Office (SHPO) and any other consulting parties, and related documentation with the ACHP at the conclusion of the consultation process. The filing of the MOA and supporting documentation with the ACHP is required in order to complete the requirements of Section 106 of the National Historic Preservation Act.

Thank you for providing us with your notification of adverse effect. If you have any questions or require further assistance, please contact Blythe Semmer at 202-606-8552 or bsemmer@achp.gov.

Sincerely,

LaShavio Johnson
Historic Preservation Technician
Office of Federal Agency Programs
Hi Ethel,

Sorry about that.

NPS concurs with the FTA/SHPO determination on ER-08/0479.

Thanks,

Joe

Joe Carriero, External Affairs Program Manager

NPS Environmental Quality Division

Mail Address: P.O. Box 25287; Denver, CO 80225

Location: 7333 W. Jefferson Ave.; Lakewood, CO 80235

303-987-6999 (phone); 303-987-6617 (fax)
April 09, 2010

Elisabeth Bowers
Parametrix, Inc.
700 NE Multnomah, Suite 1000
Portland, OR 97232

Dear Ms. Bowers:

Thank you for requesting information from the Oregon Natural Heritage Information Center (ORNHIC). We have conducted a data system search for rare, threatened and endangered plant and animal records for your Portland-Milwaukie Light Rail Project in T01S R01E, Sections 2-4, 10, 11, 13, 14, 24-26, 35 and 36, and T02S R01E, Section 1, WM.

Thirty-seven (37) element occurrence records were noted within a two-mile radius of your project and are included on the enclosed computer printout.

Please remember that a lack of rare element information from a given area does not necessarily indicate there are no significant elements present, only that there is no information known to us from the site. To ensure there are no significant elements present that may be affected by your project, you should inventory the site during the appropriate season.

This data is confidential and for the specific purposes of your project and is not to be distributed. Please also note that as our database is continually updated, the data in this report should be considered current for a maximum of one year from the date it was generated and should not be cited thereafter.

Please forward the included invoice to the appropriate party in your organization for payment.

If you need additional information or have any further questions, please do not hesitate to contact me.

Sincerely,

Cliff Alton
Conservation Information Assistant
ciff.alton@oregonstate.edu
503.731.3070 x103

encl.: invoice (H-040910-CWA01)
computer printout and data key
April 15, 2010

Honorable Debora Pigsley, Chairman
Confederated Tribes of the Siletz Reservation
PO Box 349
Siletz, OR 97347

Dear Chairman Pigsley,

Enclosed please find a draft of the Final Environmental Impact Statement (FEIS) for the Portland-
Milwaukie Light Rail Project (PMLR) which includes, as Appendix K, a draft Memorandum of
Agreement (MOA) concerning historic and archaeological resources. Also separately enclosed is
Attachment A to the MOA, which includes the Archaeological Monitoring Plan, Treatment Plan and
Inadvertent Discovery Plan. The draft MOA and Attachment A were completed after a coordination
meeting on February 26, 2010, which was attended by representatives of the Oregon Office of Historic
Preservation.

As we noted in our letter to your natural resource coordinator on December 30, 2009,
concerning the draft Biological Assessment of this Project, there are substantial efforts have been made to
avoid or minimize the biological impacts of this project. In addition, the Project has made substantial
efforts to avoid cultural resources. For example the project:

- Assessed the potential for disturbance to underground cultural resources and completed shovel
testing, where possible, to determine whether any significant resources would be in jeopardy;
- Coordinated with the SHPO to assess potential cultural resources;
- Completed a draft inadvertent discovery plan.

We request that should you have comments about either document, that they be provided by April 30,
2010. If you are unable to complete your review within this timeframe, please provide a date
when we can anticipate comments. If you have any questions, please contact James (Steve)
Shumate at 206-320-4311, or via email at james.shumate@dot.gov.

Thank you,

Respectfully,

[Linda Gehle]
Deputy Regional Administrator

cc: Mike Kennedy, Natural Resources Manager
    Pam Shumate, Int. Tribal Planner
    Bridget Wieghaus, Metro
    Dave Dearworth, TriMet

Enclosures (7)
April 15, 2010

Honorable Bill Iyah, Chairman
Cowboy Indian Tribe
PO Box 2517
Longview, WA 98632-8514

Dear Chairman Iyah:

Enclosed, please find a draft of the Final Environmental Impact Statement (EIS) for the Portland-Milwaukie Light Rail Project (PMLR) which includes, as Appendix A, a draft Memorandum of Agreement (MOA) concerning historic and archaeological resources. Also separately enclosed is Attachment A to the MOA, which includes the Archeological Monitoring Plan, Deed Transfer Plan and Archeological Discovery Plan. The draft MOA and Attachment A were completed after a coordination meeting on February 26, 2010, which was attended via teleconference by Mr. dAVE burhingame, representing your tribe, as well as representatives of the Oregon Office of Historic Preservation.

As we noted in our letter to your natural resource coordinator in a letter of December 29, 2009, concerning the draft Biological Assessment of this Project, there are substantial efforts have been made to avoid or minimize the biological impacts of this project. In addition, the Project has made substantial efforts to avoid cultural resources. For example, the project has:

- Assessed the potential for disturbance of underground cultural resources and completed shovel testing, where possible, to determine whether any significant resources would be impacted.
- Coordinated with the SHPO and Mr. Burhingame to assess potential cultural resources.
- Completed a draft archaeological discovery plan.

We request that you share comments about either document that they be provided by April 30, 2010. If you are unable to complete your review within this timeframe, please provide a date when we can anticipate comments. If you have any questions, please contact James (Stevie) Skoron at 206-220-4304, or via email at james.skoron@dot.gov.

Thank you.

Respectfully,

[Signature]

Linda Gehrke
Deputy Regional Administrator

cc: Shannon J. Wells, Lead Biologist
    dAVE burhingame, Cultural Resources
    Bridget Wiegman, Metz
    Dave Onswein, Tribes

Enclosures (2)
April 15, 2010

Honorable Ray Gardner, Chairman
Chinook Indian Tribe
PO Box 350
Ray Center, WA 98647

Dear Chairman Gardner,

I am pleased to inform you that the draft Final Environmental Impact Statement (FEIS) for the Portland-Milwaukie Light Rail Project (PMLR) which includes, as Appendix N, a draft Memorandum of Agreement (MOA) concerning historic and archaeological resources. Also separately enclosed is Attachment A to the MOA which includes the Archaeological Monitoring Plan, Treatment Plan, and Incentive Discovery Plan. The draft MOA and Attachment A were completed after a coordination meeting on February 26, 2010, with representatives of the Oregon Office of Historic Preservation.

As we noted in our letter to your natural resource coordinator in a letter of December 29, 2009, concerning the draft Biological Assessment of this Project, there are substantial efforts have been made to avoid or minimize the biological impacts of this project. In addition, the Project has made substantial efforts to avoid cultural resources, for example, the project has:

- Assessed the potential for disturbance of underground cultural resources and contained soil testing, where possible, to determine whether any significant resources would be in jeopardy;
- Coordinated with the SHPO to assess potential cultural resources;
- Completed a draft involvement discovery plan.

We request that should you have comments about other documents, that they be provided by April 30, 2010. If you are unable to complete your review within this timeframe, please provide a date when you anticipate comments. If you have any questions, please contact James (Steve) Sexton at 206-220-4311, or via email at james.sexton@dot.gov.

Thank you.

Respectfully,

[Signature]

Linda Gehrke
Deputy Regional Administrator

cc: Tony Johnson, Natural Resources
    Bridget Wiegard, Metro
    Dave Unsworth, TriMet

Enclosures (2)
April 13, 2010

Honorable Cheryl Kennedy, Chairwoman,
Confederated Tribes of the Grand Ronde Community of Oregon
9615 Grand Ronde Road
Grand Ronde, OR 97347

Dear Chairwoman Kennedy,

Enclosed please find a draft of the Final Environmental Impact Statement (FEIS) for the Portland-Milwaukie Light Rail Project (PMLR) which includes, as Appendix N, a draft Memorandum of Agreement (MOA) concerning historic and archaeological resources. Also separately enclosed is Attachment A to the MOA, which includes the Archaeological Monitoring Plan, Mitigation Plan and Final Draft Discovery Plan. The draft MOA and Attachment A were completed after a coordination meeting on February 26, 2010, which was attended by Mr. Erik Haugegard, representing your tribe, as well as representatives of the Oregon Office of Historic Preservation.

As we noted in our letter to your natural resource coordinator in a letter of December 23, 2009, concerning the draft Biological Assessment of this Project, there are substantial efforts have been made to avoid or minimize the biological impacts of this project. In addition, the Project has made substantial efforts to avoid cultural resources. For example, the project has:
- Assessed the potential for disturbance of underground cultural resources and completed shovel testing, where possible, to determine whether any significant resources would be impacted.
- Coordinated with the CRM and Mr. Haugegard to assess potential cultural resources.
- Completed a draft mitigation discovery plan.

We request that should you have comments about either document that they be provided by April 30, 2010. If you are unable to complete your review within this timeframe, please provide a date when we can anticipate comments. If you have any questions, please contact James (Steve) Sisson at 206-224-4811, or via e-mail at james.sisson@dot.gov.

Thank you.

Respectfully,

[Signature]

[Title]

[Signature]

[Title]

cc: Mike Wilson, Director, Natural Resources
    Mike Kamrowski, Natural Resources
    Erik Haugegard, Cultural Resources
    Bridget Wiegart, Metro
    Dave Lessworth, TriMet

Enclosures (2)
April 15, 2010

Honorable Ron Supplee, Council Chairman
Confederated Tribes of the Warm Springs Reservation of Oregon
1233 Veterans St.
Warm Springs, OR 97751

Dear Chairman Supplee,

Enclosed please find a draft of the Final Environmental Impact Statement (FEIS) for the Portland-Milwaukie Light Rail Project (PMLR) which includes Appendix N, a draft Memorandum of Agreement (MOA) concerning historic and archaeological resources. Also separately enclosed is Attachment A to the MOA which includes the Archaeological Monitoring Plan, Treatment Plan, and Involvement Discovery Plan. The draft MOA and Attachment A were completed after a coordination meeting on February 26, 2010, which was attended by representatives of the Oregon Office of Historic Preservation.

As we noted in our letter to your natural resource coordinator in a letter of December 29, 2009, concerning the draft Biological Assessment of this project, there are substantial efforts have been made to avoid or minimize the biological impacts of this project. In addition, the Project has made substantial efforts to avoid cultural resources. For example the project has:

- Assessed the potential for disturbance of underground cultural resources and completed shovel testing, where possible, to determine whether any significant resources would be impacted;

We expect that should you have comments about either document, that they be provided by April 30, 2010. If you are unable to complete your review within this timeframe, please provide a date when we can anticipate comments. If you have any questions, please contact James (Steve) Sexton at 206-245-4341, or via email at james.sexton@fera.gov.

Thank you.

Respectfully,

[Signature]

Linda Giangiuli
Deputy Regional Administrator

cc: Kenneth Ratliff, Natural Resources
    Sally Flint, Cultural Resources
    Steve Sexton, FTA
    Bridget Wiegman, M.are
    Dave Unsworth, TRMet
Ms. Linda Gehrke  
Deputy Regional Administrator  
Federal Transit Administration  
Region X  
915 Second Ave., suite 3142  
Seattle, WA 98174-1002

Dear Ms. Gehrke:

The Final Environmental Impact Statement for the South Corridor, Portland/Milwaukie Light Rail Project appears adequate for our bridge permit process. This refers to those parts concerning proposed structures and navigation on the Willamette River, which we would adopt from a Final Environmental Impact Statement prior to any permit action. As a cooperating agency, the Coast Guard has no substantive differences with the document or the technical appendices submitted for our review. However, we will analyze information from other sources as well to make our determination about proposed bridge locations and clearances.

If you have any questions, please call me at (206) 220-7282.

Sincerely,

Austin Pratt  
Chief, Bridge Section  
By direction of the District Commander
Appendix B

Environmental Justice Compliance
APPENDIX B. ENVIRONMENTAL JUSTICE COMPLIANCE

This appendix describes the Portland-Milwaukie Light Rail Project’s compliance with Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations, and the U.S. Department of Transportation (USDOT), Order to Address Environmental Justice in Minority Populations and Low-Income Populations. The USDOT offers the following definition of Environmental Justice:

The term environmental justice was created by people concerned that everyone within the United States deserves equal protection under the country’s laws. Executive Order 12898, issued in 1994, responded to this concern by organizing and explaining in detail the Federal government’s commitment to promote environmental justice. Each Federal agency was directed to review its procedures and to make environmental justice part of its mission by identifying and addressing the impacts of all programs, policies, and activities on minority populations and low-income populations. The U.S. Department of Transportation (DOT) issued its DOT Order to Address Environmental Justice in Minority Populations and Low-Income Populations in 1997. The Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) have been working with their State and local transportation partners to make sure that the principles of environmental justice are integrated into every aspect of their transportation mission.

Principles of Environmental Justice are to:

- Ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
- Avoid, mitigate, or minimize disproportionately high and adverse human health and environmental impacts, including social and economic impacts, on minority and low-income populations.
- Prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

B.1 PUBLIC INVOLVEMENT AND OUTREACH PROGRAM

This section summarizes the Portland-Milwaukie Light Rail Project’s public involvement processes addressing the project’s efforts to ensure “full and fair participation by all potentially affected communities.” For additional information, refer to Chapter 6, Community Participation, Agency Coordination, and Required Permits.

Metro and TriMet have been including potentially impacted minority and low-income populations in their public involvement activities throughout the evolution of the South/North, South Corridor, and Portland-Milwaukie Light Rail projects. Identifying and involving minority and low-income populations will continue through preliminary engineering and construction.
Early in the project, staff evaluated 2000 U.S. Census data and reviewed past documentation of the study area to identify concentrations of low-income, Hispanic, or minority residents. No significant concentrations of these groups were identified. However, since some limited low-income, Hispanic or minority populations were identified, areas with potential concentrations of these groups were targeted for door-to-door canvassing. Public involvement staff used these door-to-door visits to explain the project, discuss concerns, invite further involvement, and note concentrations of people who would require further specialized outreach, such as non-English speakers. These visits were also used as an opportunity to expand the project mailing list to ensure that residents would continue to be informed. Newsletters or information about upcoming meetings as well as staff contact information were left for residents who were not at home.

Outreach efforts to the public and to potentially protected populations were conducted as part of the South/North Corridor Project Draft Environmental Impact Statement (DEIS) in 1996 to 1998, for the South Corridor Project Supplemental Draft Environmental Impact Statement (SDEIS) effort in 2000 to 2002, and again when the Portland-Milwaukie Light Rail Project SDEIS was re-initiated in late 2006 and early 2007. Potentially affected communities have been included in the project’s additional outreach and communications since the process. For the Portland-Milwaukie Light Rail Project SDEIS, U.S. Census 2000 and American Community Survey (ACS) 2005 poverty data were used to help identify changes to demographics, including low-income and minority communities. Project staff also consulted with local jurisdictions to help identify any potentially affected parties that should be invited to participate.

**B.2 ANALYSIS OF PROJECT IMPACTS ON LOW-INCOME AND MINORITY POPULATIONS**

This section summarizes the analysis of impacts on low-income and minority populations that could occur with the Portland-Milwaukie Light Rail Project. The discussion begins with definition of terms and thresholds used for the analysis, followed by findings of impacts and benefits of the project. This section concludes by identifying potential mitigation measures that could minimize impacts to low-income and minority populations.

**B.2.1 Analysis Methods**

The analysis methods used in this environmental justice analysis follow. They are based on guidelines for effective practices outlined by the USDOT through the Federal Highway Administration and Federal Transit Administration. These guidelines do not specify the thresholds that should be used to determine the location of minority, Hispanic, or low-income populations or communities, but do recommend using census data, especially if it represents the most up-to-date data available. In terms of size of population or community, the following guidance is given:

While the minority or low-income population in an area may be small, this does not eliminate the possibility of a disproportionately high and adverse effect of a proposed action. Environmental Justice determinations are made based on effects, not population size. It is important to consider the comparative impact of an action among different population groups.
The threshold of disproportionately high and adverse impacts requires impacts to be greater in magnitude or appreciably more severe for a low-income or minority community than those suffered by non-low-income or non-minority populations/communities.

Potential minority and Hispanic populations or communities for this project were identified by comparing the U.S. Census 2000 minority or Hispanic proportion of the population of each census block group with the minority or Hispanic proportion of the population for all census tracts within the Metro Urban Growth Boundary (UGB). Similarly, potential low-income populations or communities were identified by comparing the U.S. Census proportion of households below poverty level of each census block group with proportion of households below the poverty level within the Metro UGB.

In addition, the same U.S. Census data were used to estimate the probable number of minority, Hispanic, and low-income displacements and the characteristics of potential rider populations receiving improved transit service.

The analysis for the Portland-Milwaukie SDEIS and Final Environmental Impact Statement (FEIS) considers U.S. Census information, as well as 2005-2008 ACS data for changes in overall trends of population growth, poverty, and minority status at the county level. The ACS data was generally consistent with earlier U.S. Census data; however, as sample data it has a wider margin of error.

**B.2.2 Findings**

**B.2.2.1 Overall Project Evaluation**

According to the U.S. Census 2000, 18.7 percent of residents within the Metro UGB were members of a minority group, compared to 17.1 percent within the Tri-County area and 10.5 percent in the Portland-Milwaukie Light Rail Project Corridor (represented by block groups adjacent to the light rail project alignment). Residents of Hispanic origin comprise only 8.3 percent of the population within the Metro UGB population, 8.0 percent within the Tri-County area, and 4.3 percent in the census block groups of the Portland-Milwaukie Light Rail Project Corridor. A higher proportion of households within the Portland-Milwaukie corridor block groups (10.0 percent) had incomes below the federally defined poverty level in 1999 than the proportion in either the Metro UGB (9.4 percent) or the Tri-County area (8.7 percent). ACS data from 2005 suggest little change in racial ethnic, and low-income make-up in the project area.

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1 The census compares household income to federal standards based on household size and composition in developing statistics to describe poverty rates by census tract (U.S. Census Bureau 2000, Summary File 3 Technical Documentation).
Table B.2-1
Comparison of Environmental Justice Population Ratios

<table>
<thead>
<tr>
<th>Area</th>
<th>Population</th>
<th>% Minority</th>
<th>% Hispanic</th>
<th>% Poverty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portland-Milwaukie Project Corridor Census Block Groups (2005)</td>
<td>23,404</td>
<td>10.6%</td>
<td>4.3%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Metro UGB (2000)</td>
<td>1,190,993</td>
<td>18.7%</td>
<td>8.3%</td>
<td>9.4%</td>
</tr>
<tr>
<td>Tri-County area</td>
<td>1,444,219</td>
<td>17.1%</td>
<td>8.0%</td>
<td>8.7%</td>
</tr>
</tbody>
</table>

Note: Percent minority and percent Hispanic refer to proportion of populations, whereas percent poverty indicates the proportion of households below the poverty level.

Downtown Portland was the only neighborhood with a higher proportion of minority residents than average for the Metro UGB. None of the neighborhoods had a higher concentration of Hispanic residents than the average for the Metro UGB. Downtown Portland, Brooklyn, Hosford-Abernethy, Sellwood-Moreland, and Ardenwald neighborhoods had higher proportions of low-income residents than the Metro UGB average. See Section 1.2.2.2 for analysis regarding the Ruby Junction Maintenance Facility.

Up to 11 residential displacements are expected to result from the project. Ten of these are in the segment between SE Lake Road and SE Park Avenue, and would only occur with the LPA to Park Avenue. These displacements would occur in areas that have relatively low levels of minority, Hispanic, or low-income populations. Additionally, eleven residential displacements constitute a low impact overall, considering the length of new light rail corridor to be provided and the fact that displacement would be mitigated by relocation assistance. Therefore, no adverse and disproportionate impacts are anticipated for the project.

Section 3.1 of the FEIS discusses the number of displaced businesses and other buildings by the Portland-Milwaukie Light Rail Project. Determination of minority or Hispanic business ownership is not easily quantified or estimated. As a result, no quantitative estimate has been made. However, no predominantly minority or Hispanic business districts are known to be among those impacted by the light rail alignment. The affected properties and resulting displacements are also distributed throughout the corridor, with only one area (SE 17th Avenue) affecting multiple properties. Compared to other linear projects, including highways or other major public works facilities, this represents a low number of property and business impacts.

B.2.2.2 Neighborhood Impacts and Benefits

The Community Impacts Assessment in the FEIS (Section 3.3) identifies cohesion and livability impacts of the Portland-Milwaukie Light Rail Project by neighborhood. None of the neighborhoods, including those few with more minority or low income populations than the regional norm, were found to have adverse affects that significantly impacted quality of life factors such as access to public services, neighborhood cohesion, noise, traffic, or air quality.
Locally Preferred Alternative to Park Avenue, LPA Phasing Option and Minimum Operable Segment to Lake Road

An analysis of probable racial, ethnic origin, and income characteristics of individuals living within a quarter-mile radius of stations was performed for the South Corridor Alternatives in 2002 to identify characteristics of potential riders. Since this information was based on the U.S. Census 2000, the latest available detailed information on socioeconomic characteristics by area, it remains a good indication of the likely benefits anticipated for the project. These characteristics of potential riders were evaluated to determine who would benefit from each of the South Corridor alternatives. Although transit riders could live anywhere, those residing within walking distance (one-quarter mile of stations) are commonly considered to receive improved access to transit services. The FEIS analysis has also considered more recently available information, including American Community Survey information, to confirm that the comparison of the affected areas to local and regional populations remained reasonable.

Table B.2-2 illustrates the benefit of light rail to potential Environmental Justice populations in the Portland-Milwaukie Light Rail Project Corridor.

| Characteristics of Potential Rider Populations for Portland-Milwaukie Light Rail Project |
|--------------------------------|-------------------------------|----------------|----------------|----------------|
|                                | Households                     | Probable Percent Minority | Probable Percent Hispanic | Probable Percent Below Poverty |
| LPA to Park Ave. and LPA       | 17,750                         | 13.2%                      | 4.4%                       | 12.6%                      |
| Phasing Option (2008 households within 1/2-mile of stations) |                                |                             |                            |                            |
| MOS to Lake Rd. (2008 households within 1/2-mile of stations) | 16,000                         | 13.5%                      | 4.1%                       | 12.9%                      |
| Metro UGB                      | 620,675                        | 18.7%                      | 8.3%                       | 9.4%                       |

Sources: Metro, U.S. Census 2000.

Note: In order to determine the exact proportion of minority, Hispanic, or persons below poverty level, a survey of all residents within the station areas would be necessary. In lieu of a survey, an estimate of the probable proportion of residents within a quarter-mile radius of stations has been made. This has been done by taking a weighted average of representation of these groups within the census block groups that intersect the quarter-mile radius, applying it to the estimated population within the radius, summing results for stations for the LPA to Park Avenue and the MOS to Lake Road, and dividing it by total population within the station radii.

The light rail project would provide a direct transit benefit to low-income populations. The proportion of low-income households within one-quarter mile of a station area for the project is slightly higher than the average within the Metro UGB, likely because the project uses rights-of-way along several major existing transportation facilities, including the Union Pacific Railroad (UPRR). While the project would serve many minority and Hispanic people, it would not provide a direct transit benefit to areas with a higher concentration of minority or Hispanic residents than the average concentration within the Metro UGB.

Ruby Junction Maintenance Facility

TriMet’s existing Ruby Junction Operations and Maintenance Facility in the Rockwood neighborhood of Gresham would be expanded to support the Portland-Milwaukie Light Rail Project and other expansions on the system. The expansion would require enlarging the existing
facility site, including the addition of new structures and storage tracks. Fifteen parcels would be impacted by the expansion of the Ruby Junction Maintenance Facility (nine parcels under the LPA Phasing Option: four residences, three businesses, and two parcels containing both a business and a residence), located in the Rockwood neighborhood in Gresham, Oregon. Within those fifteen parcels, six residences and ten businesses would be displaced. As described in Sections 3.1 and 3.3, these acquisitions and displacements would be mitigated by compensation and relocation assistance, in compliance with federal requirements.

Census data for the area surrounding the Ruby Junction Facility site indicate that 39 percent of the residents are minority and 35 percent have incomes below the poverty line. Given these data, initial observations at the time of the SDEIS had indicated that the expansion of the Ruby Junction Facility could result in a disproportionate impact to low-income or minority populations.

The project team then surveyed the properties that would be displaced or partially displaced by the expansion at Ruby Junction to determine whether those impacted by the project match the demographic characteristics of population in the area. The survey shows that the nine occupied residences that would be displaced differ somewhat from the characteristics of the census tract data as a whole, and more closely resemble those in Multnomah County. Only three of these nine residences (or 33 percent) reported Hispanic or Latino ethnicity. One residence indicated some other race, and five indicated Caucasian race. Additionally, only two of the nine residences (or 22 percent) potentially earn incomes below the poverty level, based on the number of occupants in the household and the total annual income reported. The survey indicated there are six people between 0 and 18 years of age, 17 people between 19 and 64 years of age, and three people aged 65 and older living in the Ruby Junction area residences.

These surveys indicate that fewer environmental justice populations will be impacted than would be expected from census data. However, Table B.2-3 shows that compared to Multnomah County population data, the minority composition is a little more than a third higher than the county. The proportion of the low-income population in the surrounding Rockwood neighborhood is nearly double that of Multnomah County. These findings indicate that, when assessed in isolation, the displacements at Ruby Junction would disproportionately impact environmental justice populations, even though the statistical sample size of the affected businesses and residences is low and the impacted properties are adjacent to an existing facility in an industrially zoned area. However, considering the overall displacements for the project, they do not represent a disproportionate impact. With the mitigation proposed that provides compensation and relocation assistance in accordance with federal regulations, impacts to Ruby Junction residents are not expected to be high.

<table>
<thead>
<tr>
<th>Table B.2-3</th>
<th>Ruby Junction Area Minority and Low-Income Populations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area</td>
<td>Residences Subject to Displacement</td>
</tr>
<tr>
<td>Percent Minority</td>
<td>33%</td>
</tr>
<tr>
<td>Percent Low-Income</td>
<td>22%</td>
</tr>
</tbody>
</table>
Although displacements in the Rockwood neighborhood for the Ruby Junction expansion must follow the Uniform Relocation Act, the nature of some of the displaced residences and businesses may require special consideration. Several of the properties being impacted house both an industrial type of business and a residence. This unique setting allows for small industrial business owners to live and work at the same location, which may not be possible after standard relocation to a new neighborhood. The project could provide commute assistance if no suitable site will allow for a similar home occupation, or support for development of a new home occupation where appropriate. While a phased approach to expansion would reduce business and residential replacements, the remaining properties are concentrated in one area that is already bordered by industrial uses at the southern terminus at NW Eleven Mile Road. These remaining properties, which include one residence, would be in a similar setting to what they have today, although properties to the west and the northwest would be redeveloped to accommodate the expanded maintenance facility. On a weekly basis, the remaining properties would experience occasional delays due to the new light rail crossings of NW Eleven Mile Road. The remaining properties, as well as those that are nearby today, represent a mixture of uses that are not considered interdependent, particularly given the heavy industrial setting of the area. Other properties that are acquired whose uses are displaced would receive the same relocation assistance and compensation mitigation as described for the full expansion of Ruby Junction.

B.2.2.3 Conclusion

In evaluating whether the Portland-Milwaukie Light Rail Project would result in high and adverse environmental or health impacts being borne disproportionately by low-income, minority, and Hispanic populations, guidelines indicate that offsetting benefits, mitigation and enhancement measures, design, comparative impacts, and the number of similar existing system elements in non-minority and non-low-income areas may be taken into account. The light rail project would provide the offsetting benefit of direct transit service to those station areas within neighborhoods containing concentrations of minority and low-income households that exceed the average concentration of low-income households in the corridor.

Adverse project-related impacts such as unmitigated noise impacts, traffic impacts, visual impacts, and displacements do not fall disproportionately on minority or Hispanic populations, because most of the affected neighborhoods have ratios of minorities below the ratios at the county, Metro UGB, and/or Tri-County level. Three of eleven neighborhoods have ratios of higher than the Multnomah County level but still lower than the Tri-County area. Only Downtown Portland and Rockwood (Gresham) neighborhoods are higher than the Multnomah County, Metro UGB, and Tri-County levels. All but one neighborhood (Historic Milwaukie) have lower ratios of Hispanic populations than all three larger geographies.

Adverse impacts such as unmitigated noise impacts, traffic impact, visual impacts, and displacements do not fall disproportionately on low-income communities. The light rail alignment would affect four out of eleven neighborhoods that have slightly higher ratios of low-income populations than Multnomah County. The Downtown Portland neighborhood has a noticeably higher proportion of low-income people than any of the three larger geographies.

2 Station area is defined as one-quarter-mile radius of stations.
However, the area near the alignment does not appear to contain low-income housing or areas, and the project would provide offsetting benefits.

The exception to these conclusions is at the Ruby Junction Maintenance Facility (the twelfth affected neighborhood, but not part of the alignment itself), where there could be disproportional impacts to low-income and minority persons, although the number of affected parties remains low compared to the total population in Gresham. In addition, with compensation and relocation assistance, impacts are expected to remain low.

Therefore, according to the definition established in Executive Order 12898, the Portland-Milwaukie Light Rail Project would, in general, not result in high and adverse human health, environmental, social, and/or economic impacts.

B.3 MITIGATION AND ENHANCEMENTS

Potential impact-specific mitigation measures for the alternatives and design options are reviewed in Chapters 3 and 4 of this FEIS. The same mitigation measures described the general community would apply to Environmental Justice populations. These include the use of TriMet's public involvement programs that provide outreach and communications to a variety of populations, including populations whose primary language is not English, and the compensation and relocation programs offered as mitigation for displaced property owners, businesses, and residents.
APPENDIX C. SUPPORTING DOCUMENTS

The following Portland-Milwaukie Light Rail Project supporting documents are available for review at Metro offices.

1. Portland-Milwaukie Light Rail Project, Detailed Definition of Alternatives, October 2007, and supporting documents including:
   - Portland-Milwaukie Refinement Report, Metro, May 2007
   - Portland-Milwaukie Light Rail Project Downtown Milwaukie Alignments Review, Metro, June 2007
   - Portland-Milwaukie Light Rail Project Downtown Milwaukie Workshop Summary SE Main Street/SE 21st Avenue, Metro, August 2007

2. Methodology and Results Reports for each of the following topic areas. The reports include detailed reference and methods information for information provided in the Portland-Milwaukie Supplemental Draft Environmental Impact Statement (SDEIS) and Final Environmental Impact Statement (FEIS).
   - Acquisitions and Displacements
   - Land Use and Economy
   - Community Impact Assessment (Social and Neighborhood impacts, and Environmental Justice/Title VI)
   - Visual Quality and Aesthetics (with Visual Simulations)
   - Historic, Archaeological and Cultural Resources
   - Parklands, Recreation Areas Wildlife and Waterfowl Refuge Impacts, and Section 4(f)
   - Geology and Soils
   - Ecosystems and Endangered Species
   - Water Quality and Hydrology
   - Noise and Vibration
• Air Quality
• Energy
• Hazardous Materials
• Transit Impacts and Travel Demand Forecasting
• Local and Systemwide Traffic Impacts
• Capital Costs
• Operating and Maintenance Costs


5. Portland-Milwaukie Light Rail Project Final EIS Results Reports
   • Biological Assessment: Portland-Milwaukie Light Rail Project, October 2009, amended February 2010
   • Portland-Milwaukie Light Rail Project Transportation Results Report, July 2010
   • Portland-Milwaukie Light Rail Project Noise and Vibration Results Report, July 2010
   • Portland-Milwaukie Light Rail Project Section 106/Historic and Archeological Resources Results Report, July 2010
   • Portland-Milwaukie Light Rail Project Navigation Technical Report, May 2010

6. Portland-Milwaukie Light Rail Project Public Comments and Responses (Appendix P to the FEIS), July 2010.


In addition, the following supporting documents were prepared for previous studies and are available for review at Metro.


2. South Corridor Project Supplemental Draft Environmental Impact Statement and Executive Summary, December 2002
3. South Corridor Project Public Comment Report, February 2003

4. South Corridor Project Downtown Amendment to the South Corridor Project Supplemental Draft Environmental Impact Statement, October 2003

5. Downtown Light Rail Systems Analysis Prepared in Conjunction with the South Corridor Study, December 2002

6. South Corridor Project SDEIS Results Reports, November 2002
   - Air Quality Analysis Results Report
   - Capital Costs Analysis Results Report
   - Community Impact Assessment Results Report
   - Ecosystems Impacts Results Report
   - Appendix C to the Ecosystem Results Report, Wetland Determination Report
   - Energy Impacts Results Report
   - Financial Analysis Results Report
   - Geology, Soils and Seismic Impacts Results Report
   - Historic, Archaeological and Cultural Impacts Results Report
   - Hazardous Materials Impacts Results Report
   - Land Use and Economic Activity Results Report
   - Noise and Vibration Results Report
   - Operations and Maintenance Costs Results Report
   - Parklands, Recreation Areas, Wildlife and Waterfowl Refuges (Section 4(f)) Results Report
   - Local Traffic Impacts Results Report
   - Travel Forecasting and Transit Analysis Results Report
   - Visual Quality and Aesthetics Results Report
   - Water Quality and Hydrology Results Report

7. South Corridor Project Methods Reports, November 2002
• Evaluation and Financial Methods Report, April 2002
• Transportation Analysis Methods Report, February 15, 2002
• Social, Economic and Environmental Methods Report, February 15, 2002
• Historic, Archaeological and Cultural Impact Analysis Methods Report
• Operating and Maintenance Cost Methods Report, February 15, 2002
• Approach to Threatened and Endangered Species

8. South Corridor Project Detailed Definition of Alternatives Report, April 2002
   • Light Rail Plan and Profile Drawings
   • BRT and Busway Plan and Profile Drawings
   • Detailed Definition of Alternatives Report

9. South Corridor Transportation Alternatives Study, October 2002
   • Public Comments Report
   • South Corridor Evaluation Report, October 16, 2000
   • South Corridor Evaluation Summary, October 16, 2000
   • Wide Range of Alternatives Report
   • South Corridor Background Report, January 2000

    • North Corridor Comments Received, October 1999


    • Results Reports
    • Methods Reports
    • Definition of Alternatives
Portland-Milwaukie Light Rail Project

Visual Simulation Locations

Figure D.1-1

- **Light Rail alternative**
- Simulation location and direction

<table>
<thead>
<tr>
<th>Location</th>
<th>Figure</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.2-1</td>
<td>Lincoln Street</td>
</tr>
<tr>
<td>D.3-1</td>
<td>Moody Avenue</td>
</tr>
<tr>
<td>D.4-1</td>
<td>Harbor Drive</td>
</tr>
<tr>
<td>D.5-1</td>
<td>Willamette River/OMSI</td>
</tr>
<tr>
<td>D.6-1</td>
<td>Caruthers Street/Greenway Trail</td>
</tr>
<tr>
<td>D.7-1</td>
<td>Willamette River/Ross Island Bridge</td>
</tr>
<tr>
<td>D.8-1</td>
<td>Rhine Street</td>
</tr>
<tr>
<td>D.9-1</td>
<td>Center Street</td>
</tr>
<tr>
<td>D.10-1</td>
<td>Harold Street</td>
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<tr>
<td>D.11-1</td>
<td>Tacoma Street overpass</td>
</tr>
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<td>D.12-1</td>
<td>Roswell Street</td>
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<td>D.17-1</td>
<td>21st/Adams Street</td>
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<tr>
<td>D.18-1</td>
<td>McLoughlin/Lake Road</td>
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<tr>
<td>D.19-1</td>
<td>Lake Road</td>
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<tr>
<td>D.20-1</td>
<td>Robert Kronberg Park</td>
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<td>D.21-1</td>
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<tr>
<td>D.22-1</td>
<td>22nd/Bluebird St.</td>
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<tr>
<td>D.23-1</td>
<td>Trolley Trail</td>
</tr>
<tr>
<td>D.24-1</td>
<td>McLoughlin/Park Avenue</td>
</tr>
<tr>
<td>D.25-1</td>
<td>McLoughlin Blvd.</td>
</tr>
</tbody>
</table>
Visual Simulations

Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

Figure D.2-1
View from SW Lincoln Street - Existing Condition
Looking west

Figure D.2-1a
View from SW Lincoln Street - Portland-Milwaukie Light Rail Project
Looking west
Visual Simulations

Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

Figure D.3-1
View from SW Moody Avenue - Existing Condition
Looking west

Figure D.3-1a
View from SW Moody Avenue - Portland-Milwaukie Light Rail Project
Looking west
Visual Simulations

Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

Figure D.4-1
View from SW Harbor Drive - Existing Condition
Looking north

Figure D.4-1a
View from SW Harbor Drive - Portland-Milwaukie Light Rail Project
Looking north
Visual Simulations

Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

Figure D.5-1
View from OMSI Submarine - Existing Condition
Looking southwest

Figure D.5-1a
View from OMSI Submarine - Portland-Milwaukie Light Rail Project
Looking southwest
Visual Simulations

Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

Figure D.6-1
View from SE Caruthers Street and Greenway Trail - Existing Condition
Looking west

Figure D.6-1a
View from SE Caruthers Street and Greenway Trail - Portland-Milwaukie Light Rail Project
Looking west
Visual Simulations

Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

Figure D.7-1
View from Ross Island Bridge - Existing Condition
Looking north

Figure D.7-1a
View from Ross Island Bridge - Portland-Milwaukie Light Rail Project
Looking north
Visual Simulations

Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

Figure D.8-1
View from SE Rhine Street and SE 17th Avenue - Existing Condition
Looking north

Figure D.8-1a
View from SE Rhine Street and SE 17th Avenue - Portland-Milwaukie Light Rail Project
Looking north
Visual Simulations

Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

Figure D.9-1
View from SE Center Street and SE 17th Avenue - Existing Condition
Looking north

Figure D.9-1a
View from SE Center Street and SE 17th Avenue - Portland-Milwaukie Light Rail Project
Looking north
Visual Simulations

Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

Figure D.10-1
View from SE Harold Street - Existing Condition
Looking east

Figure D.10-1a
View from SE Harold Street - Portland-Milwaukie Light Rail Project
Looking east
Figure D.11-1
View from Tacoma Street overpass - Existing Condition
Looking southeast

Figure D.11-1a
View from Tacoma Street overpass - Portland-Milwaukie Light Rail Project
Looking southeast

Visual Simulations

Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

This image depicts the multi-story Tacoma Park-and-Ride assumed for the LPA to Park Avenue. The LPA Phasing Option would initially construct a smaller facility with surface parking. See Appendix H for design drawings.
Visual Simulations

Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

Figure D.12-1
View from SE Roswell Street and SE 28th Avenue - Existing Condition
Looking west

Figure D.12-1a
View from SE Roswell Street and SE 28th Avenue - Portland-Milwaukie Light Rail Project
Looking west
Visual Simulations

Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

Figure D.13-1
View from SE Rockvorst Street and SE Roswell Street - Existing Condition
Looking west

Figure D.13-1a
View from SE Rockvorst Street and SE Roswell Street - Portland-Milwaukie Light Rail Project
Looking west
Visual Simulations

Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

Figure D.14-1
View from SE Harrison Street - Existing Condition
Looking southwest

Figure D.14-1a
View from SE Harrison Street - Portland-Milwaukie Light Rail Project
Looking southwest
Visual Simulations

Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

Figure D.15-1
View from SE Monroe Street - Existing Condition
Looking northeast

Figure D.15-1a
View from SE Monroe Street - Portland-Milwaukie Light Rail Project
Looking northeast
Visual Simulations

Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

Figure D.16-1
View from SE Washington Street - Existing Condition
Looking northeast

Figure D.16-1a
View from SE Washington Street - Portland-Milwaukie Light Rail Project
Looking northeast
Visual Simulations

Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

Figure D.17-1
View from SE 21st Avenue and SE Adams Street - Existing Condition
Looking west

This image depicts the Lake Road/Milwaukie Station: with side and center platforms, as associated with the LPA to Park Avenue. With the LPA Phasing Option this station would be built with a center platform only, but would allow construction of a side platform in the future. See Appendix H for design drawings.

Figure D.17-1a
View from SE 21st Avenue and SE Adams Street - Portland-Milwaukie Light Rail Project
Looking west
Visual Simulations

Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

Figure D.18-1
View from SE McLoughlin Boulevard - Existing Condition
Looking north

Figure D.18-1a
View from SE McLoughlin Boulevard - Minimum Operable Segment
Looking north
Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

Figure D.19-1
View from SE Lake Road - Existing Condition
Looking northwest

This image depicts a station with side and center platforms, as associated with the LPA to Park Avenue. With the LPA Phasing Option this station would be built with a center platform only, but would still allow construction of a side platform in the future. See also Appendix H for design drawings.

Figure D.19-1a
View from SE Lake Road - Portland-Milwaukie Light Rail Project
Looking northwest
Visual Simulations

Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

Figure D.20-1
View from Robert Kronberg Park - Existing Condition
Looking northwest

Figure D.20-1a
View from Robert Kronberg Park - Portland-Milwaukie Light Rail Project
Looking northwest
Visual Simulations

Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

Figure D.21-1
View from SE McLoughlin Boulevard - Existing Condition
Looking northwest

Figure D.21-1a
View from SE McLoughlin Boulevard - Portland-Milwaukie Light Rail Project
Looking northwest
Visual Simulations

Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

Figure D.22-1
View from SE 22nd Avenue and SE Bluebird Street - Existing Condition
Looking north

Figure D.22-1a
View from SE 22nd Avenue and SE Bluebird Street - Portland-Milwaukie Light Rail Project
Looking north
Visual Simulations

Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

Figure D.23-1
Illustration of Trolley Trail - Portland-Milwaukie Light Rail Project

Figure D.23-2
Illustration of Trolley Trail - Portland-Milwaukie Light Rail Project
Visual Simulations

Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

Figure D.24-1
View from SE Park Avenue - Existing Condition
Looking east

Figure D.24-1a
View from SE Park Avenue - Portland-Milwaukie Light Rail Project
Looking east

This image depicts the multi-story Park Avenue Park-and-Ride assumed for the LPA to Park Avenue. The LPA Phasing Option would initially construct a smaller facility with fewer floors. See also Appendix H for design drawings.
Visual Simulations

Note: These simulations have been prepared to illustrate the Portland-Milwaukie Light Rail Project for the Final Environmental Impact Statement. The illustrations are based on Preliminary Engineering (25% design set) and are subject to change. See Chapter 2 for a description of the project illustrated here.

Figure D.25-1
View from SE McLoughlin Boulevard - Existing Condition
Looking north

This image depicts the multi-story Park Avenue Park-and-Ride assumed for the LPA to Park Avenue. The LPA Phasing Option would initially construct a smaller facility with fewer floors. See Appendix H for design drawings.

Figure D.25-1a
View from SE McLoughlin Boulevard - Park Avenue Park-and-Ride
Looking north
APPENDIX E. LIST OF PREPARERS

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Jane McFarland, Multnomah County
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Ron Papsdorf, City of Gresham
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Deborah Kafoury, Multnomah County
Jason Tell, Oregon Department of Transportation
Rick Williams, Citizens Advisory Committee
Robert Liberty, Metro
Sue Keil, City of Portland
Susan Stone, City of Milwaukie
Bruce Warner, Portland Development Commission
Jim Bernard, Clackamas County/City of Milwaukie

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Barbara Andersen, Oak Grove
Heather Andrews, Bicycle Transportation Alliance (past member)
David Aschenbrenner, Hector Campbell Neighborhood
Lina Bensel, Member at Large / Independent Living Resources Center
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Dan Packard, Eastmoreland Neighborhood
Arnold Panitch, TriMet Committee on Accessible Transportation
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Valeria Ramirez, Portland Opera
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Henry Schmidt, Oak Lodge Community Council (past member)
Joe Traverso, North industrial Milwaukie business (past member)
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Lynn Welsh, Island Station Neighborhood (past member)
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APPENDIX F. LIST OF RECIPIENTS

F.1 FEDERAL AGENCIES

Department of the Army, Corps of Engineers
Federal Emergency Management Administration
Federal Highway Administration
Federal Railroad Administration
Federal Transit Administration
Interstate Commerce Commission
National Marine Fisheries Service
US Coast Guard
US Department of Agriculture
US Department of Commerce
US Department of Energy
US Department of Interior
US Environmental Protection Agency
US Fish and Wildlife Service

F.2 NATIVE AMERICAN TRIBES

Chinook Tribe
Cowlitz Tribe
Confederated Tribes of the Grand Ronde
Confederated Tribes of the Warm Springs
Confederated Tribes of Siletz
Columbia Inter-Tribal Fish Commission

F.3 OREGON STATE AGENCIES

Office of the Governor
Department of Energy
Department of Environmental Quality
Department of Fish and Wildlife
Department of Geology and Mineral Industries
Department of Land Conservation and Development
Department of Transportation
Department of Water Resources
Division of State Lands
Economic Development Department
Department of Geology & Mineral Industries
Public Utilities Commission
State Historic Preservation Office
State Parks and Recreation Department

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City of Gresham
City of Milwaukie
City of Oregon City
City of Portland
Clackamas County
Multnomah County
TriMet

F.5 LIBRARIES
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Multnomah County Library
Portland State University Library
Milwaukie Ledding Library

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Brooklyn
Downtown Community Association
Eastmoreland
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Lents
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Linwood
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Central Eastside Industrial Council
Clackamas Community College
Clackamas County Historical Society
Clackamas Town Center
East Portland Chamber of Commerce
Foster/82nd Business Association
Inner Foster Study Citizen Advisory Committee
Lents Urban Renewal Public Advisory Committee
Macadam Business Association
Milwaukie to Portland Light Rail Coalition
Milwaukie Neighborhood Development Association
North Clackamas Chamber of Commerce
North Macadam Development Council
Opportunity Gateway Public Advisory Committee
Outer Southeast Light Rail Coalition
Oregon Museum of Science and Industry
Oregon City Chamber of Commerce
Oregon Historical Society
Oregon Institute of Technology
Oregon League of Women Voters
Oregon Water Resource Council
Portland Business Alliance
Portland Development Commission
Portland Metropolitan Chamber of Commerce
Portland State University

In addition to those listed above, notices to every person or group that commented on either the South Corridor SDEIS (December 2002) or South Corridor SDEIS (May 2008) were sent prior to the publication of this document.
APPENDIX G. PROPERTIES AFFECTED BY ACQUISITIONS

Building and operating the Portland-Milwaukie light rail system requires acquiring property for right-of-way and other facilities and will include displacing and relocating some of the existing uses. This appendix presents the likely property acquisitions based on the current 25 percent preliminary engineering. The estimates described below reflect the existing conditions at the time the analysis was conducted.

There are two types of property acquisitions:

- A partial acquisition would acquire part of a parcel but would not dislocate the existing use.
- A full acquisition would acquire the full parcel and displace the current use. Full acquisitions include parcels that may not be fully acquired for the project but would be affected (due to loss of parking, access or other features) such that the existing use would be substantially impaired. This includes parcels that would be required for construction activities, although in some cases all or part of the parcels would be available for other use or redevelopment after construction is complete.

The following tables present updated information on the likely acquisitions derived from data pulled from Metro RLIS in December 2009. Tables G-1 through G-4 present a list of properties potentially affected with every alternative, which are mapped in the following figures. These tables list property mapping numbers, parcel identification numbers, addresses, and property owners’ names provided by the County Tax Assessor.

The project is expected to need temporary construction easements for most properties that immediately abut the project footprint. For instance, in areas where improvements to sidewalks or utilities are needed but they are at the edge of the public right-of-way, TriMet will need easements onto private property to complete construction. Table G-5 provides a list of properties potentially affected by construction easements.

This appendix also provides maps of potential staging locations in Figures G.3.1-10 through G.3.1-12.

In addition to the potential property acquisitions described, the project would also require subterranean, aerial, and other easements and use of public right-of-way.
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* Potentially deferred with LPA Phasing Option.

The properties affected by the Minimum Operable Segment (MOS) to Lake Road are consistent with the Locally Preferred Alternative (LPA) to Park Avenue from the Downtown Portland Transit Mall to Highway 224 (see Figure G.3.1-1 to Figure G.3.1-5). Listed below are the properties affected by the MOS to Lake Road south of Highway 224 (Figure G.3.1-8).
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Table G-4
Related Bridge Area Transportation Facilities
See Figure G.3.1-9)

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G-14  Portland-Milwaukie Light Rail Project FEIS
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Portland-Milwaukie Light Rail Project

Potentially Affected Parcels - Locally Preferred Alternative to Park Avenue

- Light Rail alternative
- Potentially affected parcel # Map ID

April 2010
Portland-Milwaukie Light Rail Project

Figure G.3.1-5

Potentially Affected Parcels - Locally Preferred Alternative to Park Avenue

- Light Rail alternative
- Potentially affected parcel
- # Map ID

April 2010
Note: The map shows locations of temporary staging areas to be used during construction. Properties affected by full acquisition may also be used for construction staging.
Potential Staging Locations

Clinton Station to Tacoma Station

Figure G.3.1-11

- Light Rail Alternative
- Station
- Future Station
- Park-and-Ride
- MOS Park-and-Ride

Potential Staging Locations

Note: The map shows locations of temporary staging areas to be used during construction. Properties affected by full acquisition may also be used for construction staging.

February 2010
Note: The map shows locations of temporary staging areas to be used during construction. Properties affected by full acquisition may also be used for construction staging.
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Portland-Milwaukie Light Rail Project

Locally Preferred Alternative to Park Ave

- Light Rail track centerline
- Park and Ride
- Light Rail station platform
- Pedestrian crossing

Figure H-3

Pedestrian overcrossing will be deferred under the Phasing Option

February 2019
Portland-Milwaukee Light Rail Project

Locally Preferred Alternative to Park Ave

- Light Rail track centerline
- Park and Ride
- Light Rail station platform
- Pedestrian crossing

Pedestrian overcrossing will be deferred under the Phasing Option

Figure H-6

February 2010
Phased Option includes potential removal of center belveder at center of bridge. The trails would remain 14-foot wide.

Phased option includes potential reduction of path width at towers from 22 to 14 feet.

Phased option includes potential removal of pier articulation.
Figure H-25

NOTES:
1. Layout is approximate & for planning purposes only.
2. Total site area includes land north of platforms to Tacoma bridge including to meet 50% site coverage requirements.

approx. 320 parking spaces - 9/01/10
Note: Surface Parking lot only (no elevated structured parking) with LPA Phasing Option
Figure H-27a
Figure H-29A

LPA Phasing Option

PARK STATION GARAGE - WEST ELEVATION
SCALE: 1/16" = 1'-0"

PARK STATION GARAGE - EAST ELEVATION
SCALE: 1/16" = 1'-0"

NOTES:
1. AS PART OF THE NATURE IN NEIGHBORHOODS PROGRAM, A SERIES OF TERRIS STRUCTURES WILL BE INCORPORATED IN TO THE BUILDING ARCHITECTURE ON THE NORTH AND EAST FACADES.
2. AS PART OF THE NATURE IN NEIGHBORHOODS PROGRAM, AN ART INSTALLATION CONSISTING OF VERTICAL STORM WATER ELEMENTS WILL BE INCORPORATED IN TO THE ARCHITECTURE ON THE NORTH AND EAST FACADES.
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<td>Alternatives Analysis</td>
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<tr>
<td>AADT</td>
<td>Annual averaged daily traffic</td>
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<td>AASHTO</td>
<td>American Association of State Highway and Transportation Officials</td>
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<tr>
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<td>Advisory Council for Historic Preservation</td>
</tr>
<tr>
<td>ACM</td>
<td>asbestos containing material</td>
</tr>
<tr>
<td>ACS</td>
<td>American Community Survey</td>
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<td>ADA</td>
<td>Americans with Disabilities Act</td>
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<tr>
<td>ADT</td>
<td>average daily traffic</td>
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<td>APE</td>
<td>Area of Potential Effect</td>
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<td>Air Quality Maintenance Area</td>
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<td>Automatic Train Stop</td>
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<td>BES</td>
<td>Bureau of Environmental Services</td>
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<td>BG</td>
<td>Block Group</td>
</tr>
<tr>
<td>BMP</td>
<td>Best Management Practice</td>
</tr>
<tr>
<td>BRT</td>
<td>Bus Rapid Transit</td>
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<tr>
<td>Btu</td>
<td>British Thermal Unit</td>
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<td>Candidate for listing as Threatened or Endangered</td>
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<td>CAA</td>
<td>Clean Air Act</td>
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<tr>
<td>CAC</td>
<td>Citizens Advisory Committee</td>
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<td>CBD</td>
<td>Central Business District</td>
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<td>Clackamas County Fire District #1</td>
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<tr>
<td>CCSO</td>
<td>Clackamas County Sheriff’s Office</td>
</tr>
<tr>
<td>CCTV</td>
<td>Closed-circuit television</td>
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<td>Central Eastside Industrial District</td>
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<tr>
<td>CEP TED</td>
<td>Crime Prevention Through Environmental Design</td>
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<td>CERCLIS</td>
<td>Comprehensive Environmental Response and Liability Information</td>
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<td>Council on Environmental Quality</td>
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<td>cfs</td>
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<td>construction management/general contractor</td>
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<td>Columbia River Basalt Group</td>
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<td>Census Tract</td>
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<td>chlorinated volatile organic compound</td>
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<td>Clean Water Act</td>
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<td>compensatory wetland mitigation</td>
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<td>dB</td>
<td>decibel</td>
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<tr>
<td>dBA</td>
<td>A-weighted decibel</td>
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<td>DDE</td>
<td>Dichloro-Diphenyl-Dichloroethylene</td>
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<tr>
<td>DDT</td>
<td>Dichloro-Diphenyl-Trichloroethane</td>
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<td>24-hour, Time Averaged, A-weighted Sound Level (day-night sound level)</td>
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<td>Equivalent Continuous Sound Level</td>
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<td>LIFT</td>
<td>Transit vehicle with lift capabilities</td>
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<td>National Oceanic and Atmospheric Administration</td>
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<td>Nitrogen Oxides</td>
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<td>NPDES</td>
<td>National Pollutant Discharge Elimination System</td>
</tr>
<tr>
<td>NRHP</td>
<td>National Register of Historic Places</td>
</tr>
<tr>
<td>NWNG</td>
<td>NW Natural Gas</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Operations and Maintenance</td>
</tr>
<tr>
<td>OAR</td>
<td>Oregon Administrative Rule</td>
</tr>
<tr>
<td>Acronym</td>
<td>Meaning</td>
</tr>
<tr>
<td>---------</td>
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</tr>
<tr>
<td>OCS</td>
<td>Overhead Catenary System</td>
</tr>
<tr>
<td>ODA</td>
<td>Oregon Department of Agriculture</td>
</tr>
<tr>
<td>ODFW</td>
<td>Oregon Department of Fish and Wildlife</td>
</tr>
<tr>
<td>ODOT</td>
<td>Oregon Department of Transportation</td>
</tr>
<tr>
<td>OEA</td>
<td>Office of Economic Analysis for the State of Oregon</td>
</tr>
<tr>
<td>OHSU</td>
<td>Oregon Health &amp; Science University</td>
</tr>
<tr>
<td>OHW</td>
<td>ordinary high water</td>
</tr>
<tr>
<td>OMSI</td>
<td>Oregon Museum of Science and Industry</td>
</tr>
<tr>
<td>ONHP</td>
<td>Oregon Natural Heritage Project</td>
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<td>OPR</td>
<td>Oregon Pacific Railroad</td>
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<td>ORNHIC</td>
<td>Oregon Natural Heritage Information Center</td>
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<td>OTIA</td>
<td>Oregon Transportation Improvement Act</td>
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<tr>
<td>OUS</td>
<td>Oregon University System</td>
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<tr>
<td>PAAC</td>
<td>Public Art Advisory Committee</td>
</tr>
<tr>
<td>PAH</td>
<td>polycyclic aromatic hydrocarbon</td>
</tr>
<tr>
<td>PCB</td>
<td>polychlorinated biphenyl</td>
</tr>
<tr>
<td>PCPS</td>
<td>precast-prestressed</td>
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<tr>
<td>PD</td>
<td>Police Department</td>
</tr>
<tr>
<td>PF&amp;R</td>
<td>Portland Fire and Rescue</td>
</tr>
<tr>
<td>PGE</td>
<td>Portland General Electric</td>
</tr>
<tr>
<td>pH</td>
<td>measure of the acidity or alkalinity of a solution</td>
</tr>
<tr>
<td>PMx</td>
<td>Particulate Matter, particulates with aerodynamic diameter of x micrometers</td>
</tr>
<tr>
<td>POM</td>
<td>polycyclic organic matter</td>
</tr>
<tr>
<td>PP&amp;R</td>
<td>Portland Parks and Recreation</td>
</tr>
<tr>
<td>PPB</td>
<td>Portland Police Bureau</td>
</tr>
<tr>
<td>ppm</td>
<td>Parts Per Million</td>
</tr>
<tr>
<td>PSU</td>
<td>Portland State University</td>
</tr>
<tr>
<td>RA</td>
<td>Remedial Action</td>
</tr>
<tr>
<td>REC</td>
<td>Recognized Environmental Condition</td>
</tr>
<tr>
<td>RFP</td>
<td>Regional Framework Plan</td>
</tr>
<tr>
<td>RFT</td>
<td>Riverine Flow-Through</td>
</tr>
<tr>
<td>Acronym</td>
<td>Meaning</td>
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<tr>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>RI</td>
<td>Riverine Impounding</td>
</tr>
<tr>
<td>RISG</td>
<td>Ross Island Sand and Gravel</td>
</tr>
<tr>
<td>RM</td>
<td>river mile</td>
</tr>
<tr>
<td>RMS</td>
<td>Root-Mean-Square</td>
</tr>
<tr>
<td>ROD</td>
<td>Record of Decision</td>
</tr>
<tr>
<td>ROW</td>
<td>Right-of-Way</td>
</tr>
<tr>
<td>RTP</td>
<td>Regional Transportation Plan</td>
</tr>
<tr>
<td>SAAQS</td>
<td>State Ambient Air Quality Standards</td>
</tr>
<tr>
<td>SAFETEA-LU</td>
<td>Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users</td>
</tr>
<tr>
<td>SC</td>
<td>Sensitive Critical</td>
</tr>
<tr>
<td>SCTAS</td>
<td>South Corridor Transportation Alternatives Study</td>
</tr>
<tr>
<td>SDEIS</td>
<td>Supplemental Draft Environmental Impact Statement</td>
</tr>
<tr>
<td>S/F</td>
<td>Slope/Flat</td>
</tr>
<tr>
<td>SFR</td>
<td>Single-family Residence</td>
</tr>
<tr>
<td>SHPO</td>
<td>State Historic Preservation Office</td>
</tr>
<tr>
<td>SIP</td>
<td>State Implementation Plan</td>
</tr>
<tr>
<td>SMSA</td>
<td>Standard Metropolitan Statistical Area</td>
</tr>
<tr>
<td>SO2</td>
<td>sulfur dioxide</td>
</tr>
<tr>
<td>SOC</td>
<td>Species of Concern</td>
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<tr>
<td>SOV</td>
<td>Single-Occupant Vehicle</td>
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<tr>
<td>SSCP</td>
<td>Streetcar System Concept Plan</td>
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<tr>
<td>SSM</td>
<td>supplemental safety measure</td>
</tr>
<tr>
<td>SV</td>
<td>Sensitive Vulnerable</td>
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<tr>
<td>SWCAA</td>
<td>Southwest Clean Air Agency (Vancouver, WA)</td>
</tr>
<tr>
<td>TCDD</td>
<td>tetrachlorodibenzo-p-dioxin</td>
</tr>
<tr>
<td>TCE</td>
<td>temporary construction easement</td>
</tr>
<tr>
<td>TDA</td>
<td>tire derived aggregate</td>
</tr>
<tr>
<td>TES</td>
<td>Threatened, Endangered and Sensitive</td>
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<tr>
<td>TGA</td>
<td>Troutdale Gravel Aquifer</td>
</tr>
<tr>
<td>TMDL</td>
<td>Total Maximum Daily Load</td>
</tr>
<tr>
<td>TOD</td>
<td>Transit-Oriented Development</td>
</tr>
<tr>
<td>Acronym</td>
<td>Meaning</td>
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<tr>
<td>-----------</td>
<td>-------------------------------------------------------------------------</td>
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<tr>
<td>TPD</td>
<td>Transit Police Division</td>
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<tr>
<td>TPR</td>
<td>Transportation Planning Rule</td>
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<td>TriMet</td>
<td>Tri-County Metropolitan Transportation District of Oregon</td>
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<td>TSP</td>
<td>Transportation System Plan</td>
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<tr>
<td>UGB</td>
<td>Urban Growth Boundary</td>
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<td>UPRR</td>
<td>Union Pacific Railroad</td>
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<tr>
<td>USA</td>
<td>Unconsolidated Sedimentary Aquifer</td>
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<tr>
<td>USACE</td>
<td>United States Army Corps of Engineers</td>
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<td>USC</td>
<td>United States Code</td>
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<td>USCG</td>
<td>United States Coast Guard</td>
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<td>USDOT</td>
<td>United States Department of Transportation</td>
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<td>USFWS</td>
<td>United States Fish and Wildlife Service</td>
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<td>USPS</td>
<td>United States Postal Service</td>
</tr>
<tr>
<td>V/C</td>
<td>Volume-to-capacity</td>
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<tr>
<td>VdB</td>
<td>Vibration decibels</td>
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<td>VHD</td>
<td>vehicle hours per day</td>
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<tr>
<td>VHT</td>
<td>vehicle hours traveled</td>
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<tr>
<td>VMT</td>
<td>vehicle miles traveled</td>
</tr>
<tr>
<td>VOC</td>
<td>Volatile organic compound</td>
</tr>
<tr>
<td>WES</td>
<td>Westside Express Service</td>
</tr>
<tr>
<td>WPA</td>
<td>Works Progress Administration</td>
</tr>
<tr>
<td>WRBAC</td>
<td>Willamette River Bridge Advisory Committee</td>
</tr>
<tr>
<td>YOE</td>
<td>year-of-expenditure</td>
</tr>
</tbody>
</table>

*Portland-Milwaukie Light Rail Project FEIS*

*Appendix J. Acronyms and Abbreviations*
APPENDIX K. PORTLAND-MILWAUKIE LIGHT RAIL PROJECT FINAL SECTION 4(F) EVALUATION

This section addresses how the Portland-Milwaukie Light Rail Project is responding to a federal environmental law known as Section 4(f), which protects parks, recreation areas, historic and cultural resources, and nature refuges. The document describes Section 4(f) of the United States Department of Transportation Act and explains its role in the Federal Transit Administration’s (FTA’s) decision-making. It also summarizes several key terms, concepts, and legal standards that are used here. This description is followed by the Section 4(f) evaluation for the project.

K.1 PROJECT PURPOSE AND NEED

The Portland-Milwaukie Light Rail Project is a proposal to extend the regional light rail system to serve the southern portion of the Portland, Oregon metropolitan area, connecting urban centers in Multnomah and Clackamas counties. The Portland-Milwaukie Light Rail Project is part of a two-phase program to develop light rail serving what is known as the “South Corridor” in the Portland metropolitan area.

The project selected a Locally Preferred Alternative (LPA) in 2008, based on the Portland-Milwaukie Light Rail Project Supplemental Draft Environmental Impact Statement (SDEIS) in April 2008, and on a previous LPA selection and SDEIS in 2002. The South Corridor Project SDEIS examined various high-capacity transit alternatives between downtown Portland and Clackamas County, including a light rail alignment between downtown Portland and Milwaukie and an I-205 alignment to the Clackamas Regional Center connecting to the existing east side MAX line. Phase I of the South Corridor Project was the I-205/Portland Mall Transit Project, which began operating in 2009. Phase II is the Portland-Milwaukie Light Rail Project, a light rail segment that would connect Phase I’s Downtown Portland Transit Mall segment at Portland State University with the City of Milwaukie and north Clackamas County.

The purpose leading to the proposed light rail investment was originally defined by the South/North Corridor Project DEIS in 1998. The purpose and need were updated with the South Corridor Supplemental DEIS in December 2002 and a subsequent South Corridor LPA decision in 2003, and were confirmed in the most recent LPA decision in 2008. The purpose is:

To implement a major transit improvement in the South Corridor that maintains livability in the metropolitan region, supports land use goals, optimizes the transportation system, is environmentally sensitive, reflects community values, and is fiscally responsive.

The need for a major transit investment in Phase II, the Portland-Milwaukie Project Corridor, is identified as:

Historic and projected rapid population and employment growth in the corridor, which creates an unmet demand for increased travel choices and transit capacity
High levels of existing traffic congestion and travel delay in the corridor and deteriorating travel conditions in the future

The need for high-quality transit service in the corridor to achieve regional and local land use objectives

The goals and objectives established for the Portland-Milwaukie Light Rail Project derive from the purpose and need statement and were articulated through the earlier studies noted above. These include:

1. Provide high-quality transit service in the corridor
2. Ensure effective transit system operations in the corridor
3. Maximize the ability of the transit system to accommodate future growth in travel demand in the corridor
4. Minimize traffic congestion and traffic infiltration through neighborhoods in the corridor
5. Promote regionally agreed-upon land use patterns and development in the corridor
6. Provide for a fiscally stable and financially efficient transit system
7. Maximize the efficiency and environmental sensitivity of the engineering design of the proposed project

The project goals and objectives have been reinforced by several other regional and national initiatives including efforts to address climate change and reduce our dependence on fossil fuels, and Metro’s recently adopted High Capacity Transit System Plan update conducted as part of the Regional Transportation Plan (RTP).

K.2 SECTION 4(F) GUIDELINES AND REGULATIONS

The United States Department of Transportation (USDOT) Act of 1966 (49 USC 303) includes regulations that prohibit the use of parks, recreation areas, historic sites or nature refuges for transportation projects except in very unusual circumstances. These regulations, known as Section 4(f), require that USDOT agencies (including the FTA):

… not approve the use of land from a significant publicly-owned park, recreation area or wildlife and waterfowl refuge or any significant historic site, unless there is no feasible and prudent alternative to the use of land from the property and the action includes all possible planning to minimize harm to the property resulting from the use.

A use is generally defined as a transportation activity that permanently or temporarily acquires land from a Section 4(f) property. Section 6009(a) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), Pub. L. 109-59, amended existing Section 4(f) legislation at Section 138 of Title 23 and Section 303 of Title 49, United States Code. Section 6009 directed the USDOT to issue regulations that clarify the factors to be considered and the standards to be applied when determining whether feasible and prudent alternatives could avoid the use of a Section 4(f) property. On March 12, 2008, the Federal Highway Administration (FHWA) issued a Final Rule on Section 4(f), which moves the Section 4(f) regulation to 23 CFR 774 and provides updated direction for Section 4(f) evaluations.
Section 6009 of SAFETEA-LU also provided regulations simplifying the processing and approval of projects that have only de minimis impact of lands protected by Section 4(f). This revision provides for minor uses of Section 4(f) properties under specific conditions. If USDOT determines that a transportation use of Section 4(f) property (including any impact avoidance, minimization, and mitigation or enhancement measures) results in a de minimis impact on that property, an analysis of avoidance alternatives is not required and the Section 4(f) evaluation process is complete.

This Final Section 4(f) Evaluation addresses the Portland-Milwaukie Light Rail Project and its Locally Preferred Alternative (LPA) to Park Avenue, the Minimum Operable Segment (MOS) to Lake Road, and Related Bridge Area Transportation Facilities. It identifies potential uses of Section 4(f) properties as outlined in 23 CFR 774. A previous Draft Section 4(f) Evaluation was released for public review in May of 2008 as part of the Portland-Milwaukie Light Rail Project SDEIS.

Section 4(f) properties may not be used for any transportation project receiving federal funds or approval from a USDOT agency, except where de minimis impact occurs, where there is a specific exception to a use in Section 4(f) regulations, or where no feasible or prudent alternative exists. Section 4(f) ensures that all possible planning has been done to minimize harm to those properties covered by the act.

State and local governments often obtain grants through the Land and Water Conservation Fund Act to acquire or make improvements to parks and recreation areas. Section 6(f) of this act prohibits the conversion of property acquired or developed with these funds to a non-recreational purpose, without the approval of the U.S. Department of Interior (DOI) National Park Service. Because Section 4(f) lands may have been developed with Section 6(f) funds, a Section 6(f) analysis was also conducted, and it was determined that none of the parks potentially impacted by the proposed project were constructed with these funds.

The Area of Potential Effect (APE) for this project is based on the APE used for the historic, cultural, and archaeological resources investigations. This area extends 150 feet on either side of the proposed light rail alignment, or at least one block from areas with a defined street grid pattern. In addition, it includes properties within 50 feet of other facilities or improvements, including any fully acquired parcel or any other surface feature or modification required for the light rail project. The evaluation of historic, cultural, and archaeological resources is based on the analysis and documentation provided in the Final Environmental Impact Statement (FEIS) and its related documentation as required under Section 106 of the National Historic Preservation Act of 1966. The evaluation of potential impacts to parks and recreation resources incorporates findings from the FEIS parks and recreational resources section and other environmental analyses, particularly visual and aesthetic, traffic, transportation, and noise and vibration analyses. Other findings and information from the FEIS and its preceding environmental and planning documents are also used in this Final Section 4(f) Evaluation to support conclusions regarding other avoidance and minimization alternatives.

Section 4(f) of the U.S. Department of Transportation Act of 1966 (49 USC 303) establishes a national policy “to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites.” This act applies to three types of resources:
1. Significant publicly owned parks, and recreation areas that are open to the public;
2. Significant publicly owned wildlife and waterfowl refuges, whether or not they are open to the public; and
3. Historic sites of national, state or local significance, whether or not these sites are publicly owned or open to the public. In most cases, only historic properties listed in or eligible for inclusion in the National Register of Historic Places are protected under Section 4(f).

Section 4(f) resources are presumed to be significant unless the official having jurisdiction over the site, or in the case of historic resources, the State Historic Preservation Officer (SHPO), concludes that the entire site is not significant. Additionally, FTA must confirm that the official’s finding of significance or nonsignificance is reasonable.

**K.2.1 “Uses” of Section 4(f) Resources**

Under Section 4(f), USDOT agencies cannot approve a transportation program or project that incorporates land or substantially affects the essential functions and features of a significant Section 4(f) resource, except under specific circumstances, as defined in the following section. A use can be permanent, temporary, constructive, or *de minimis* as defined below.

**Permanent use** includes acquisition and incorporation of the resource into the transportation facility. It includes fee simple and permanent easements use, and involves the taking of any property within the established boundary of a Section 4(f) resource.

**Temporary use** occurs when a transportation project temporarily occupies any portion of the resource. In order for a temporary use of Section 4(f) land not to be considered adverse, it must meet the following conditions as summarized from 23 CFR 774.13:

- The duration of the occupancy must be less than the time needed for the construction of the project and there must not be a change in ownership.
- Both the nature and magnitude of the changes to Section 4(f) resources are minimal.
- There are no anticipated permanent adverse physical changes or interference with protected activities, features, or attributes of the resource, on a temporary or permanent basis.
- The land is restored to the same or better condition.
- There is a documented agreement of the appropriate federal, state, or local officials having jurisdiction over the resource, and authority over use of the property, regarding the above condition.

**Constructive, or indirect, use** occurs when the proximity effects of the transportation project are so great that the use of the property is substantially impaired. Examples are provided in 23 CFR 774.15.

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1 23 CFR 774.
2 Section 4(f) “use” is defined and addressed in the FHWA/FTA Regulations at 23 CFR 774.
A *de minimis* impact is allowed when, in consultation with the resource owner, the project proponent determines that the use is so small or minimal that it will not “adversely affect the activities, features, and attributes” that make the resource eligible for protection under Section 4(f).

**K.2.2 Permitted Uses of Section 4(f) Resources**

Approval of a transportation use of a Section 4(f) resource may occur if the project proponent demonstrates that:

- The use of the resource falls within the criteria allowing an exception to Section 4(f) as allowed in 23 CFR 774.13. Particular to this project, this regulation allows an exception for uses that are temporary.
- The use will have no more than a *de minimis* impact on the property; or
- There is no feasible and prudent avoidance alternative to using the property; and
- The program or project includes all possible planning to minimize harm to the property resulting from the use.

*De minimis* impacts relate to publicly owned parks, recreation areas, and wildlife and waterfowl refuges. *De minimis* impacts do not “adversely affect the activities, features and attributes” of a Section 4(f) resource. Once the USDOT determines that a transportation use of Section 4(f) property results in a *de minimis* impact, the project does not need to analyze avoidance alternatives, and the Section 4(f) evaluation process is complete.

When a project impact is greater than *de minimis*, the project proponent must determine whether there are feasible and prudent alternatives that would not result in an impact. An alternative is feasible if it is technically possible to design and build. An alternative is prudent if:

- It meets the project purpose and need and does not compromise the project to a degree that it is unreasonable to proceed with the project in light of its stated purpose and need;
- It does not require extraordinary operational or safety problems;
- It carries no unique problems or truly unusual factors;
- It has no other unacceptable or severe adverse economic or environmental impacts;
- It would not cause extraordinary community disruption;
- It does not have construction costs of an extraordinary magnitude; or

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3 For historic and archaeological sites, a *de minimis* impact is defined as a “no adverse effect” or “no historic or archaeological properties affected” in compliance with Section 106 of the National Historic Preservation Act. Prior to making a determination of *de minimis* impact, USDOT should receive concurrence on the determination of effect to historic resources from the State Historic Preservation Officer (23 CFR 774.5).
• There are no other factors that collectively have adverse impacts that present unique problems or reach extraordinary magnitudes.

Once a project proponent demonstrates that an alternative is not feasible and prudent, that alternative may be removed from consideration. When there are no prudent and feasible alternatives that can avoid all Section 4(f) resources, which is the case for the Portland-Milwaukie Light Rail Project, then the Section 4(f) analysis must determine which alternative results in the least overall harm to Section 4(f) resources. Assessing least harm must consider the relative significance of the impacts on the Section 4(f) resources, mitigation incorporated into the proposed project, and impacts on other important resources that would occur from avoiding or minimizing the impact to a Section 4(f) resource.

The regulations list specific factors that FTA must consider when determining which alternative causes the “least overall harm.” See 23 USC 774.3(c)(1). These factors include:

i. The ability to mitigate adverse impacts to each Section 4(f) property (including mitigation measures that result in benefits to the property);

ii. The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection;

iii. The relative significance of each Section 4(f) property;

iv. The views of the official(s) with jurisdiction over each Section 4(f) property;

v. The degree to which each alternative meets the purpose and need for the project;

vi. After reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f); and

vii. Substantial differences in costs among the alternatives.

This Final Section 4(f) Evaluation describes the Section 4(f) resources, the uses of those resources by the Portland-Milwaukie Light Rail Project alternatives, potential avoidance alternatives, potential measures to minimize harm, the net impacts of measures to minimize harm, coordination efforts to protect Section 4(f) resources, and a determination.

K.2.3 Section 106 Historic and Cultural Resources

Section 4(f) resources include those historic and cultural resources that qualify for protection under Section 106 of the National Historic Preservation Act. This Final Section 4(f) Evaluation incorporates the results and findings developed through the project’s Section 106 Consultation process.

Section 106 of the National Historic Preservation Act requires consideration of the impacts of federal transportation projects on historic properties and archaeological resources that are eligible for or listed in the National Register of Historic Places (NRHP). For this project, Section 106 compliance requires consultation between FTA and the SHPO. TriMet and Metro also coordinated with the SHPO during preparation of the Section 106 Consultation.

There are four ways, or criteria, through which an historic property or cultural resource can qualify for NRHP eligibility. These criteria are described below:
• Criterion A. The property is associated with events that have made a significant contribution to the broad patterns of our history.

• Criterion B. The property is associated with the lives of persons significant in our past.

• Criterion C. The property embodies distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.

• Criterion D. The property has yielded, or may be likely to yield, information important in prehistory or history. This criterion is generally associated with archaeological resources.

In addition to defining Section 4(f) historic resources based on their eligibility for inclusion in the NRHP, the Section 4(f) evaluation considers the determination of effects from the Section 106 process in determining whether or not there is a use of a Section 4(f) resource in the following ways:

If an alternative has a direct use of land from an historic site, but there is a finding of “no adverse effect” in the Section 106 process, a Section 4(f) de minimis finding may result. If the use results in an “adverse effect” in the Section 106 process, a Section 4(f) de minimis finding cannot be made.

If an alternative avoids a direct use of land from an historic site, but has proximity impacts that are determined to have “no adverse effect” through the Section 106 process, there would likely be no constructive use under the Section 4(f) evaluation.

The Section 106 process requires consultation to resolve any adverse effects. Commitments made in the Section 106 process and documented in the MOA may also satisfy the requirement under Section 4(f) to minimize harm resulting from the use of a historic property.

K.3 DATA COLLECTION METHODS

The identification of publicly owned parks, recreation areas, and wildlife and waterfowl refuges in the project area was based on a review of existing published information, including the previously published environmental studies for the project, a field inspection, and discussions with various public agency representatives. Maps were reviewed and various field inspections of the project area were conducted to identify potential Section 4(f) resources. Public agency representatives were contacted, and the agencies also provided additional information about the status of several of the potential Section 4(f) resources within the project area.

The Section 4(f) APE included an area approximately 150 feet on each side of the rail alignment, and an additional 50 feet from any other surface feature. Potential resources included some parks and recreation areas that were later determined to be either previously dedicated as transportation corridors that were temporarily being used as open space, were undeveloped areas, or were privately owned facilities, and did not qualify as Section 4(f) resources. Potential resources included parks and open spaces, boat ramps, recreation areas, trails, and one wildlife refuge. Section 4(f) park, recreation, and historic resources in the project APE are shown on Figure 1, which also illustrates the light rail alternatives being considered in the FEIS.
The *Historic, Archaeological, and Cultural Resources Results Report* details the methods used for identifying and evaluating known and potential resources within the project area. The APE for historic properties was defined as extending one-half block on each side of the study alternatives in the central business districts that are characterized by a defined grid street pattern. Outside of the defined grid pattern, the APE extends 150 feet from the proposed improvements of the study area.

**K.4 AGENCY COORDINATION**

The Section 4(f) evaluation requires coordination and consultation with the officials with jurisdiction over each Section 4(f) property and the DOI. In this project, the Section 4(f) properties include local park and recreation facilities and historic resources.

**K.4.1 Portland Parks and Recreation**

The City of Portland contains 12,591 acres of public parkland and open space. Portland Parks and Recreation (PP&R) owns and manages over 10,000 of these acres and is the region’s largest provider of parks and recreation. Park planning in Portland is guided by the City of Portland’s *Parks 2020 Vision*, its comprehensive master plan for parks and recreation, which addresses parks, open spaces, natural areas, and facilities, and identifies programs, partnerships, and funding options.

**K.4.2 North Clackamas Parks and Recreation District**

Parks and recreational resources within the City of Milwaukie and in North Clackamas County are, for the most part, owned and managed by the North Clackamas Parks and Recreation District (NCPRD), a service district of Clackamas County created in 1990. NCPRD’s service area extends over 32 square miles, roughly from the Clackamas/Multnomah county line at the north to the Clackamas River at the south.

**K.4.3 City of Milwaukie**

While the City of Milwaukie owns a number of parks near the project area, the majority are managed by the NCPRD. Parks planning within the city is still guided by Chapter 3 of its Comprehensive Plan, Environmental and Natural Resources.

**K.4.4 Metro**

Metro manages a regional land acquisition program that includes several open spaces and park facilities in the region. In November 2006, through a second voter-approved bond measure, Metro initiated an additional land acquisition program. This second program aims to acquire between 3,500 and 4,500 acres in 27 specific target areas. These target areas have been selected for their particular value in preserving wildlife and water quality, regional trails, and greenways. Among the 27 target areas are Johnson Creek, the Willamette River Greenway, and the Springwater Corridor.
K.4.5

K.4.6 U.S. Department of Interior

In accordance with the requirements of Section 4(f) regulations, the Section 4(f) evaluation has been made available for review by the DOI.

K.4.7 Oregon State Historic Preservation Officer (SHPO)

Oregon’s SHPO was established in 1967 within the Oregon Parks and Recreation Department to manage and administer programs for the protection of the state’s significant historic and prehistoric resources.

K.5 ALTERNATIVES CONSIDERED

The Final Section 4(f) Evaluation reviews the effects of the Portland-Milwaukie Light Rail Project on Section 4(f) resources. The Section 4(f) evaluation also reviews the potential for other potentially feasible and prudent alternatives to avoid the use of Section 4(f) resources while still maintaining the ability of the project to meet its purpose and need. The identification of feasible and prudent avoidance alternatives includes a review of alternatives that were previously considered and dismissed during the South/North Corridor Project DEIS in 1998, the South Corridor SDEIS in December 2002, and the most recent South Corridor SDEIS and LPA decision in 2008.

More detailed descriptions of the FEIS alternatives and the project’s consideration of other alternatives are provided in Chapter 2 and Appendix L of the FEIS. The FEIS evaluation includes (see also Figure 1 above):

- No-Build Alternative
- Locally Preferred Alternative (LPA) to Park Avenue
- Minimum Operable Segment (MOS) to Lake Road

The LPA to Park Avenue and its MOS to Lake Road option are nearly identical, with the MOS to Lake Road representing a phasing approach that the project could pursue depending on funding and other project development decisions. Even if the MOS to Lake Road is identified as the first phase of construction and operation for the project, the project would still seek to ultimately extend to a terminus at SE Park Avenue.

The light rail project also includes the following facilities, none of which will involve a use of Section 4(f) resources:

- Ruby Junction Maintenance Facility
- Related Bridge Area Transportation Facilities
Locally Preferred Alternative (LPA) to Park Avenue

The LPA to Park Avenue from the Downtown Portland Transit Mall to SE Park Avenue in north Clackamas County includes approximately 7.3 miles of light rail, ten stations, plus five shelters and one station deferred from the Portland Transit Mall Project at SW Jackson Street, two park-and-rides, and a new bridge across the Willamette River.

Minimum Operable Segment (MOS) to Lake Road

The MOS to Lake Road provides an initial terminus at SE Lake Road in downtown Milwaukie, with 6.5 miles of light rail. This alignment could be constructed and operated until the full-length project is extended to SE Park Avenue. The MOS to Lake Road alignment is the same as the LPA to Park Avenue between the Downtown Portland Transit Mall and SE Lake Road, but it provides a park-and-ride facility associated with the Lake Road Station and increases park-and-ride capacity at the Tacoma Station.

Ruby Junction Maintenance Facility

The Portland-Milwaukie Light Rail Project would require expanding the existing Ruby Junction Operations and Maintenance Facility in Gresham to store and service the additional light rail vehicles and supporting maintenance activities associated with the project.

Related Bridge Area Transportation Facilities

This Final Section 4(f) Evaluation includes related streetcar and local street improvements that are being planned to maximize the transportation benefits of the light rail project and to allow it to be built and operated consistent with local development plans.

K.5.1 Previously Considered Alternatives

Nearly 20 years of previous studies of transit alternatives covering the Portland-Milwaukie corridor have been conducted. The key planning, engineering, and environmental efforts that have shaped the current definition of the Portland-Milwaukie Light Rail Project are:

- 1993 South/North Alternatives Analysis (1993 South/North AA)
- 2000 South Corridor Transportation Alternatives Study (2000 SCTAS)
- 2002 South Corridor Supplemental Draft Environmental Impact Statement (2002 South Corridor SDEIS)
- 2003 Downtown Amendment to the South Corridor Project Supplemental Draft Environmental Impact Statement (2003 Downtown Amendment)
- 2008 Portland-Milwaukie Light Rail Project Supplemental Draft Environmental Impact Statement (Portland-Milwaukie SDEIS)
Chapter 2 and Appendix L of this FEIS describe other alternatives previously considered through the project’s development history, including documentation on why specific past alternatives were removed from further consideration due to their inability to fulfill the project’s purpose and need, including higher costs, higher environmental impacts, or lower transportation and land use benefits.

K.6 SECTION 4(F) RESOURCES AFFECTED

Tables K-1 and K-2 below summarize the uses of Section 4(f) resources that are anticipated as a result of the construction or operation of the Portland-Milwaukie Light Rail Project.

Uses for the historic resources were determined through the direct use of the property containing an NHRP-eligible resource and/or a determination that the development of the LPA to Park Avenue would result in an effect under Section 106. The LPA to Park Avenue would have a de minimis Section 4(f) use to nine historic resources and a Section 4(f) use to two historic resources along its alignment. Specific impacts and mitigation commitments for the LPA to Park Avenue are addressed in a formal MOA with the SHPO. The MOA is included with this analysis in Attachment A.

One recreational resource has been identified as being required for temporary occupancy, which is an exception to Section 4(f) use requirements under CFR 23 part 774.13. Several other recreational resources were assessed for risk of constructive uses because of the proximity of light rail to the resource. FTA, TriMet, and Metro have determined that there would be no impacts from the project to any recreational resources that would substantially diminish any protected activities, features, or attributes of the recreational properties to the level that a constructive use would occur. As indicated in 23 CFR 774.15(c), the project proponents are “not required to document each determination that a project would not result in a constructive use of a nearby Section 4(f) property.” Further information about project noise, vibration, and visual impacts may be found in Chapter 3 of the FEIS.

This section describes the potential uses of Section 4(f) resources by the Portland-Milwaukie Light Rail Project, and identifies whether the uses would occur with the LPA to Park Avenue and/or with the MOS to Lake Road option. The discussion addresses the Section 4(f) resources, based on analyses and coordination reported in the FEIS and related documentation.
### Table K-1
Portland-Milwaukie Light Rail Project - Summary of Park and Recreational Resource Use

<table>
<thead>
<tr>
<th>Name</th>
<th>Owner/Custodian</th>
<th>Type of Use and Project Element Involved</th>
<th>Description of Project Activity</th>
<th>Approximate Area of Use</th>
<th>Total Acreage of Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastside Willamette River Greenway Trail</td>
<td>City of Portland</td>
<td>De minimis LPA to Park Ave. MOS to Lake Rd.</td>
<td>Reconstruction of trail under a new Willamette River bridge, and construction of a bridge abutment</td>
<td>&lt;0.05 acre Temporary use area and lowering of trail</td>
<td>4.27</td>
</tr>
<tr>
<td>Springwater Corridor Trail</td>
<td>Metro / City of Portland</td>
<td>De minimis LPA to Park Ave. MOS to Lake Rd.</td>
<td>Reconstruction of abutment of trail bridge over light rail; new trail access; potential sidewalk improvements</td>
<td>&lt;0.1 acre use area beneath trail</td>
<td>n/a</td>
</tr>
<tr>
<td>Westmoreland Park</td>
<td>City of Portland</td>
<td>LPA to Park Ave. MOS to Lake Rd.</td>
<td>Partly funding City project to restore stream and wetland functions to replace a constructed pond; mitigates light rail wetland impacts</td>
<td>Restoring 3 acres of the pond, including 1.03 acres for wetland mitigation</td>
<td></td>
</tr>
<tr>
<td>Trolley Trail (Planned)</td>
<td>North Clackamas Parks and Recreation District</td>
<td>De minimis LPA to Park Ave.</td>
<td>Use of trail right-of-way (ROW)</td>
<td>0.87 acres permanent use area</td>
<td>17.41</td>
</tr>
</tbody>
</table>

1 Westmoreland Park is a Section 4(f) resource as a park as well as an historic resource under Section 106.

### Table K-2
Portland-Milwaukie Light Rail Project - Section 4(f) Historic Sites Used

<table>
<thead>
<tr>
<th>Name/Type</th>
<th>Address</th>
<th>Built Date</th>
<th>Section 106 Status 1</th>
<th>Section 106 Finding 2</th>
<th>Type of Section 4(f) Use</th>
<th>Description of Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSU/School</td>
<td>2000 SW 5th Ave.</td>
<td>1965</td>
<td>Determined Eligible</td>
<td>ROW acquisition; No adverse effect</td>
<td>De minimis LPA to Park Ave. MOS to Lake Rd.</td>
<td>No adverse effect; partial acquisition of property behind the building</td>
</tr>
<tr>
<td>Royal Foods/Warehouse/Office</td>
<td>2425-2445 SE 8th Ave.</td>
<td>1957</td>
<td>Determined Eligible</td>
<td>Full or Partial Demolition; Adverse effect</td>
<td>Use LPA to Park Ave. MOS to Lake Rd.</td>
<td>Adverse effect due to full acquisition and demolition</td>
</tr>
<tr>
<td>Residence</td>
<td>1635 SE Rhone St.</td>
<td>1926</td>
<td>Determined Eligible</td>
<td>Partial ROW acquisition; No adverse effect</td>
<td>De minimis LPA to Park Ave. MOS to Lake Rd.</td>
<td>No adverse effect; minor acquisition required for sidewalk and streetscape treatments</td>
</tr>
<tr>
<td>Name/Type</td>
<td>Address</td>
<td>Built Date</td>
<td>Section 106 Status</td>
<td>Section 106 Finding</td>
<td>Type of Section 4(f) Use</td>
<td>Description of Use</td>
</tr>
<tr>
<td>---------------------------</td>
<td>--------------------------------</td>
<td>------------------</td>
<td>--------------------</td>
<td>---------------------</td>
<td>--------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Westmoreland Park</td>
<td>7605 SE McLoughlin Blvd.</td>
<td>1937</td>
<td>Determined Eligible</td>
<td>No ROW acquisition; adverse effect</td>
<td>Use LPA to Park Ave. MOS to Lake Rd.</td>
<td>Adverse effect due to enhancement of park feature as mitigation for project wetland impacts</td>
</tr>
<tr>
<td>Brooklyn Yard</td>
<td>2001 SE Holgate Blvd.</td>
<td>1912-1946</td>
<td>Determined Eligible</td>
<td>ROW acquisition; No adverse effect</td>
<td>Use LPA to Park Ave. MOS to Lake Rd.</td>
<td>No adverse effect; partial acquisition and relocation of one facility in yard; no change of use</td>
</tr>
<tr>
<td>R. Derwey House</td>
<td>2206 SE Washington St.</td>
<td>1925</td>
<td>Determined Eligible</td>
<td>ROW acquisition – Impacts setting; Adverse effect</td>
<td>Use LPA to Park Ave. MOS to Lake Rd.</td>
<td>Adverse effect due to partial acquisition and change of setting</td>
</tr>
<tr>
<td>Spanish Revival House</td>
<td>2326 SE Monroe St.</td>
<td>1928</td>
<td>Determined Eligible</td>
<td>ROW acquisition; No adverse effect</td>
<td>Use LPA to Park Ave. MOS to Lake Rd.</td>
<td>No adverse effect; partial acquisition but no change of setting</td>
</tr>
<tr>
<td>Oregon Pacific Railroad</td>
<td>Various locations along the alignment</td>
<td>Various</td>
<td>Determined Eligible</td>
<td>Direct use of ROW; No adverse effect, railroad only (not trestle)</td>
<td>Use LPA to Park Ave. MOS to Lake Rd.</td>
<td>No adverse effect; partial use of ROW and relocation of yard facilities</td>
</tr>
<tr>
<td>Union Pacific Railroad (excluding trestle)</td>
<td>Various locations along the alignment</td>
<td>1900</td>
<td>Determined Eligible</td>
<td>Direct use of ROW; No adverse effect, railroad only (not trestle)</td>
<td>Use LPA to Park Ave. MOS to Lake Rd.</td>
<td>No adverse effect; partial use of ROW and relocation of yard facilities</td>
</tr>
<tr>
<td>Railroad Trestle</td>
<td>At Kellogg Lake</td>
<td>1900</td>
<td>Determined Eligible</td>
<td>Indirect, visual; No adverse effect</td>
<td>Use LPA to Park Ave.</td>
<td>No adverse effect; use of ROW but no direct alterations; change of setting, decreased visual opportunities</td>
</tr>
</tbody>
</table>
Table K-2
Portland-Milwaukie Light Rail Project - Section 4(f) Historic Sites Used

<table>
<thead>
<tr>
<th>Name/Type</th>
<th>Address</th>
<th>Built Date</th>
<th>Section 106 Status¹</th>
<th>Section 106 Finding²</th>
<th>Type of Section 4(f) Use</th>
<th>Description of Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residence</td>
<td>2313 SE Wren Street</td>
<td>1953</td>
<td>Determined Eligible</td>
<td>Partial acquisition; no adverse effect</td>
<td>De minimis LPA to Park Ave.</td>
<td>No adverse effect; use of small area at rear of lot; removal of trees</td>
</tr>
</tbody>
</table>

¹ Listed or Determined Eligible for Listing in the National Register of Historic Places; Oregon SHPO has concurred.
² Determination of Effect with concurrence by the Oregon SHPO.

Portland State University (PSU)/School – The PSU building in the project area is located at 2000 SW 5th Avenue and was built in 1965. It is eligible for the NRHP for its architectural merit. The distinctive qualities of the architecture include the central block with vertical steel columns and painted steel plates. The projecting wings on either side of the building include decorative brickwork. This building blends horizontal and vertical features into a distinctive mid-century modern form. This resource qualifies under Section 106 Criterion C.

Eastside Willamette River Greenway Trail – The Eastside Willamette River Greenway Trail provides for a connection to the Springwater Corridor Trail (described in more detail below). Immediately south of the Eastbank Esplanade, and ending at SE Caruthers Street, the trail is located within easements from private landowners. The trail area is within an easement granted to the City of Portland for recreational purposes; therefore, Section 4(f) regulations apply. For areas south of SE Caruthers Street and south to SE Ivon Street, the City of Portland envisions additional connections to be provided through future development or redevelopment actions, as required by the City of Portland’s greenway overlay code. Although the city envisions the area south of SE Caruthers Street as a future segment of the Eastside Willamette River Greenway Trail, this area is on private land, there are not yet permanent easements provided for the trail, and the existing land is not used for recreational purposes.

Royal Foods Warehouse and Office – This resource is located at 2425 and 2445 SE 8th Avenue and was built in 1957. This building is considered eligible for the NRHP for its architectural merit. The distinctive qualities of the architecture include the fenestration patterns consisting of vertical windows arranged in a horizontal pattern, the use of glass block interwoven with brick surfaces, and the cantilevered overhang on the second level of the front façade. This building illustrates the blending of traditional features, such as materials, with the mid-century modern streamlined forms. This resource qualifies under Section 106 Criterion C.

SE Rhone Street Residence – This resource is located at 1635 SE Rhone Street and was built in 1926. It is a good example of a circa 1920 Bungalow-style residence in the Brooklyn neighborhood, and it is eligible for the NRHP under Criterion C.
Brooklyn Yard – Brooklyn Yard is a freight rail yard located at 2001 SE Holgate Boulevard and consists of a complex of buildings and structures dating from 1912 to 1946. This district is historically significant for its association with early interstate and transcontinental steam-powered rail transportation in Oregon. This resource qualifies under Section 106 Criterion A.

Westmoreland Park – Westmoreland Park is a 40-acre facility owned and operated by PP&R and is a Section 4(f) recreational resource. It has a variety of park and recreation facilities, including a baseball field, basketball court, disabled access restroom, football field, paved and unpaved paths, picnic tables, playgrounds, soccer fields, softball fields, and tennis courts. Westmoreland Park began as a part of a residential subdivision that was subtracted from the Ladd Estate’s Crystal Spring Stock Farm in 1909. By the 1930s, the site east of the subdivision had been converted from a wetland to serve time as a dairy, brickyard, and airstrip known as Broom Field.

In 1935, the City Planning Commission recommended development of recreational amenities for the nearby residents and later proposed a plan, prepared by architect Francis B. Jacobberger, that resulted in a casting pond, a cement-bordered model yacht lagoon (known as the Duck Pond), a fly caster’s club house, bridges, a water supply for the casting pond supplied from Eastmoreland Golf Course, and grading of the athletic fields. The area of potential impact from the light rail project is restricted to the duck pond area.

Section 4(f) applies to Westmoreland Park as both a recreational and historic resource. This resource qualifies under Section 106 Criterion A because it is associated with the Works Progress Administration (WPA), a major Depression-era program that made a significant contribution to the broad patterns of our history.

Springwater Corridor Trail – The Springwater Corridor is a railbanked corridor and, under Section 8(d) of the National Trails Act, is still under jurisdiction of the Surface Transportation Board. Today, the trail is the major southeast segment of the 40-Mile Loop, which was inspired by the 1903 Olmsted Portland Parks Plan for a parkway and boulevard loop to connect park sites. When the Springwater Corridor Trail is fully developed, it will be over 21 miles long. The City of Portland and Metro own various sections of the right-of-way for the trail. Within the project area, the City of Portland owns, operates, and maintains the trail.

For the most part, the trail is separated from public roadways. A project constructing three bridges along the Springwater Corridor Trail was completed in early 2007. These bridges provide elevated crossings over Johnson Creek, SE McLoughlin Boulevard, and the Union Pacific Railroad (UPRR) line in Milwaukie.

The Springwater Corridor Trail is a multi-use trail. The paved surface is generally 10 to 12 feet wide with soft shoulders. The hard surface trail is designed to accommodate walkers, joggers, hikers, bicycles, wheelchairs, and strollers.

R. Derwey House – This resource is located at 2206 SE Washington Street. This two-and-one-half story Dutch Colonial style house was built in 1925 for a well-known Milwaukie jeweler and watchmaker named R. Derwey. It is architecturally significant as the best known example of a Dutch Colonial house in Milwaukie. This resource qualifies under Section 106 Criteria B and C.
Spanish Revival Residence – This resource is located at 2326 SE Monroe Street. This house, built in 1928, is architecturally significant. The character-defining features of the house include the stucco finish, tile roof, and arched openings. It is one of the best remaining examples of a Spanish Revival style residence in Milwaukie. This resource qualifies under Section 106 Criterion C.

Oregon Pacific Railroad (OPR) and the Union Pacific Railroad – The railroad system is significant for its association with early interstate and transcontinental rail transportation in Oregon. The railroads qualify under Section 106 Criterion A because they are associated with transcontinental rail transportation in Oregon, which made a significant contribution to the broad patterns of our history.

Historic Trestle – The wooden railroad trestle crossing Kellogg Creek is part of the Tillamook Branch line owned by the UPRR, and is a component of an extensive system of railroads that run throughout the project area; the entire railroad system has been determined an historic resource, significant for its association with early interstate and transcontinental rail transportation in Oregon. The trestle is located between the Robert Kronberg Park and a related park property known as the Milwaukie Local Share Parcel. The trestle qualifies under Section 106 Criterion A, because it is associated with transcontinental rail transportation in Oregon, which made a significant contribution to the broad patterns of our history and also qualifies under Criterion C, because it embodies the distinctive engineering characteristics of a type, period, or method of construction.

Trolley Trail (Planned) – The NCPRD is planning the Trolley Trail along a six-mile stretch of a historic corridor once used by a streetcar line traveling between Portland and Oregon City. Although the trolley corridor purchased by NCPRD and Metro in 2001 is approximately 40 feet wide, the trail itself will be 16 feet wide.

The trail is expected to have an asphalt or concrete surface and soft shoulders to accommodate pedestrian, recreational, and commuting bicyclists, horses, wheelchairs, and other nonmotorized uses. The Trolley Trail will have 25 pedestrian access points from neighborhood roads. The trail will provide connections to community facilities, parks, and public transit. Intersection improvements will be designed to provide safe trail crossings at existing roads.

NCPRD was awarded federal funding to conduct preliminary engineering and design work for the entire trail and to construct the trail from Kellogg Creek south to Glen Echo Avenue. Design efforts were initiated in late 2007, and construction is expected to begin in 2010.

SE Wren Street Residence – This resource is located at 2313 SE Wren Street and was built in 1956. It is a good example of a mid-century Ranch-style house in Milwaukie. It is eligible for the NRHP under Criterion C, because it embodies the distinctive architectural characteristics of a type, period, or method of construction.

K.6.1 Cultural Resources

Five previously recorded archaeological resources are located within the APE. Four of these resources either have been previously removed and will not be impacted by the project or have been determined not eligible for inclusion in the NRHP and therefore are not subject to Section 4(f) requirements. The fifth resource is located along the proposed alignment in Milwaukie and
has not been evaluated for NRHP eligibility. This resource may potentially be impacted by the proposed project. Six additional archaeological sites containing historic-period and/or prehistoric materials have been recorded near the project area.

There are also locations along the corridor that have the potential to contain significant archaeological resources. The project inventory identified areas with high to moderate probabilities for encountering archaeological resources. The probability reflects available information about other known resources that may be nearby, as well as areas that are typically associated with the presence of Native American and historic-period Euroamerican archaeological sites. The project has conducted additional field surveys and assessments to assist in determining the likelihood that a significant archaeological resource is present in an area that could be disturbed by the project.

An area where there is a reasonable expectation that a significant archaeological site may be present is noted as having a high probability. Moderate probability areas are noted where there is less certainty, as a result of past impacts. Nineteen high probability areas and three moderate probability areas for the presence of Native American and historic-period Euroamerican archaeological sites have been identified within the APE. The areas include the following.

- Two high probability areas (HPA-1 and HPA-2) are located in downtown Portland; one is near a recorded archaeological site that is outside of the project APE, and the other high probability area is associated with a work space where a significant archaeological site, now removed, was previously recorded. Two additional high probability areas (HPA-9 and HPA-10) are positioned where the alignment transitions between downtown Portland and the South Waterfront area.
- One high probability area (HPA-3) is located near a recorded archaeological site on the east side of the Willamette River. There is an additional high probability area (HPA-11) located between the UPRR and OPR rail facilities.
- Two high probability areas (HPA-4 and HPA-5) were previously noted as part of the South Corridor Project SDEIS. They are in the vicinity of Crystal Springs and Johnson Creek.
- A high probability area (HPA-8) is located near SE McLoughlin Boulevard and is recorded as a former historic brick factory.
- An additional high probability area is located within Westmoreland Park (HPA-12), and would be related to a wetland mitigation site for the project.
- Three high probability areas (HPA-6, HPA-7, and HPA-16) are located north and south of Kellogg Lake.
- Three high probability areas for historic archaeological resources are within downtown Milwaukie: HPA-13, HPA-14, and HPA-15.
- Three moderate probability areas (MPA-A, MPA-B, and MPA-C) for historic archaeological resources are located along SW Lincoln Street where the corridor is wider than the historic-period street.
- Three high probability areas (HPA-17, HPA-18, and HPA-19) are within the expansion area for the Ruby Junction Maintenance Facility although HPA-19 would be initially
avoided by the LPA Phasing Option. There are also two identified sites containing prehistoric and historic-period archaeological resources in the vicinity. Maps indicate that a marsh was once present, and several areas within the expansion area do not appear to have been previously disturbed.

K.7 EVALUATION OF SECTION 4(F) RESOURCE USE

Except for the No-Build Alternative, the use of one or more Section 4(f) properties appears unavoidable for the light rail project’s LPA or its MOS. However, all previously considered alternatives that have the potential to meet the project’s purpose and need also required the use of one or more Section 4(f) resources. This reflects the difficulty of developing a new light rail facility to serve a densely developed urban area. More than 20 different alignment and modal alternatives have been considered through the alternatives analysis and previous National Environmental Policy Act environmental reviews conducted for this project. As noted above, Chapter 2 and Appendix L of this FEIS provide additional background on why previous alternatives have not been advanced, including as a result of their lower effectiveness in meeting the project’s purpose and need, and because their costs and environmental impacts were higher than the alternatives carried forward. When there are no prudent and feasible alternatives that can avoid all Section 4(f) resources, the Section 4(f) analysis must determine that the selected alternative results in the least overall harm to Section 4(f) resources.

K.7.1 No-Build Alternative Uses of Section 4(f) Resources

With the No-Build Alternative, there would be no project-related uses of park, recreational, or historic resources subject to Section 4(f) provisions. However, the No-Build Alternative would not address the underlying project purpose and need and therefore it is not considered a prudent Section 4(f) avoidance alternative.

K.7.2 Locally Preferred Alternative (LPA) to Park Avenue: Uses of Recreational or Historic Properties

FTA, TriMet, Metro, and SHPO, when applicable, have determined that the LPA to Park Avenue will have a de minimis impact to the recreational and historic resources listed below. These findings would not change with the LPA Phasing Option. Attachments to this Final 4(f) evaluation include documentation of the de minimis determinations for these resources.

- Portland State University School
- Eastside Willamette River Greenway Trail
- SE Rhone Street Residence
- Brooklyn Yard
- Springwater Corridor Trail
- Spanish Revival House
- Oregon Pacific Railroad
- Union Pacific Railroad
- Westmoreland Park (as a recreational resource)
FTA has determined that construction of the LPA to Park Avenue would require the temporary occupancy of a portion of Robert Kronberg Park. If specific conditions are met, a temporary occupancy does not constitute a use within the meaning of Section 4(f). A temporary occupancy must involve only a minor, short-term activity, and there should be no change in ownership of the land. The scope of the work must not create permanent adverse physical impacts, and no interference with the protected activities, features, or attributes of the property can occur on either a temporary or permanent basis. The land being used must be fully restored to a condition which is at least as good as that which existed prior to the project, and the agency with jurisdiction over the resource must agree in writing. The City of Milwaukie, the park owner, has agreed in writing (Attachment A) that the temporary occupancy would meet these conditions, and as provided under 23 CFR 774.13 it would qualify as an exception to Section 4(f) use approval requirements, and no further evaluation of the resource is required for its approval.

As detailed in the correspondence between the City of Milwaukie, FTA, TriMet, and Metro, the LPA to Park Avenue alignment would not require any permanent right-of-way from the park property, but it would construct a new bridge on the western boundary of the park (see Figure 2). The new bridge would be adjacent to an existing railroad trestle that separates Robert Kronberg Park from the Milwaukie Local Share Parcel. The LPA to Park Avenue alignment requires a temporary occupancy to allow construction staging within the park.

The construction staging will require approximately 0.3 acres of the park within a 50-foot-wide area immediately southeast of the light rail alignment. The park is currently open space, and public access is not restricted. It has no developed facilities and no formally designated activities, features, or attributes. During construction, the site would generally remain open to public access except for the 50-foot staging area. The construction staging area will be used for approximately three and one-half years, less than the estimated four-year construction period for the overall project.

The temporary occupancy of the parkland is not anticipated to adversely impair or diminish the open space or natural attributes of the park or preclude the ability of the City of Milwaukie to ultimately develop the park. The majority of the park’s area will continue to be available to public access during construction. Because Robert Kronberg Park contains an existing railroad trestle that remains in operation, and because the park is also bounded by SE McLoughlin Boulevard, a busy thoroughfare, the LPA to Park Avenue will not greatly alter the park setting or atmosphere on a permanent basis. The light rail project also includes several features that would benefit long-term plans to develop the park, including a bridge structure over Kellogg Creek that has been designed to accommodate a future trail between downtown Milwaukie and the park.
Portland - Milwaukie Light Rail Project

Robert Kronberg Park Staging Location
Project will be staging within 50 foot buffer of light rail alignment (highlighted in blue).

Figure 2: Robert Kronberg Park Staging Location
FTA has determined that the LPA to Park Avenue will have a full use of the recreational and historic resources listed below. An evaluation of these uses is included in this section.

- Royal Foods Warehouse and Office
- Westmoreland Park (as an historic resource)
- R. Derwey House

**K.7.3 Locally Preferred Alternative (LPA) to Park Avenue Use and Extent of Its Effects to the Royal Foods Warehouse**

**Would this alternative result in a use of this resource?**

Yes, the LPA to Park Avenue would require full acquisition and demolition of this property in order to provide adequate right-of-way for the light rail tracks. See Figure 3.

**What measures to minimize harm to this resource have been incorporated into this alternative?**

Because a large portion of the building will be required for use by the LPA to Park Avenue alignment, demolition of the building will be required. The project considered removal of one side of the building, but this would still result in an adverse effect and would eliminate key features that make the building eligible as a Section 4(f) resource. Viable economic use of the building remnant would also be unlikely. There were no other options to minimize harm except through avoidance, as illustrated in Figure 4 and discussed below. Because this is an historic resource, mitigation will include documentation of the resource.

**Can this alternative be modified to avoid the use or to minimize the harm resulting from the use?**

There are several reasons that it would be difficult to avoid the use of this resource or minimize harm to the resource to de minimis impact, without incurring high levels of other impacts, including to other potential Section 4(f) resources. This resource is close to the existing railroad right-of-way, a location that minimizes the proximity effects and traffic conflicts of a new at-grade light rail alignment serving this densely developed urban area. By locating any new light rail facilities in or near existing railroad right-of-way, overall project impacts are minimized, resulting in an alternative that creates less overall harm than other potential alternatives for light rail serving this area. Because of this resource’s proximity to the railroad right-of-way, many previous light rail alignments studied, including the South/North alignments on the Hawthorne Bridge, considered this property to be a displacement.

**SE Division Place Alignment**

An alignment that still served the area but joined the railroad corridor farther to the south was considered (see Figure 4), but it would have had greater levels of property impacts and would have been located in the primary freight route, creating higher levels of congestion, impacting trucking operations and property access, and increasing the potential for unacceptable safety and operational conflicts between trucks, heavy rail, and light rail. A design using SE Division Place
Portland - Milwaukie Light Rail Project

SE Division Alignment Options Impacts on Areas Near Royal Foods Office and Warehouse
also resulted in additional property impacts. The additional impacts of this option were great enough to lead to the dismissal of its further evaluation. Specific impacts included:

There would be impacts to four additional buildings. Two of these buildings, the Darigold property south of SE Division Place and the building north of SE Division Place, are older buildings that could also qualify as potentially eligible for the NRHP.

- The location of the tracks on SE Division Place would impact freight movement in this industrial sanctuary.
- The distance between the tracks on SE Division Place and the Union Pacific freight rail line is 180 feet. This would create an unsafe traffic queuing distance between railroad gates and could trap trucks/vehicles on either the Union Pacific or light rail tracks. It is unlikely that the Oregon Department of Transportation (ODOT) Rail Safety group would permit this design.

**Southern Bridge Alternatives**

In the 1998 *South/North Corridor DEIS*, the project considered alignments that did not serve the Oregon Museum of Science and Industry (OMSI), the Central Eastside Industrial District or the Brooklyn neighborhood of southeast Portland, and instead crossed south of the Ross Island Bridge. These alternatives were removed from consideration because they had lower transportation benefits and high levels of environmental impacts, including impacts to a nature refuge as well as historic neighborhoods. These options also did not serve key transit markets, including the Central Eastside Industrial District and OMSI.

**Ross Island Bridge Alternative**

An alignment adjacent to the Ross Island Bridge, south of the Royal Foods Warehouse, was eliminated from further consideration due to the significant impacts to the historic Ross Island Bridge, property impacts on the east side of the river, and high cost. Like the southern bridge alternatives studied in 1998, the Ross Island Bridge Alternative studied as part of the 2006 Refinement Study also lacked transit service to key markets, including the Central Eastside Industrial District and OMSI.

**K.7.4 Locally Preferred Alternative (LPA) to Park Avenue and extent of its effects to Westmoreland Park**

Would this alternative result in a use of this resource?

Yes, there would be a use of an historic resource because the project proposes to mitigate some of its natural resource impacts by developing a natural resource mitigation and enhancement project within the park. This action would alter an historic feature of the park. However, effects on the park as a park resource constitute a de minimis impact, and therefore the park effects are treated separately from the historic effects; see Attachment 4. The light rail project is mitigating wetland impacts that occur north of the Bybee Station outside of Westmoreland Park, by

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4 See Appendix L.
providing funds to a City of Portland project to develop wetlands and enhance ecosystem functions within the park. The City is proposing a project to provide ecosystem enhancements to the park, restoring a stream that had been altered to be a duck pond when the park was first developed. The restored stream would have a functioning wetland; the action to alter the pond within the park has been determined by SHPO to have an adverse effect on the historic characteristics of the park. See Figure 5.

TriMet’s funding to the City of Portland’s project would improve natural functions to Crystal Springs Creek as it flows through Westmoreland Park. This mitigates the light rail project’s natural resource impacts where it crosses the Crystal Springs Creek upstream near the Bybee Station, and impacts wetlands within the creek’s drainage. The City of Portland’s enhancement and restoration project for the park is proposed to restore wetland and natural stream functions in an area where a concrete lined pond currently exists. The light rail project would provide funds for developing approximately one acre of wetland mitigation area as part of the City of Portland’s ecosystem restoration project. Based on the enhancement plan, between 2.5 to 3 acres of wetland and stream area are anticipated to be developed as part of the City of Portland’s project. Further discussions with the Oregon Department of State Lands (DSL) and the U.S. Army Corps of Engineers will need to occur to determine whether this area and type of mitigation is sufficient to meet agency requirements.

The determination of a Section 106 adverse effect on this resource and the use of land within the park to provide natural resource mitigation needed for the light rail project is being considered a 4(f) use, and requires a full Section 4(f) evaluation.

What measures to minimize harm to this resource have been incorporated into this alternative?

FTA, TriMet, Metro, and the City of Portland are working with SHPO to design the wetland enhancements in ways that have minimal impact to the historic characteristics of the park.

In addition to designing the wetland enhancements in ways that minimize changes to the historic characteristics of this resource, the project proponents have coordinated with SHPO to develop measures to mitigate the loss of these characteristics through measures such as documentation, site identification, or public education. These mitigation commitments have been documented in the project’s MOA.
Figure 5

Proposed light rail alignments:
(LPA to Park and MOS to Lake)

- Construction Limit
- Westmoreland Park
- Duck Pond
- Mitigation Site
Can this alternative be modified to avoid the use or to minimize the harm resulting from the use?

For impacts to wetlands, three mitigation options are available, but only the Westmoreland Park site provides the opportunity to address wetland and stream crossing mitigation impacts in a way that maximizes benefits to wetlands as well as aquatic habitats, particularly habitat for endangered species. The Westmoreland Park Alternative is a result of a combined parks enhancement and natural resource impact mitigation strategy designed to offset impacts of an upstream stream crossing and fill of wetlands within the Crystal Springs Creek drainage, outside of the park boundaries. The proposed location within the park was identified as the most beneficial to ecosystems and parks resources, based on a consensus of resource agencies, the City of Portland, Metro, and TriMet, and it supports long-term plans to restore and enhance the Crystal Springs Creek drainage for endangered species habitat.

The proposal would restore this section of Crystal Springs Creek to a more natural ecosystems function, and there are limited other opportunities for major improvements or enhancements within the drainage, which is otherwise largely developed. One benefit of the Westmoreland Park enhancement is the increase in functions for juvenile salmon. Currently, usage of the pond is limited to juveniles that emerge upstream of the site. The City of Portland is currently retrofitting and replacing culverts downstream to remove barriers for Johnson Creek juveniles to use the site. This project would benefit those populations in the Johnson Creek watershed.

The proposed enhancements are consistent with plans that the City of Portland has for improving the biological functions of the park. The City of Portland and several other natural resource agencies have written letters identifying the Westmoreland Park site as the most promising and beneficial mitigation site to address the natural resource impacts of the light rail project within the Crystal Springs Creek drainage. FTA, TriMet, and Metro are developing mitigation features and measures through SHPO to minimize impacts under Section 106. This includes additional documentation of the historic property to meet the standards of the Historic American Buildings Survey (HABS), Historic American Engineering Record (HAER) and Historical American Landscapes Survey (HALS), including large scale photographs. The project will also develop an interpretive panel or display at the Bybee Station, and develop materials describing the historic attributes and features of the property for use by the City of Portland and other interested parties. The information will highlight the relationship of the park to Portland WPA projects, as well as the social, economic, and cultural trends of recreational city parks. Despite the fact that this alternative has a Section 106 adverse effect, FTA, TriMet, Metro, and the City of Portland believe this alternative will cause the least overall harm to the environment, when considering overall effects.

In addition, in the review of the Section 106 effects and consultation with the SHPO, FTA determined that although the alteration of the pond would constitute an adverse effect, the park overall would retain sufficient integrity to remain eligible for inclusion in the NRHP.

**Bybee Wetland Mitigation Alternative**

Another mitigation alternative is to create new wetland south of Bybee Boulevard (see Figure 6), and between SE McLoughlin Boulevard and the UPRR tracks. Based on the project’s wetland delineation and a soil pit in the area, existing hydrology is not present. Therefore, the chance of
creating successful mitigation at this site is low. If conducted, however, 1.575 acres of wetland would need to be created, based on DSL’s requirement of a ratio of 1.5:1 for wetland creation. Due to the low potential for success and the lack of offsetting benefits for endangered species, this option is not considered prudent for the purposes of mitigating the light rail project’s natural resource impacts.

**Foster Creek Mitigation Alternative**

Another alternative is to purchase mitigation credits from the Foster Creek wetland mitigation bank. Foster Creek is between Damascus and Estacada, off of the Clackamas River, and is not within the Johnson Creek watershed, so the mitigation would not benefit the location that is being impacted. It also does not provide the additional benefit of restoring endangered species habitat for salmon. Mitigating at Foster Creek is not preferred for meeting salmon uplift or watershed enhancement in the City of Portland or for Crystal Springs Creek or Johnson Creek because the mitigation is distant from the project impact. It therefore does not support the project goal of enhancing the environment nearly as well as the mitigation at Westmoreland Park does. Due to these factors and the lack of a connection to the Crystal Springs Creek or offsetting benefits for endangered species habitat, this option is not considered prudent for the purposes of mitigating the light rail project’s natural resource impacts.

**K.7.5 Locally Preferred Alternative (LPA) to Park Avenue Use and Extent of Its Effects to the R. Derwey House**

Would this alternative result in a use of this resource?

The LPA to Park Avenue would require the acquisition of land along the west side of the parcel to within approximately 10 feet of the R. Derwey House, including the removal of a mature tree and other vegetation, as well as a detached shed on the property (see Figure 7). The project would also construct a retaining wall and a fence on the boundary of the property. The proximity of the light rail facilities and associated features would alter the setting of the building and compromise the historic characteristics of the site, constituting an adverse effect.

What measures to minimize harm to this resource have been incorporated into this alternative?

As noted previously, this resource qualifies for listing on the NRHP because of its representation of Dutch Colonial-style housing. Several efforts have been made to minimize harm to this resource, including omitting an early proposal for a light rail station at SE Monroe Street, which would have required an additional 10 to 15 feet of property from the R. Derwey House property. Additionally, the placement of the alignment was designed to be as close to the UPRR tracks as permitted by the UPRR, while maintaining adequate setbacks and sight distances at intersections to allow for safe and effective operation of the light rail system in a corridor shared with freight rail and with at-grade street crossings. The project includes several features, including retaining walls, to minimize the amount of land required from the R. Derwey House. The house itself is not physically impacted, and the use required for the project is related to the narrow strip of land required for the light rail project, and the unavoidable removal of mature landscaping. While the SHPO has concurred with a determination that this use would result in an adverse effect under Section 106, the R. Derwey House would remain eligible for listing in the NRHP.
Figure 7

R. Derwey House

Proposed LPA to Park Ave alignment

Construction Limit

R. Derwey House Property boundary
Can this alternative be modified to avoid the use or to minimize the harm resulting from the use?

There are several reasons that it would be difficult to modify this alternative to fully avoid the use of the property or minimize harm to the resource to the level of a de minimis impact. This resource is close to the existing railroad right-of-way, which provides an existing corridor for light rail facilities to serve the City of Milwaukie. By locating any new rail facilities in or near existing railroad right-of-way, the project is minimizing its overall impacts to the environment and to property, compared to other alignment options serving this heavily developed urban area.

Three other alignment options to avoid or minimize the harm to the R. Derwey House were considered leading up to the 2008 SDEIS. These included SE Main Street, SE Main Street and SE 21st Street, and SE McLoughlin Boulevard alignments, which are described below.

**SE Main Street Alignment**

This alignment considered placing the light rail alignment on SE Main Street through the middle of downtown Milwaukie. This would have avoided impacts to the R. Derwey House, but would have had serious impacts to downtown traffic circulation and business access, downtown parking, and potential impacts to other downtown historic resources such as the Masonic Temple and City Hall that are also Section 4(f) historic resources. City of Milwaukie staff determined this alignment to be incompatible with the Milwaukie Downtown and Riverfront Land Use Framework Plan because of impacts on SE Main Street and the connection to the Willamette River. In addition to the City of Milwaukie opposition, through public workshops it was determined that community opposition to this alignment was also high.

**SE Main Street and SE 21st Street Rail Couplet Alignment**

This alignment considered placing the light rail alignment on SE Main Street and in the opposite direction on SE 21st Street through the middle of downtown Milwaukie. Like the SE Main Street alignment, this alignment would have had no impact to the R. Derwey House, but would have had serious impacts to downtown traffic circulation and business access, downtown parking, and, similar to the SE Main Street alignment, this alignment would have potential impacts to other historic properties including the Masonic Temple and City Hall, which are Section 4(f) historic resources. City of Milwaukie staff determined this alignment to be incompatible with the Milwaukie Downtown and Riverfront Land Use Framework Plan because of impacts on Main Street and the connection to the Willamette River.

**SE McLoughlin Boulevard Alignment**

This alignment was studied during the 2008 SDEIS alternatives refinement and would have located light rail on SE McLoughlin Boulevard through Milwaukie. This alternative would have had no impact to the R. Derwey House. However, this alternative would require rebuilding and widening SE McLoughlin Boulevard, which had recently been reconstructed to incorporate streetscape and pedestrian facilities and improve operations and safety conditions. Widening would have also increased property impacts compared to other alternatives, and light rail operations on this major transportation facility had higher potential for substantial traffic impacts. This alternative would have also required a substantial amount of right-of-way from Riverfront Park, a Section 4(f)
resource to the west that is important to implementation of the Milwaukie downtown plan. In addition to requiring between 36,000 and 48,000 square feet of Riverfront Park, this alternative would have also impacted park access and circulation, and decreased vehicle parking for this resource. This alternative would have also had adverse effects to the historic trestle. The station facility would have been less accessible to the downtown, thus reducing mobility benefits.

K.7.6 Minimum Operable Segment (MOS) to Lake Road

The MOS to Lake Road has the same Section 4(f) uses as the LPA to Park Avenue until it reaches its terminus at SE Lake Road in downtown Milwaukie. The affected Section 4(f) properties include:

- Portland State University School (de minimis)
- Eastside Willamette River Greenway Trail (de minimis)
- Royal Foods Warehouse and Office (use)
- SE Rhone Street Residence (de minimis)
- Brooklyn Yard (de minimis)
- Westmoreland Park (de minimis)
- Springwater Corridor Trail (de minimis)
- Spanish Revival House (de minimis)
- Oregon Pacific Railroad (de minimis)
- Union Pacific Railroad (de minimis)

K.8 OVERALL COMPARISON OF ALTERNATIVES

To date, the project has been unable to identify a prudent and feasible project alternative that fulfills the project’s purpose and need and completely avoids the use of Section 4(f) resources.

Of the alternatives considered in the FEIS, the No-Build Alternative does not meet the project’s purpose and need, and over the long run, will contribute to increased traffic congestion and an inability to implement local community plans, both of which increase long-term environmental impacts. Therefore, it does not provide a feasible and prudent avoidance alternative to a Section 4(f) use.

As described above, both the LPA to Park Avenue and the MOS to Lake Road option would require the use of Section 4(f) properties. The project has been designed to incorporate measures to avoid Section 4(f) resources while still maintaining an effective balance of project benefits and avoiding significant environmental impacts. This effort includes all possible planning to minimize harm to specific resources and for the project overall. For example, the project’s current alignment using railroad rights-of-way in many portions of the corridor avoids the much higher levels of impact that would otherwise occur with alignments that would be along local streets or through established neighborhoods where sufficient linear rights-of-way are not available.

In this final step of the Section 4(f) evaluation, the LPA to Park Avenue and the MOS to Lake Road option are compared to one another to determine which alternative causes the least overall harm,
consistent with Section 774.3(c)(1) of the Section 4(f) regulations. The evaluation also briefly reviews other alternatives previously considered, showing that they do not provide an opportunity to avoid Section 4(f) resources while also successfully fulfilling the project’s purpose and need.

K.8.1 Locally Preferred Alternative (LPA) to Park Avenue

The LPA to Park Avenue would result in a permanent use of three historic Section 4(f) resources. It has been designed to minimize its effects on the other Section 4(f) resources that are along its alignment, with either de minimis or temporary use of other Section 4(f) resources. The LPA to Park Avenue is the only feasible and prudent alternative that has been found to satisfy the project’s purpose and need for a major transit investment. The LPA to Park Avenue involves the same full use of Section 4(f) resources as does the MOS to Lake Road. While the LPA to Park Avenue does involve de minimis impacts of the historic trestle and the Trolley Trail, de minimis impacts do not require further evaluation of avoidance alternatives.

The LPA to Park Avenue would provide multimodal transportation options, support land use goals, contribute to the decrease in congestion, and provide better connections throughout the region. It would therefore best meet the project purposes of maintaining livability, supporting land use goals, minimizing environmental impacts, reflecting community values, and optimizing the transportation system.

K.8.2 Minimum Operable Segment (MOS) to Lake Road

The MOS to Lake Road does not offer the opportunity to avoid any Section 4(f) resources that require a full use under the LPA to Park Avenue. Because it has the same full uses of Section 4(f) properties, it does not represent a separate Section 4(f) avoidance alternative. The MOS to Lake Road, which is similar to a previously considered alternative terminating in downtown Milwaukie (as evaluated in the 2008 SDEIS), represents an interim phasing approach for the project, and is not considered an alternative to ultimately building and operating the LPA to Park Avenue. Further, because the MOS to Lake Road would have a terminus at SE Lake Road and requires developing a park-and-ride in downtown Milwaukie, it carries higher traffic impacts within the downtown area and increases the right-of-way acquisition in downtown to provide for a park-and-ride. The park-and-ride structure required for the MOS to Lake Road is more inconsistent with the City of Milwaukie’s plans for its downtown revitalization, which includes goals for a pedestrian scale downtown area and a stronger connection between the downtown area and the Willamette River waterfront. It also has one less station and a lower supply of parking than the LPA to Park Avenue. It has lower ridership and lower transportation system benefits, and lower levels of environmental benefits. All of these factors show that the MOS to Lake Road would have higher localized impacts and lower local and regional mobility benefits than the LPA to Park Avenue. It also offers less opportunity for efficient transit connections from areas to the south. The region’s High Capacity Transit Plan, an element of the adopted RTP, also identifies a future extension of light rail to Oregon City, which would further extend the benefits of light rail. As a stand-alone project, the MOS to Lake Road, with a permanent terminus at Lake Road, would therefore not fully achieve the project’s purposes of maintaining the livability of the region, supporting land use goals, optimizing the transportation system, and reflecting community values.
K.8.3 Other Alternatives Previously Considered

The 2008 SDEIS for the Portland-Milwaukie Light Rail Project considered a 2003 LPA and a Tillamook Branch Alignment, as well as an extension to SE Park Avenue. Alternative alignments were also considered in two areas: for the Willamette River bridge and the Milwaukie Industrial Area. These alternatives and alignment options were variations on the overall project alignment currently proposed for the LPA to Park Avenue, and they did not include any alternatives that avoided the use of the Section 4(f) resources affected by the current light rail project. Therefore, they do not constitute a complete avoidance alternative to Section 4(f) use nor do they represent complete alternatives capable of meeting the project’s purpose and need.

One of the alignment options (known as the 2003 LPA) had a Section 4(f) use that the current project alignment now avoids. The 2003 LPA extended from the Downtown Portland Transit Mall to SE Lake Road in Milwaukie with a new bridge across the Willamette River and an alignment along SE McLoughlin Boulevard and SE Main Street in the North Milwaukie Industrial Area. It terminated in Milwaukie with a Lake Road station and park-and-ride, similar to the current MOS to Lake Road. This route included uses of three Section 4(f) properties, including an historic ODOT building that the current LPA to Park Avenue avoids. It also carried higher traffic and property displacement impacts to streets in an industrial area that are now avoided. As the MOS to Lake Road now represents this alternative, it is not considered a separate alternative for comparison to the effects of the current FEIS alternatives.

A 2002 SDEIS for the South Corridor considered transit improvements between downtown Portland and Milwaukie and from the Clackamas Regional Center via the Gateway Regional Center. The SDEIS alternatives included a light rail alternative that served the Portland-Milwaukie corridor, and also included Bus Rapid Transit (BRT) and Busway Alternatives. The alternatives applicable to the Portland-Milwaukie corridor included:

Milwaukie Light Rail Alternative. This alternative was an early version of the current FEIS MOS to Lake Road, except it entered downtown Portland on the Hawthorne Bridge (with an adverse effect to that historic resource), and it had an additional alignment option at Brooklyn Yard. It did not provide the opportunity to avoid the Section 4(f) resources currently affected by the FEIS alternatives, and it had several other elements that no longer would comprise a prudent avoidance alternative to the currently proposed project.

Busway and BRT Alternatives. The Busway and BRT Alternatives were removed from further consideration with the 2003 LPA decision to move forward with light rail in the South Corridor in two investment phases. The region’s 2003 LPA decision selecting light rail for the Portland-Milwaukie corridor found that these alternatives were much less effective in meeting the project’s purpose and need, particularly in the areas of optimizing the transportation system, supporting land use plans, remaining environmentally sensitive, maintaining the livability of the region, and reflecting community values. They served far fewer transit trips and had less reliability and slower travel times than the light rail alternative. In light of the growth in corridor transit demand and congestion since then, the ability for the BRT or Busway Alternatives to serve the corridor’s transportation need effectively is further compromised. The current light rail alignment, which includes a new bridge and connection to the transit mall and the Green Line light rail line built since 2002, offers a far better connection to Portland’s downtown population and employment centers than the one studied in 2002. Therefore, the BRT and Busway
Alternatives are not prudent alternatives that would meet the project’s purpose and need. The use of Busway or BRT to serve the Portland-Milwaukie corridor are also not consistent with the region’s newest High Capacity Transit Plan, which calls for further extending light rail beyond Milwaukie to Oregon City. Finally, the Busway Alternative affected seven potential Section 4(f) resources, while the BRT Alternative affected at least one potential Section 4(f) resource, so neither comprise a complete Section 4(f) avoidance alternative. Based on more current information, including the identification of additional Section 4(f) resources along the corridor, it is likely that the BRT Alternative would impact additional Section 4(f) resources as well. See the FEIS Appendix J for additional details on prior decisions eliminating these alternatives from consideration.

1998 South/North DEIS

This DEIS reviewed alternatives from Vancouver, Washington, to North Clackamas County, including earlier variations of light rail alignments between Portland and Milwaukie. The alternatives applicable to the Portland-Milwaukie corridor included alignments that are similar to the LPA to Park Avenue, as well as several alternatives that were removed from consideration because of higher environmental impacts, higher costs, and lower transportation performance. These included several other alignments for Willamette River bridge crossings, alignments along Railroad Avenue rather than along the UPRR right-of-way, and an alignment turning eastward on Highway 224 rather than continuing into downtown Milwaukie. The potential for using portions of these alternatives to avoid Section 4(f) resources used by the current FEIS alternatives was discussed by resource above, and all involved either a direct use of a Section 4(f) resource, or they did not meet the project’s purpose and need because they provided lower land use and transportation benefits and carried unacceptable levels of environmental impacts. This supports a conclusion that there are no longer any complete alternatives from the 1998 DEIS that remain prudent to implement today or that avoid Section 4(f) uses, other than the refinements that now comprise the current project’s LPA to Park Avenue.

K.8.3.1 Other Alignment Options

In addition to the full-length light rail alternatives considered through earlier Environmental Impact Statements (EISs) and related alternatives analysis and refinements, the project has considered the potential for localized alignment options to avoid impacts to individual Section 4(f) resources. These alignment options do not comprise a complete avoidance alternative for the entire project, and therefore feasible and prudent or least environmental harm tests do not directly apply. However, the alignments have been discussed by resource in support of the project’s review of all possible planning that could either avoid or minimize the current project’s effects on individual Section 4(f) resources. The alignment options for avoiding the project’s use to Section 4(f) resources include:

- Alignments avoiding the Royal Foods Warehouse. In the 1998 South/North Corridor DEIS, the project considered several river crossing alignments that did not serve OMSI, the Central Eastside Industrial District or the Brooklyn neighborhood of southeast Portland, and instead crossed near or south of the Ross Island Bridge. A later alignment, developed through alternatives analysis following the 1998 South/North Corridor DEIS, also considered an alignment that would be adjacent to the Ross Island Bridge, south of OMSI and the Central Eastside Industrial District. These alignments were removed from
consideration because of their adverse impacts to other Section 4(f) resources, including the historic Ross Island Bridge,

- Hawthorne Bridge Alignment. An alternative in the 2002 South Corridor SDEIS used the Hawthorne Bridge to cross the Willamette River. This alignment resulted in an adverse effect to the Hawthorne Bridge, an historic property. The alignment also resulted in high levels of traffic impacts to the downtown area, and it did not provide an opportunity to avoid other Section 4(f) uses of the current Portland-Milwaukie Light Rail Project.

- SE Division Place Alignment. An alignment that still served OMSI and the Central Eastside Industrial District but that joined the UPRR railroad corridor farther to the south would avoid the Royal Foods Warehouse but would involve other uses of Section 4(f) resources. It carries unacceptably high levels of traffic and freight transport impacts, and it also compromises safety and operating conditions for light rail.

- SE Main Street Alignment, SE Main Street and SE 21st Street Rail Couplet Alignment, SE McLoughlin Boulevard Alignment. These alignments considered placing the light rail alignment on SE Main Street through the middle of downtown Milwaukie, rather than along the Tillamook Branch line, thus avoiding the use of the R. Dewey House. These alignments would have involved other uses of Section 4(f) resources including park and historic resources; they carried higher impacts to traffic, property, and the environment; and they had lower levels of transportation performance, including travel times and reliability. The options for the location of the light rail alignment in downtown Milwaukie also conflicted with local land use plans, reducing their ability to meet the project’s purpose and need. The Milwaukie Downtown and Riverfront Land Use Framework Plan (adopted in 2000 by Ordinance No. 1880) guides the development of private and public land in downtown Milwaukie, a small area centered on ten blocks that exhibit the classic structure and scale of a small town downtown. The plans call for building on existing assets (including Main Street), existing uses (including businesses), and the town’s unique character; strengthening Main Street to ensure economic success; and featuring the natural environment, especially the Willamette River. The addition of light rail using downtown Milwaukie streets would not be consistent with local plans and would impact traffic and properties and potentially hinder its future economic vitality. It would also introduce another interruption between the east side of downtown and the river. The current LPA to Park Avenue alternative was identified as the best way to provide for a major transit improvement while minimizing environmental impacts and meeting land use goals in the downtown Milwaukie area.

**K.8.4 Conclusions**

Based on the foregoing analysis, FTA determines that:

1. there is no feasible and prudent alternative that completely avoids the use of Section 4(f) property;
2. the LPA to Park Avenue is the alternative that causes “least overall harm” and still meets the project’s purpose and need; and
3. the LPA to Park Avenue incorporates all possible planning to minimize harm to Section 4(f) resources.
K.9 SECTION 4(F) DE MINIMIS IMPACT EVALUATION AND DOCUMENTATION

Congress amended Section 4(f) in 2005 when it approved SAFETEA-LU. Section 6009 of SAFETEA-LU added a new subsection to Section 4(f) authorizing the FHWA to approve a project that results in a *de minimis* impact to a Section 4(f) resource without the evaluation of avoidance alternatives typically required in a Section 4(f) evaluation.

K.9.1 Coordination

The LPA to Park Avenue and the MOS to Lake Road will require land from several historic NRHP-eligible properties, including a PSU building; land within the OPR and UPRR railroads, including Brooklyn Yard; Westmoreland Park within the City of Portland; and a property in Milwaukie known as the Spanish Revival House. In accordance with the FHWA/FTA *de minimis* guidance, FTA (or, its agents, Metro and TriMet) must notify SHPO that it intends to make a *de minimis* finding based on the Section 106 finding of “no adverse effect.” As stated in the “Guidance for Determining De minimis use to Section 4(f) Resources” (FHWA 2005), SHPO must concur in writing with FTA, Metro, and TriMet’s Section 106 “no adverse effect” finding for historic resources.

In 2008, FTA, Metro, and TriMet advertised a 45-day comment period with public meetings for the SDEIS and for the preliminary *de minimis* determinations. This comment period also served as the opportunity for public review and comments for proposed Section 4(f) *de minimis* impacts. In addition, as the project continued to be advanced through preliminary engineering, it advertised and conducted two public meetings on February 23 and 25, 2010. These two meetings provided additional public review and comment opportunity for *de minimis* treatments for all properties, including several Section 4(f) resources that involved *de minimis* impacts that were identified as a result of additional coordination with agencies with jurisdiction and based on the further detail available through preliminary engineering. These resources included Westmoreland Park, the Eastside Willamette River Greenway Trail, and the Springwater Corridor Trail, the Rhone Street house, and the Wren Street house.

No wildlife or waterfowl refuges or archaeological resources are being evaluated under the Section 4(f) *de minimis* provisions. Individual *de minimis* determinations for each resource are attached to this Section 4(f) Evaluation.
ATTACHMENT A

ADDITIONAL CORRESPONDENCE
January 28, 2010

Ms. Bridget Wieghart  
Metro  
600 NE Grand  
Portland, OR 97232

Dear Ms. Wieghart:

The City of Milwaukie agrees that a proposed temporary occupancy to allow a construction staging area on a portion of Robert Kronberg Park, as proposed for the Portland Milwaukie Light Rail Project, is acceptable given the following conditions:

1. Duration will be temporary, i.e., less than the projected four years that are needed for construction of the overall project, and the City will retain ownership of the land;
2. The scope of the work as proposed is minor, involving construction staging on a currently undeveloped portion of the property;
3. There are no anticipated permanent adverse physical impacts, nor will there be interference with the activities, features, or attributes of the property, on either a temporary or permanent basis, as the park is currently an open space with no formally designated activities;
4. TriMet shall fully restore the areas to be used, returning the property to a condition which is at least as good as that which existed prior to the project.

The City recognizes that specific details of the property agreement between the City and TriMet, including compensation, restoration plans, or other benefits remain to be determined, based on final design and other project development activities following the release of the Final EIS. We look forward to working with TriMet to formalize an agreement to allow the project to use the property during construction.

We also wish to again express or support and preference for the LPA to Park Avenue, as described in the FEIS, which we believe provides the greatest access to downtown Milwaukie, while also having the least permanent impacts to the community, particularly compared to the MOS with a terminus station and park and ride in our downtown area.

We look forward to working with Metro and TriMet as it completes the Final EIS and begins final design and permitting phases for the project.

Sincerely,

Kenny Asher  
Community Development Director

cc: JoAnne Herrigel, City of Milwaukie  
    Dave Unsworth, TriMet
-----Original Message-----
From: Joe_Carriero@nps.gov [mailto:Joe_Carriero@nps.gov]
Sent: Wednesday, March 31, 2010 4:21 PM
To: Smith, Ethel M
Cc: Morlock, Dale; Singleton, Ellen; Rai, Vijai N
Subject: RE: Status of ER 08/479 - DOI cmts on Portland to Milwaukie Light Rail Project, OR

Hi Ethel,

Sorry about that.

NPS concurs with the FTA/SHPO determination on ER-08/0479.

Thanks,

Joe

Joe Carriero, External Affairs Program Manager

NPS Environmental Quality Division

Mail Address: P.O. Box 25287; Denver, CO 80225

Location: 7333 W. Jefferson Ave.; Lakewood, CO 80235

303-987-6999 (phone); 303-987-6617 (fax)
ATTACHMENT 1

SECTION 4(F) DE MINIMIS IMPACT EVALUATION AND DETERMINATION – PORTLAND STATE UNIVERSITY

Property Description

The historic PSU building is located at 2000 SW 5th Avenue. Built in 1965, this building is considered eligible for the NRHP for its architectural merit. The distinctive qualities of the architecture include the central block with vertical steel columns and painted steel plates. The projecting wings on either side of the building include decorative brickwork. This building blends horizontal and vertical features into a distinctive mid-century modern form.

Locally Preferred Alternative (LPA) to Park Avenue

The acquisition of a portion of the parking lot of the PSU building (2000 SW 5th Avenue) and minor revisions in site access do not physically alter the building and do not substantially change the urban setting of the property. However, the use of a portion of the property is considered to be a direct effect. The introduction of light rail along the eastern portion of the property introduces a new visual element on this site; however, it would not constitute an adverse effect, because it would not significantly alter the integrity of the resource or its relationship with its setting. The SHPO concurred with the determination of no adverse effect following the publication of the 2008 SDEIS. Therefore, the light rail project meets the requirements for a de minimis determination for this resource.
Cover Sheet
for
“Section 106” Reconnaissance Level Surveys

Submit this Cover Sheet to the Oregon SHPO along with all survey materials (see checklist below).

<table>
<thead>
<tr>
<th>Survey Project Name</th>
<th>Portland - Macadam Light Rail</th>
<th></th>
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</thead>
<tbody>
<tr>
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<td>Survey Sponsor</td>
<td>PCA/Portland M/Lep/Lent</td>
<td></td>
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<tr>
<td>Date Submitted</td>
<td>SHPO</td>
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</tr>
</tbody>
</table>

# Eligible Properties | # Ineligible Properties |  |
<table>
<thead>
<tr>
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<td></td>
</tr>
<tr>
<td>Acres Surveyed</td>
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<td></td>
</tr>
</tbody>
</table>

Survey Boundaries
The survey was designed to evaluate the potential impacts of the proposed project on the adjoining property. The survey was conducted by PCA/Portland M/Lep/Lent in accordance with the requirements of the Oregon State Historic Preservation Office (SHPO). The survey was designed to evaluate the potential impacts of the proposed project on the adjoining property. The survey was conducted by PCA/Portland M/Lep/Lent in accordance with the requirements of the Oregon State Historic Preservation Office (SHPO).

Survey Summary:
This survey was designed to evaluate the potential impacts of the proposed project on the adjoining property. The survey was conducted by PCA/Portland M/Lep/Lent in accordance with the requirements of the Oregon State Historic Preservation Office (SHPO). The survey was designed to evaluate the potential impacts of the proposed project on the adjoining property. The survey was conducted by PCA/Portland M/Lep/Lent in accordance with the requirements of the Oregon State Historic Preservation Office (SHPO).

Survey Comments:
The survey was designed to evaluate the potential impacts of the proposed project on the adjoining property. The survey was conducted by PCA/Portland M/Lep/Lent in accordance with the requirements of the Oregon State Historic Preservation Office (SHPO). The survey was designed to evaluate the potential impacts of the proposed project on the adjoining property. The survey was conducted by PCA/Portland M/Lep/Lent in accordance with the requirements of the Oregon State Historic Preservation Office (SHPO).

106 Case #: 0102717

106 Comments:
The survey was designed to evaluate the potential impacts of the proposed project on the adjoining property. The survey was conducted by PCA/Portland M/Lep/Lent in accordance with the requirements of the Oregon State Historic Preservation Office (SHPO). The survey was designed to evaluate the potential impacts of the proposed project on the adjoining property. The survey was conducted by PCA/Portland M/Lep/Lent in accordance with the requirements of the Oregon State Historic Preservation Office (SHPO).
Submit this Cover Sheet to the Oregon SHPO along with all survey materials (see checklist below).

SHPO Evaluation of Survey Project
- Approved
- Conditionally Approved
- Not Approved

SHPO Comment on NR Eligibility Evaluations
- Concurs
- Does Not Concur
- Requested for Additional Data

SHPO Comment on Effect Determination
- Concurs
- Does Not Concur
- Requested for Additional Data

SHPO Staff Signature

Checklist of Required Items:
1. Completed "Cover Sheet" (in digital form and hard copy)
2. 106 Form if Obtained from SHPO and Included on Form
3. Survey data submitted in electronic format
4. Proprietary labeled photos (digital photos and with data)
5. Properly marked survey map
6. Copy of 1066: Map Showing Location of Surveyed Area

Optional Items:
- Research Design Completed Prior to Survey
- Completed Survey Forms (Field Forms)
- Final Report

Comments:
ATTACHMENT 2

SECTION 4(F) **DE MINIMIS IMPACT EVALUATION AND DETERMINATION – EASTSIDE WILLAMETTE RIVER GREENWAY TRAIL**

Property Description

The Eastside Willamette River Greenway Trail provides for a connection to the Springwater Corridor Trail. Immediately south of the Eastbank Esplanade, and ending at SE Caruthers Street, the trail is located within easements from private landowners, granted to the City of Portland for recreational purposes; therefore, Section 4(f) regulations apply.

For areas south of SE Caruthers Street and south to SE Ivon Street, the City of Portland envisions additional connections to be provided through future development or redevelopment actions, as required by the City of Portland’s greenway overlay code. Although the city envisions the area south of SE Caruthers Street as a future segment of the Eastside Willamette River Greenway Trail, this area is on private land, there are not yet permanent easements provided for the trail, and the existing land is not used for recreational purposes.

Locally Preferred Alternative (LPA) to Park Avenue Use

The LPA to Park Avenue alignment would cross over the Eastside Willamette River Greenway Trail on an elevated structure, inhabiting air space above the trail (see Figures 1 and 2), and requiring a temporary closure and detour during construction. While the use of air rights is not considered a direct use under Section 4(f) regulations and related guidance, construction of the new bridge and related improvements, which include abutment and embankment structures beside the trail and the reconstruction, lowering, and slight realignment of a portion of the trail, would be a modification that would constitute a use. The permanent modification of the trail elevation is to provide clearance of at least 14 feet 4 inches below the light rail project.

Several design and construction actions would minimize the effects of the LPA to Park Avenue alternative. These include providing connectivity during construction through a detour plan that is mutually agreeable to the City of Portland and FTA, TriMet, and Metro. Additionally, the new bridge would include a new path connection between existing and planned greenway trails on both sides of the Willamette River, providing increased access for regional trail system users. Design measures would ensure that visual impacts to this resource would not impair the essential activities, features, and attributes of the trail, which are to protect, conserve, restore, enhance, and maintain the ecological, natural, scenic, historical, agricultural, economic, cultural, and recreational qualities and resources along the Willamette River.

During construction, the trail would be temporarily rerouted away from construction activities, and adequate signage and way-finding mitigation would be implemented to ensure a safe and continuous pathway for the trail. FTA, Metro, and TriMet will reach agreements with the PP&R and the Portland Bureau of Transportation on an exact route for the temporary pathway during construction of the light rail bridge and the reconstruction of the permanent Eastside Willamette River Greenway Trail. The duration of construction will be less than duration period for the
construction of the bridge. Aside from the change in elevation and the minor realignment by the bridge abutments, reconstruction of the trail will leave it essentially in the same location as it is today.

The reconstructed trail will be returned to a similar or better condition compared to today. It will be similar in width, grade, and lighting to the current pathway, and will still safely accommodate pedestrians, cyclists, and other nonmotorized modes. The trail will maintain an open view to the river, except where it passes between the bridge abutment and landside pier. Specific design elements will be determined during final design, in consultation with the City of Portland. There will be no essential changes to the function of the trail, and the new light rail alignment will provide additional access to the trail, including an improved connection between the Central Eastside Industrial District and the South Waterfront area, providing a shorter route for bicycle commuters or walkers traveling between those areas.

FTA, in consultation with TriMet, Metro, and the City of Portland, has determined that the use of the Eastside Willamette River Greenway Trail will be de minimis. A letter from the City of Portland concurring in the determination of de minimis impact is included as an attachment to this document.
Portland - Milwaukie Light Rail Project

Eastside Willamette River Greenway Trail and Proposed Light Rail Alignments
January 28, 2010

Bridget Wieghart  
Metro  
600 NE Grand Avenue  
Portland, OR 97232

Dear Ms. Wieghart:

Portland Parks & Recreation would like to express its concurrence with the Portland-Milwaukie Light Rail Project’s Section 4(f) determinations of de minimis use of small parts of the Eastside Willamette River Greenway Trail, Springwater Corridor Trail, and Westmoreland Park as a natural resource mitigation site for the project.

We understand and concur with a de minimis use determination of Eastside Willamette River Greenway Trail and the Springwater Corridor Trail. We believe the project will not “adversely affect the activities, features, and attributes” that make these resources eligible for protection under Section 4(f).

We also strongly support the development of a natural resource mitigation and enhancement feature within Westmoreland Park, which provides an excellent opportunity for the City and TriMet to partner on one of our highest priority environmental enhancement actions on Crystal Springs Creek. We concur with a finding that the use of the park will not prevent the public’s use and enjoyment of the majority of the park’s features and facilities. We also support the Section 4(f) Evaluation finding that the impacts to the duck pond, one of the park’s historic characteristics, are outweighed by the positive benefits that the mitigation and enhancement project would have for the natural environment, Crystal Springs, and the overall park setting.

We are confident that the project development approach described in your letter for the Section 4(f) properties under the City’s jurisdiction will allow the City of Portland and TriMet to develop the formal agreements needed to develop the light rail project in a way that maximizes benefits to the City, while minimizing impacts
to its park and recreation resources. The City urges TriMet to design, fund, and construct trail connections from the new Willamette bridge to the Greenway Trails, particularly on the east side.

We look forward to having these important trail connections incorporated into the plans for the bridge, and collaborating with Metro and TriMet as the project completes the Final EIS and enters the final design and permitting phases for the project.

Sincerely,

[Signature]

Zari Sammer
Director

cc: Brett Burrell, PP&R
    Emily Roth, PP&R
    Teresa Boyle, PBOT
    Dave Unsworth, TriMet
ATTACHMENT 3

SECTION 4(F) DE MINIMIS IMPACT EVALUATION AND DETERMINATION – SE RHONE STREET HOUSE

Property Description

This historic resource is located at 1635 SE Rhone Street and was built in 1926. It is a good example of a circa 1920 Bungalow-style residence in the Brooklyn neighborhood, and it is eligible for the NRHP under Criterion C.

2008 Locally Preferred Alternative (LPA) to Park Avenue

The LPA to Park Avenue requires a realignment of SE 17th Avenue and its related streetscape. This requires the acquisition of a strip of property, but would not physically alter the house or significantly alter the surrounding visual aspects of the property (see Figure 1). As part of the Section 106 process, FTA concluded that the project would not have an adverse effect, and the SHPO has concurred; this satisfies the requirements for a finding of *de minimis* impact of an historic resource.
Portland-Milwaukie Light Rail Project

Residence:
1635 SE Rhone

Figure 1

Proposed light rail alignments
(LPA to Park Ave and MOS to Lake Rd)

- Construction Limit
- Property boundary

1635 SE Rhone
Cover Sheet
for
"Section 106" Reconnaissance Level Surveys
Submit this Cover Sheet to the Oregon SHPO along with all survey materials (see checklist below).

Survey Project Name: Portland Meadec Light Rail 2
Survey Start Date: 10-10-2000
Survey End Date: 11-11-2000
Survey Sponsor: FTA Office of Planning
Survey Type: Section 106 CRL
Surveyor Name: Rejoice Keeley, SR of Cultural Resources Specialist, Parametrics, 541-752-3149

City: Portland
County: Multnomah

Survey Boundaries:
In an area surveyed is bounded on the west by SW 5th Ave in Portland and a boundary line extending to the south and east by SW 10th Ave.

Survey Summary:
The area surveyed in the project is located on SW 3rd Ave between SW 5th and SW 6th Aves in Portland.

Comments:
The survey was done to provide information on historic properties in the project area and to determine the potential impacts of the project on historic properties. The survey was conducted by a team of archaeologists who have expertise in the field of cultural resources. The survey was conducted in accordance with the standards and guidelines established by the Oregon Historic Preservation Office.

106 Case:
105-2749
Evaluating Evaluation - Railroad and Historic Resources - Effect Determination - No Adverse Effect

106 Comments:
The effects of the cultural resources are included in the database of each project. Comments may vary.
Cover Sheet
for
"Section 106" Reconnaissance Level Surveys

Submit this Cover Sheet to the Oregon SHPO along with all survey materials (see checklist below).

- 4811 SW 16TH AV SE, residence, Portland, 1970, no effect
- 15425 NE 8TH AVE, residence, Portland, 1976, no adverse effect
- 3400 SE 18TH AVE, residence, Portland, 1974, no adverse effect
- 1025 SE 28TH AVE, residence, Portland, 1970, no adverse effect
- 6735 SE 10TH AVE, residence, Portland, 1970, no adverse effect
- 6955 SE 10TH AVE, residence, Portland, 1970, no adverse effect
- 3000 SW Clearwater Rd, residence, Milwaukie, 1970, no adverse effect
- 2800 SW 12TH AVE, residence, Milwaukie, 1970, no adverse effect
- 2711 SW 12TH AVE, residence, Milwaukie, 1970, no adverse effect
- 3020 SW Park Ave, residence, Milwaukie, 1970, no adverse effect
- 1202 NE 11TH AVE, residence, Milwaukie, 1970, no adverse effect
- 1510 NE 11TH AVE, residence, Milwaukie, 1970, no adverse effect
- 2311 NE 11TH AVE, residence, Milwaukie, 1970, no adverse effect
- 2510 NE 11TH AVE, residence, Milwaukie, 1970, no adverse effect

To Be Completed by SHPO Staff

SHPO Evaluation of Survey Project

- Completed
- On-Delay or Rejected
- Return for Additional Data

SHPO Comment on NHI Eligibility Evaluations

- Completed
- On-Delay or Rejected
- Return for Additional Data

SHPO Comment on Effect Determinations

- Completed
- On-Delay or Rejected
- Return for Additional Data

Checklist of Required Items:
1. Completed "Cover Sheet" in data base and hard copy
2. 106 Case # Obtained from SHPO and included on form
3. Survey data submitted in electronic format
4. Property lines and photos of site with objects
5. Properly marked sketch map
6. Copy of 10600 A Map showing location of Surveyed Area

Optional Items:
- Research Design Completed Prior to Survey
- Completed Survey Forms in Both Initial and Final Format

Date: 

Comments:
ATTACHMENT 4

SECTION 4(F) DE MINIMIS IMPACT EVALUATION AND DETERMINATION – WESTMORELAND PARK

Property Description

Westmoreland Park is owned and operated by PP&R, and is a Section 4(f) historic resource, as well as being a park and recreational resource. This *de minimis* determination is for the park as a recreational resource only. Westmoreland Park began as a part of a residential subdivision that was subtracted from the Ladd Estate’s Crystal Spring Stock Farm in 1909. In 1935, the City Planning Commission recommended development of recreational amenities for the nearby residents. The following year, the City of Portland purchased the 45-acre parcel called Fairways Addition from Oregon Iron & Steel. The commission proposed a plan, prepared by architect Francis B. Jacobberger, for the park. The project resulted in a casting pond, a model yacht lagoon (known as the Duck Pond), a fly caster’s club house, bridges, and grading of the athletic fields.

Locally Preferred Alternative (LPA) to Park Avenue Use

A wetland restoration of an existing pond in Westmoreland Park (see Figure 1) is proposed as mitigation for project impacts elsewhere in the alignment corridor. It is anticipated that any changes will remain consistent with the overall original design vision, and that impacts will be minimal and not adverse. FTA concluded that the project would not have an adverse effect to the recreational attributes, and the City of Portland has concurred in writing (attached); this satisfies the requirements for a *de minimis* finding.
Portland-Milwaukie Light Rail Project

Westmoreland Park

Figure 1

Proposed light rail alignments:
(LPA to Park and MOS to Lake)

- Construction Limit
- Westmoreland Park
- Duck Pond Mitigation Site
January 28, 2010

Bridget Wieghart  
Metro  
600 NE Grand Avenue  
Portland, OR 97232

Dear Ms. Wieghart:

Portland Parks & Recreation would like to express its concurrence with the Portland-Milwaukie Light Rail Project’s Section 4(f) determinations of de minimis use of small parts of the Eastside Willamette River Greenway Trail, Springwater Corridor Trail, and Westmoreland Park as a natural resource mitigation site for the project.

We understand and concur with a de minimis use determination of Eastside Willamette River Greenway Trail and the Springwater Corridor Trail. We believe the project will not “adversely affect the activities, features, and attributes” that make these resources eligible for protection under Section 4(f).

We also strongly support the development of a natural resource mitigation and enhancement feature within Westmoreland Park, which provides an excellent opportunity for the City and TriMet to partner on one of our highest priority environmental enhancement actions on Crystal Springs Creek. We concur with a finding that the use of the park will not prevent the public’s use and enjoyment of the majority of the park’s features and facilities. We also support the Section 4(f) Evaluation finding that the impacts to the duck pond, one of the park’s historic characteristics, are outweighed by the positive benefits that the mitigation and enhancement project would have for the natural environment, Crystal Springs, and the overall park setting.

We are confident that the project development approach described in your letter for the Section 4(f) properties under the City’s jurisdiction will allow the City of Portland and TriMet to develop the formal agreements needed to develop the light rail project in a way that maximizes benefits to the City, while minimizing impacts...
to its park and recreation resources. The City urges TriMet to design, fund, and construct trail connections from the new Willamette bridge to the Greenway Trails, particularly on the east side.

We look forward to having these important trail connections incorporated into the plans for the bridge, and collaborating with Metro and TriMet as the project completes the Final EIS and enters the final design and permitting phases for the project.

Sincerely,

[Signature]

Zari Santner
Director

cc: Brett Hamer, PP&R
    Emily Roth, PP&R
    Teresa Boyle, PBOT
    Dave Unsworth, TriMet
ATTACHMENT 5

SECTION 4(F) DE MINIMIS IMPACT EVALUATION AND DETERMINATION – BROOKLYN YARD

Property Description

Brooklyn Yard is located at 2001 SE Holgate Boulevard and consists of a complex of buildings and structures dating from 1912 to 1946. This district is historically significant for its association with early interstate and transcontinental steam-powered rail transportation in Oregon.

Locally Preferred Alternative (LPA) to Park Avenue

The LPA to Park Avenue would extend along the western edge of the Brooklyn Yard and would be considered an effect because it introduces a new visual element to this historic built environment resource. In addition, one modular building and an internal intersection would be relocated on the site. The LPA to Park Avenue, however, will be parallel with other rail lines, and the effect would therefore not constitute an adverse effect. As part of the Section 106 process, FTA concluded that the project would not have an adverse effect, and the SHPO has concurred; this satisfies the requirements for a finding of de minimis impact of an historic resource.
April 25, 2008

Ms. Bridget Wieghart
Portland Metro
600 NE Grand Avenue
Portland, OR 97232-2736

RE: SHPO Concurrence
South Corridor Portland-Milwaukie Light Rail Project
Multiple Sites, Portland/Milwaukie, Multnomah/Clackamas

Dear Ms. Wieghart,

The State Historic Preservation Office (SHPO) has reviewed the materials submitted on the project referenced above. SHPO conditionally approves the survey project contingent upon successful resolution of any adverse effects noted on the 17 National Register eligible properties listed below and on the attached Cover Sheet. Also, we concur with the effect determinations of the following properties, also listed below and on the attached Cover Sheet:

- 2300 SE Harrison, Milwaukie Middle School, No Adverse Effect
- 2405 SE Harrison, Residence, No Adverse Effect
- 2326 SE Monroe St., Spanish Revival Residence, No Adverse Effect
- 2001 SE Holgate, Brooklyn Yard, No Adverse Effect
- 11205 SE McLoughlin Blvd., Kellogg Lake Outlet, No Effect
- 12006 SE McLoughlin Blvd., Birkemeier-Sweetland Home, No Effect
- 2505 SE 11th Ave., Ford Motor Assembly Plant, No Effect
- 4784 SE 17th Ave., Iron Fireman Building, No Effect
- 2425 SE Bybee Blvd., Eastmoreland Golf Course, No Effect
- 7605 SE McLoughlin Blvd., Westmoreland Park, No Effect
- 1200 Naito Parkway, Hawthorne Bridge, No Effect
- 600 SE Powell Blvd., Ross Island Bridge, No Effect
- 9002 SE McLoughlin Blvd., ODOT Region Office, Adverse Effect with possible design refinements or mitigation options to reduce effect
- 2206 SE Washington, R. Derwey House, Adverse Effect with possible design refinements or mitigation options to reduce effect
- 2425 SE 8th Ave., Royal Foods, Adverse Effect, with possible design refinements or mitigation options to reduce effect
- 11200 SE McLoughlin Blvd., Oregon Pacific & Union Pacific Railroad/Trestle, No Adverse Effect to Railroad track/grade; Adverse Effect to Trestle with possible design refinements or mitigation options to reduce effect
- 2000 SW 5th Ave., Portland State School Building, No Adverse Effect (NP, however, due to acquisition of property, included for review)

Our response here is to assist you with your responsibilities under Section 106 of the National Historic Preservation Act (36 CFR Part 800). Please feel free to contact me if you have questions.

Sincerely,

[Signature]
Stephen P. Poyser, PhD
Sec. 106 Review & Compliance/Preservation Planner
503.986.0686 or stephen.poyser@state.or.us
The area surveyed is bounded on the west by SW 8th Ave and spans southeastward to Milwaukie along either side (north/south) of McLoughlin Blvd.

The selection of inventoried properties within the APE (one-half block within the Portland grid system, and 150 on either side of the alignment outside the grid system) was based on several factors: (1) It was to build on the information prepared for the 2002 SDIS; (2) It included all properties along the transit line that will be affected to provide context for the resources that are potentially eligible; and (3) It included assessing properties built between 1957 and 1967 that may become eligible when they reach the 50-year age criterion.

106 Effect:
The effects to eligible historic resources are included in the database comments. Summarized they are:

- 2300 SE Harrison, Milwaukie Middle School, No Adverse Effect
- 2400 SE Morrison, Residences, No Adverse Effect
- 2326 SE Monroe St., Spanish Revival Residence, No Adverse Effect
- 2001 SE Holgate, Brooklyn Yard, No Adverse Effect
- 71125S SE McLoughlin Blvd., Kellogg Lake Outlet, No Effect
- 12006 SE McLoughlin Blvd., Birkemeier-Sweetland Home, No Effect
- 2505 SE 11th Ave., Ford Motor Assembly Plant, No Effect
- 4734 SE 17th Ave., Iron Fireman Building, No Effect
- 2425 SE Bybee Blvd., Eastmoreland Golf Course, No Effect
- 7605 SE McLoughlin Blvd, Westmoreland Park, No Effect
- 1200 Naito Parkway, Hawthorne Bridge, No Effect
- 601 SE Powell Blvd., Ross Island Bridge, No Effect
- 9002 SE McLoughlin Blvd., ODOT Region Office, Adverse Effect with possible design refinements or mitigation options to reduce effect
- 2205 SE Washington, R. Derwey House, Adverse Effect with possible design refinements or mitigation options to reduce effect
- 2426 SE 8th Ave., Royal Foods, Adverse Effect, with possible design refinements or mitigation options to reduce effect
- 711200 SE McLoughlin Blvd., Oregon Pacific & Union Pacific Railroad/Trestle, No Adverse Effect to Railroad track/grade; Adverse Effect to Trestle with possible design refinements or mitigation options to reduce effect
- 2000 SW 8th Ave., Portland State School Building, No Adverse Effect (NP, however, due to acquisition of property, included for review)

To Be Completed by SHPO Staff:

SHPO Evaluation of Survey Project

- [ ] Approved
- [X] Conditionally Approved
- [ ] Returned for Corrections

SHPO Comment on Effect Determinations
- [X] Concur
- [ ] Do Not Concur
- [ ] Return for Additional Data

SHPO Staff Signature: [Signature]
Date: 4/22/08

Checklist of Required Items:

1. [ ] Research Design Completed Prior to Survey
2. [ ] Properly Marked Survey Map
3. [ ] Copy of USGS Map Showing Location of Surveyed Area
4. [ ] Completed Survey Forms (Field Forms)
5. [ ] Survey Data Submitted in Electronic Format
6. [ ] Properly Labeled Photos
7. [ ] Final Report, including outline of historic contexts and recommendations for future action
8. [ ] Completed "Cover Sheet"
9. [ ] Duplicates of everything: one for SHPO and one for the contracting community or agency.
Property Description

The Springwater Division Line was developed for rail service in 1903. By 1906, under a joint ownership with Portland General Electric and the Portland Railway Light and Power Company, the line reached its peak usage. By 1910, the company had six electric plants and 161 miles of rail, carrying 16,000 passengers each year on a citywide system.

The Springwater Corridor is a railbanked corridor and, under Section 8(d) of the National Trails Act, is still under jurisdiction of the Surface Transportation Board. Today, the Springwater Corridor Trail is the major southeast segment of the 40-Mile Loop that was inspired by the 1903 Olmsted plan for a parkway and boulevard loop to connect park sites. When the Springwater Corridor Trail is fully developed, it will be over 21 miles long.

For the most part, the trail is separated from public roadways. A project constructing three bridges along the Springwater Corridor Trail was completed in early 2007. These bridges provide elevated crossings over Johnson Creek, SE McLoughlin Boulevard, and the UPRR line in Milwaukie.

The Springwater Corridor Trail is a multi-use trail. The paved surface is generally 10 to 12 feet wide, with soft shoulders. The hard surface trail is designed to accommodate walkers, joggers, hikers, bicycles, wheelchairs, and strollers. Equestrian use is more common east of I-205, where a separate, soft-surface path meanders away from the main trail where topography allows.

Locally Preferred Alternative (LPA) to Park Avenue

The LPA to Park Avenue would travel along the UPRR right-of-way and cross under the Springwater Corridor Trail’s existing bridge above the UPRR line (see Figure 1). The LPA to Park Avenue would not require any trail land during construction in this location, and it is not expected to require closing or rerouting the trail. Through an agreement with Metro, a small area under the Springwater Corridor Trail overcrossing will be controlled by TriMet for the purposes of operating the light rail line. Some reconstruction of one of the trail’s bridge abutments will be required, and the reconstruction is not expected to prevent the use of the trail. The minimal reconstruction of the bridge abutment will take less time than the construction of the project; there will be no change in ownership; and there will be no permanent physical changes to the trail features. If a temporary closure is necessary for safety reasons during construction, the closure would be brief, and a temporary detour route will be provided to maintain the trail’s function. In addition, traffic mitigation measures to the east of this location (near SE Johnson Creek Boulevard) require a minor roadway widening that would encroach on the trail’s right-of-way, affecting a vegetated area uphill from the trail itself. A partial acquisition or easement would be needed to construct the widened roadway within an area that would be approximately 200 feet long and 7 feet wide.

Neither the construction nor the operation of the LPA to Park Avenue is anticipated to create proximity impacts that would substantially impair or diminish the trail characteristics so that it
could not be used as a recreational resource for pedestrians, bicyclists, or other nonmotorized recreational modes. The trail in this area already crosses over a transportation corridor that has substantial traffic and freight rail traffic, with other industrial uses nearby. No appreciable noise or visual impacts have been identified, and it is not anticipated that the LPA to Park Avenue would result in a constructive use of the trail. The nearby station would improve access to the trail, and a new pathway and stairway will connect directly to the trail from the station; these new connections to the trail would be considered an improvement and does not constitute a Section 4(f) use. With the LPA Phasing Option, the stairway construction may be deferred in the project’s initial construction, but the pathway would still provide a new ADA-compliant connection to the trail.

Considering these factors, the FTA has determined that the temporary construction near the overcrossing, for the connection to the trail, and the potential minor property impact for the improved intersection are a *de minimis* impact of the property. The City of Portland and Metro have both concurred, and their concurrence letters are included as Exhibits to this document.
**Portland-Milwaukie Light Rail Project**

**Figure 1**

- **Springwater Corridor**
- **SE 32nd Ave and SE Johnson Creek Blvd:** sidewalk improvements
- **Light rail alignment under trail bridge**
- **New trail connection to station**

Legend:
- Yellow: Light Rail track
- Blue: Station platforms
- Gray: Construction limit
- Green: Springwater Corridor
- Orange: Trail connection to station

Map details:
- 0 - 240 - 480 Feet
January 28, 2010

Bridget Wieghart
Metro
600 NE Grand Avenue
Portland, OR 97232

Dear Ms. Wieghart:

Portland Parks & Recreation would like to express its concurrence with the Portland-Milwaukie Light Rail Project’s Section 4(f) determinations of de minimis use of small parts of the Eastside Willamette River Greenway Trail, Springwater Corridor Trail, and Westmoreland Park as a natural resource mitigation site for the project.

We understand and concur with a de minimis use determination of Eastside Willamette River Greenway Trail and the Springwater Corridor Trail. We believe the project will not “adversely affect the activities, features, and attributes” that make these resources eligible for protection under Section 4(f).

We also strongly support the development of a natural resource mitigation and enhancement feature within Westmoreland Park, which provides an excellent opportunity for the City and TriMet to partner on one of our highest priority environmental enhancement actions on Crystal Springs Creek. We concur with a finding that the use of the park will not prevent the public’s use and enjoyment of the majority of the park’s features and facilities. We also support the Section 4(f) Evaluation finding that the impacts to the duck pond, one of the park’s historic characteristics, are outweighed by the positive benefits that the mitigation and enhancement project would have for the natural environment, Crystal Springs, and the overall park setting.

We are confident that the project development approach described in your letter for the Section 4(f) properties under the City’s jurisdiction will allow the City of Portland and TriMet to develop the formal agreements needed to develop the light rail project in a way that maximizes benefits to the City, while minimizing impacts.
to its park and recreation resources. The City urges TriMet to design, fund, and construct trail connections from the new Willamette bridge to the Greenway Trails, particularly on the east side.

We look forward to having these important trail connections incorporated into the plans for the bridge, and collaborating with Metro and TriMet as the project completes the Final EIS and enters the final design and permitting phases for the project.

Sincerely,

Zari Santner
Director

cc: Brett Harmer, PP&R
    Emily Roth, PP&R
    Teresa Boyle, PBOT
    Dave Unsworth, TriMet
February 5, 2010

Ms. Bridget Wieghart
Metro
600 NE Grand Avenue
Portland, OR

Dear Ms. Wieghart,

Metro would like to express its support for the Portland-Milwaukie Light Rail project and we concur with a de minimis finding for the Springwater Corridor Trail. We agree with a finding that the proposed activities would not adversely affect the trail. We understand that a de minimis use is allowed when the use is so small or minimal that it will not "adversely affect the activities, features, and attributes" that make the resource eligible for protection under Section 4(f).

We will continue to review and advise the project, in cooperation with The City of Portland, which owns the structures as well as maintains and operates the trail in this section, as the light rail project continues into final design and construction.

Sincerely,

Jim Desmond

cc:
Dave Unsworth, TriMet
ATTACHMENT 7

SECTION 4(F) DE MINIMIS IMPACT EVALUATION AND DETERMINATION – SPANISH REVIVAL HOUSE

Property Description

The Spanish Revival house, located at 2326 SE Monroe Street, was built in 1928. It is architecturally significant and its character-defining features include the stucco finish, tile roof, and arched openings. It is one of the best remaining examples of a Spanish Revival style residence in Milwaukie.

Locally Preferred Alternative (LPA) to Park Avenue

The acquisition of a strip of land approximately 10 feet wide adjacent to the public right-of-way on the south side of the Spanish Revival residence (2326 SE Monroe Street) would not adversely affect the house’s historic characteristics (see Figure 1). The LPA to Park Avenue would be parallel with other rail lines and would not significantly alter the surrounding visual aspects of the property. Therefore, the effect would not constitute an adverse effect. As part of the Section 106 process, FTA concluded that the project would not have an adverse effect, and the SHPO has concurred; this satisfies the requirements for a finding of de minimis impact of an historic resource.
Figure 1

Proposed light rail alignments
(LPA to Park Ave and MOS to Lake Rd)

Construction Limit

Property boundary
April 25, 2008

Ms. Bridget Wieghart
Portland Metro
600 NE Grand Avenue
Portland, OR 97232-2736

RE: SHPO Concurrence
South Corridor Portland-Milwaukie Light Rail Project
Multiple Sites, Portland/Milwaukie, Multnomah/Clackamas

Dear Ms. Wieghart,

The State Historic Preservation Office (SHPO) has reviewed the materials submitted on the project referenced above. SHPO conditionally approves the survey project contingent upon successful resolution of any adverse effects noted on the 17 National Register eligible properties listed below and on the attached Cover Sheet. Also, we concur with the effect determinations of the following properties, also listed below and on the attached Cover Sheet:

- 2300 SE Harrison, Milwaukie Middle School, No Adverse Effect
- 2405 SE Harrison, Residence, No Adverse Effect
- 2326 SE Monroe St., Spanish Revival Residence, No Adverse Effect
- 2001 SE Holgate, Brooklyn Yard, No Adverse Effect
- 11205 SE McLoughlin Blvd., Kellogg Lake Outlet, No Effect
- 12006 SE McLoughlin Blvd., Birkemeier-Sweetland Home, No Effect
- 2505 SE 11th Ave., Ford Motor Assembly Plant, No Effect
- 4784 SE 17th Ave., Iron Fireman Building, No Effect
- 2425 SE Bybee Blvd., Eastmoreland Golf Course, No Effect
- 7605 SE McLoughlin Blvd., Westmoreland Park, No Effect
- 1200 Naito Parkway, Hawthorne Bridge, No Effect
- 600 SE Powell Blvd., Ross Island Bridge, No Effect
- 9002 SE McLoughlin Blvd., ODOT Region Office, Adverse Effect with possible design refinements or mitigation options to reduce effect
- 2206 SE Washington, R. Derwey House, Adverse Effect with possible design refinements or mitigation options to reduce effect
- 2425 SE 8th Ave., Royal Foods, Adverse Effect, with possible design refinements or mitigation options to reduce effect
- 11200 SE McLoughlin Blvd., Oregon Pacific & Union Pacific Railroad/Trestle, No Adverse Effect to Railroad track/grade; Adverse Effect to Trestle with possible design refinements or mitigation options to reduce effect
- 2000 SW 5th Ave., Portland State School Building, No Adverse Effect (NP, however, due to acquisition of property, included for review)

Our response here is to assist you with your responsibilities under Section 106 of the National Historic Preservation Act (36 CFR Part 800). Please feel free to contact me if you have questions.

Sincerely,

Stephen P. Poyser, PhD
Sec. 106 Review & Compliance/Preservation Planner
503.986.0666 or stephen.poyser@state.or.us
The area surveyed is bounded on the west by SW 8th Ave and spans southeastward to Milwaukie along either side (north/south) of McLoughlin Blvd.

The survey boundaries of the area surveyed were as follows:

Survey Boundaries:

The selection of inventoried properties within the APE (one-half block within the Portland grid system, and 150 on either side of the alignment outside the grid system) was based on several factors: (1) it was to build on the information prepared for the 2002 SDEIS; (2) it included all properties along the transit line that will be affected to provide context for the resources that are potentially eligible; (3) it included assessing properties built between 1857 and 1967 that may become eligible when they reach the 80-year age criterion.

106 Effect:
The effects to eligible historic resources are included in the database comments. Summarized they are:

- 2300 SE Harrison, Milwaukie Middle School, No Adverse Effect
- 2408 SE Morrison, Residence, No Adverse Effect
- 2326 SE Monroe St., Spanish Revival Residence, No Adverse Effect
- 2001 SE Holgate, Brooklyn Yard, No Adverse Effect
- 711205 SE McLoughlin Blvd., Kellogg Lake Outlet, No Effect
- 12005 SE McLoughlin Blvd., Birkemeier-Sweetland Home, No Effect
- 2505 SE 11th Ave., Ford Motor Assembly Plant, No Effect
- 4784 SE 17th Ave., Iron Fireman Building, No Effect
- 2425 SE Bybee Blvd., Eastmoreland Golf Course, No Effect
- 7905 SE McLoughlin Blvd., Westmoreland Park, No Effect
- 1200 Naito Parkway, Hawthorne Bridge, No Effect
- 600 SE Powell Blvd., Ross Island Bridge, No Effect
- 9002 SE McLoughlin Blvd., ODOT Region Office, Adverse Effect with possible design refinements or mitigation options to reduce effect
- 2205 SE Washington, R. Dwerry House, Adverse Effect with possible design refinements or mitigation options to reduce effect
- 2425 SE 8th Ave., Royal Foods, Adverse Effect, with possible design refinements or mitigation options to reduce effect
- 711205 SE McLoughlin Blvd., Oregon Pacific & Union Pacific Railroad/Trestle, No Adverse Effect to Railroad track/grade; Adverse Effect to Trestle with possible design refinements or mitigation options to reduce effect
- 2000 SW 8th Ave., Portland State School Building, No Adverse Effect (NP, however, due to acquisition of property, included for review)

Checklist of Required Items:

1. ___ Research Design Completed Prior to Survey
2. ___ Property Marked Survey Map
3. ___ Copy of USGS Map showing location of surveyed area
4. ___ Completed Survey Forms (Field Forms)
5. ___ Survey Data Submitted in Electronic Format
6. ___ Properly Labeled Photos
7. ___ Final Report, including outline of historic context and recommendations for future action
8. ___ Completed "Cover Sheet"
9. ___ Duplicates of everything: one for SHPO and one for the contracting community or agency

To Be Completed by SHPO Staff:

SHPO Evaluation of Survey Project:
- Approved
- Conditionally Approved
- Returned for Corrections

SHPO Comment on Effect Determinations:
- Concur
- Do Not Concur
- Return for Additional Data

SHPO Staff Signature: _______________________________ Date: 4/22/08

Oregon State Historic Preservation Office, 725 Summer Street NE, Suite C, Salem OR 97301
ATTACHMENT 8

SECTION 4(F) DE MINIMIS IMPACT EVALUATION AND DETERMINATION – UNION PACIFIC RAILROAD

Property Description

Railroad tracks run throughout the project area, and the system is an historic resource, significant for its association with early interstate and transcontinental rail transportation in Oregon.

Locally Preferred Alternative (LPA) to Park Avenue

The LPA to Park Avenue would require the use of railroad right-of-way, including building structures parallel to and crossing over the UPRR (two facilities associated with the railroad, the Brooklyn Yard and an existing trestle that is part of the Tillamook Branch line, are addressed as related facilities with qualities that also qualify them as Section 4(f) resources). As part of the Section 106 process, FTA concluded in the 2008 SDEIS that the project would not have an adverse effect, and the SHPO subsequently concurred; this satisfies the requirements for a finding of de minimis impact of an historic resource.
April 25, 2008

Ms. Bridget Wieghart
Portland Metro
600 NE Grand Avenue
Portland, OR 97232-2736

RE: SHPO Concurrence
South Corridor Portland-Milwaukie Light Rail Project
Multiple Sites, Portland/Milwaukie, Multnomah/Clackamas

Dear Ms. Wieghart,

The State Historic Preservation Office (SHPO) has reviewed the materials submitted on the project referenced above. SHPO conditionally approves the survey project contingent upon successful resolution of any adverse effects noted on the 17 National Register eligible properties listed below and on the attached Cover Sheet. Also, we concur with the effect determinations of the following properties, also listed below and on the attached Cover Sheet:

- 2300 SE Harrison, Milwaukie Middle School, No Adverse Effect
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- 7605 SE McLoughlin Blvd., Westmoreland Park, No Effect
- 1200 Naito Parkway, Hawthorne Bridge, No Effect
- 600 SE Powell Blvd., Ross Island Bridge, No Effect
- 9002 SE McLoughlin Blvd., ODOT Region Office, Adverse Effect with possible design refinements or mitigation options to reduce effect
- 2206 SE Washington, R. Derwey House, Adverse Effect with possible design refinements or mitigation options to reduce effect
- 2425 SE 8th Ave., Royal Foods, Adverse Effect, with possible design refinements or mitigation options to reduce effect
- 11200 SE McLoughlin Blvd., Oregon Pacific & Union Pacific Railroad/Trestle, No Adverse Effect to Railroad track/grade; Adverse Effect to Trestle with possible design refinements or mitigation options to reduce effect
- 2000 SW 5th Ave., Portland State School Building, No Adverse Effect (NP, however, due to acquisition of property, included for review)

Our response here is to assist you with your responsibilities under Section 106 of the National Historic Preservation Act (36 CFR Part 800). Please feel free to contact me if you have questions.

Sincerely,

[Signature]

Stephen P. Poyser, PhD
Sec. 106 Review & Compliance/Preservation Planner
503.986.0686 or stephen.poyser@state.or.us
Oregon

Cover Sheet

for

Reconnaissance Level Surveys and 106 Compliance

Submit this Cover Sheet to SHPO along with all survey materials (see checklist below).

Survey Project Name: Portland - Milwaukie LRT
City: Portland
Survey Type: Selective Baseline
Survey Sponsor: Parametrix
Surveyor Name: Julie Osborne/Kimberly Fitzgerald
County: Multnomah

Acreage Surveyed: 110
(# Contributing Properties: 17, estimate using USGS quad; # Non-contributing Properties: 64)

The area surveyed is bounded on the west by SW 6th Ave and spans southeastward to Milwaukie along either side (north/south) of McLoughlin Blvd.

Survey Boundaries

Survey Summary

The selection of inventoried properties within the APE (one-half block within the Portland grid system, and 150 on either side of the alignment outside the grid system) was based on several factors: (1) It was to build on the information prepared for the 2002 SDEIS; (2) it included all properties along the transit line that will be affected to provide context for the resources that are potentially eligible; (3) it included assessing properties built between 1957 and 1967 that may become eligible when they reach the 50-year age criterion.

106 Effect:

The effects to eligible historic resources are included in the database comments. Summarized they are:
- 2300 SE Harrison, Milwaukie Middle School, No Adverse Effect
- 2408 SE Morrison, Residence, No Adverse Effect
- 2326 SE Monroe St., Spanish Revival Residence, No Adverse Effect
- 2001 SE Holgate, Brooklyn Yard, No Adverse Effect
- 71120 SE McLoughlin Blvd., Kellogg Lake Outlet, No Effect
- 1200 SE McLoughlin Blvd., Birkemeier-Sweetland Home, No Effect
- 2505 SE 11th Ave., Ford Motor Assembly Plant, No Effect
- 4784 SE 17th Ave., Iron Fireman Building, No Effect
- 2425 SE Bybee Blvd., Eastmoreland Golf Course, No Effect
- 7605 SE McLoughlin Blvd., Westmoreland Park, No Effect
- 1200 Naito Parkway, Hawthorne Bridge, No Effect
- 600 SE Powell Blvd., Ross Island Bridge, No Effect
- 9002 SE McLoughlin Blvd., ODOT Region Office, Adverse Effect with possible design refinements or mitigation options to reduce effect
- 2205 SE Washington, R. Derway House, Adverse Effect with possible design refinements or mitigation options to reduce effect
- 2426 SE 8th Ave., Royal Foods, Adverse Effect, with possible design refinements or mitigation options to reduce effect
- 711200 SE McLoughlin Blvd., Oregon Pacific & Union Pacific Railroad/Trestle, No Adverse Effect to Railroad track/grade; Adverse Effect to Trestle with possible design refinements or mitigation options to reduce effect
- 2000 SW 8th Ave., Portland State School Building, No Adverse Effect (NP, however, due to acquisition of property, included for review)

To Be Completed by SHPO Staff

SHPO Evaluation of Survey Project

Approved
☐ Conditionally Approved
☐ Returned for Corrections

SHPO Comment on Effect Determinations

☐ Concur
☐ Do Not Concur
☐ Return for Additional Data

Checklist of Required Items:

1. ___ Research Design Completed Prior to Survey
2. ___ Properly Marked Survey Map
3. ___ Copy of USGS Map Showing Location of Surveyed Area
4. ___ Completed Survey Forms (Field Forms)
5. ___ Survey Data Submitted in Electronic Format
6. ___ Properly Labeled Photos
7. ___ Final Report, including outline of historic contexts and recommendations for future action
8. ___ Completed "Cover Sheet"
9. ___ Duplicates of everything: one for SHPO and one for the contracting community or agency.

SHPO Staff Signature: ____________________________ Date: 4/22/08

Oregon State Historic Preservation Office, 725 Summer Street NE, Suite C, Salem OR 97301
ATTACHMENT 9

SECTION 4(F) DE MINIMIS IMPACT EVALUATION AND DETERMINATION – OREGON PACIFIC RAILROAD

Property Description

The OPR is part of an extensive system of railroads that run throughout the project area; the entire railroad system has been determined an historic resource, significant for its association with early interstate and transcontinental rail transportation in Oregon. OPR is a short-line rail operator connecting to the UPRR mainline in southeast Portland, and it extends along the eastern bank of the Willamette River to serve a customer base five miles to the south in Milwaukie, in the vicinity of SE 17th Avenue and SE McBrod Street.

The OPR has a railyard located at SE Caruthers and SE Water streets, consisting of seven tracks that include a mainline, a connection to the UPRR mainline, an interchange track between the UPRR and OPR, a crossover track, a track siding in the OPR yard, and three stub tracks. While the individual facilities and tracks within the yard have been modified over time, the OPR railyard allows OPR to arrange and store cars transferring to and from UPRR and OPR.

Locally Preferred Alternative (LPA) to Park Avenue

The LPA to Park Avenue has an at-grade crossing of the OPR and requires relocating its switching yard near SE Caruthers Street. The project does not propose moving the location of the OPR mainline. However, the Portland-Milwaukie Light Rail Project will create an at-grade light rail track crossing of the OPR tracks at the SE Sherman Street right-of-way. The proposed track crossing would bisect the current OPR yard. After consulting with OPR, UPRR, the Federal Railroad Administration, and ODOT rail, the project developed a design that relocates the OPR yard functions to the north to avoid freight yard train movements across the light rail alignment. The replacement yard meets the functional requirements of the OPR, and the quality of the track and beds would be upgraded from the current equipment. As part of the Section 106 process, FTA concluded that the project would not have an adverse effect, and the SHPO has subsequently concurred; this satisfies the requirements for a finding of de minimis impact of an historic resource.
# Cover Sheet

for

"Sect 106" Reconnaissance Level Surveys

Submit this Cover Sheet to the Oregon SHPO along with all survey materials (see checklist below).

<table>
<thead>
<tr>
<th>Survey Project Name</th>
<th>Portland - Multnomah Light Rail</th>
<th>Survey Start Date</th>
<th>10/1/2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>City</td>
<td>Portland</td>
<td>County</td>
<td>Multnomah</td>
</tr>
<tr>
<td>Survey Type</td>
<td>Section 106</td>
<td>Survey Completed</td>
<td>2009</td>
</tr>
<tr>
<td>Survey Sponsor</td>
<td>FTA/Multnomah Met</td>
<td>Date Submitted</td>
<td>12/27/2009</td>
</tr>
<tr>
<td>Surveyor Name</td>
<td>Portland Regional Cultural Resources, Specialized, Paramedics C 827-2439</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

# Eligible Properties

<table>
<thead>
<tr>
<th>Einig</th>
<th># Valuable Properties</th>
<th># Valuable Properties</th>
<th>Acres Surveyed</th>
<th>No. of Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

# Survey Boundaries

This survey was done to review potentially eligible properties in the eligible area for the FTA Light Rail Project, which includes the Portland-Multnomah Light Rail Project, as defined in Section 106 of the National Historic Preservation Act of 1966, in order to identify and document potentially eligible properties within the project area that are 106 eligible. The results of this survey will be used to update the SHPO file and to provide information to the SHPO for the 106 process.

# Survey Summary

This survey was done to review potentially eligible properties in the eligible area for the FTA Light Rail Project, which includes the Portland-Multnomah Light Rail Project, as defined in Section 106 of the National Historic Preservation Act of 1966, in order to identify and document potentially eligible properties within the project area that are 106 eligible. The results of this survey will be used to update the SHPO file and to provide information to the SHPO for the 106 process.

# Comments

The survey was conducted in order to identify and document potentially eligible properties within the project area that are 106 eligible. The results of this survey will be used to update the SHPO file and to provide information to the SHPO for the 106 process.

# 106 Case #

07-2-448

# Eligibility Evaluation

[Eligibility Evaluation]

# Date of Submission

10/27/2009

# Historic Information

Non-Historic

# Adverse Effect

No Adverse Effect
Cover Sheet

for

"Section 106" Hazards Assessment Level Surveys

Submit this Cover Sheet to the Oregon SHPO along with all survey materials (see checklist below).

- 4934 NE Ave. St., residence, Portland, 1995, no effect
- 1625 SE Powell, residence, Portland, 1995, no adverse effect
- 1625 NE Powell St., residence, Portland, no effect
- 3225 NE 18th Ave, residence, Portland, 1995, no effect
- 4300 NE 21st Ave, residence, Portland, 1995, no effect
- 4225 NE 21st Ave, residence, Portland, 1995, no effect
- 3200 NE 21st Ave, residence, Portland, 1995, no effect
- 4300 NE 21st Ave, residence, Portland, 1995, no effect
- 4300 NE 21st Ave, residence, Portland, 1995, no effect
- 3200 NE 21st Ave, residence, Portland, 1995, no effect

To Be Completed by SHPO Staff:

SHPO Evaluation of Survey Project

Approved
Conditionally Approved
Not Approved

SHPO Comment on NR Eligibility Evaluations

Comment
(Do Not Comment)
Required for Additional Data

SHPO Comment on Effect Determination

Comment
(Do Not Comment)
Required for Additional Data

SHPO Staff Signature

Comments:

Checklist of Required Items:

1. Completed "Cover Sheet" (in data base and hard copy)
2. 106 Case # Obtained from SHPO and included on form
3. Survey data submitted in electronic format
4. Properly labeled photos (digital photos not with data)
5. Properly marked survey map
6. Copy of NWS Map Showing Location of Surveyed Areas

Optional Items:

Research Design Completed Prior to Survey
Completed Survey Forms (Field Forms)
Final Report
ATTACHMENT 10

SECTION 4(F) DE MINIMIS IMPACT EVALUATION AND DETERMINATION – RAILROAD TRESTLE

Property Description

The wooden railroad trestle crossing Kellogg Creek is part of the Tillamook Branch line owned by the UPRR and is a component of an extensive system of railroads that run throughout the project area. The entire railroad system has been determined an historic resource, significant for its association with early interstate and transcontinental rail transportation in Oregon. The trestle is located in between Robert Kronberg Park and the Milwaukie Local Share Parcel.

Locally Preferred Alternative (LPA) to Park Avenue

The LPA to Park Avenue requires the use of railroad right-of-way and would build a structure parallel to the existing trestle (see Figure 1). In 2008, the SDEIS analysis concluded that the introduction of the new structure could have high visual impacts to the trestle if no design or other measures to reduce the visual impacts could be found. The SDEIS identified an adverse effect. Following the SDEIS, FTA, TriMet, and Metro have worked with SHPO to provide further information on the characteristics of setting and contrast for the trestle, and also developed design and enhancement measures that would minimize the visual impacts and provide additional opportunities for the public to see and appreciate the structure.

The light rail bridge is being designed and constructed to accommodate a potential pedestrian bridge connecting from Robert Kronberg Park to SE Lake Road, which would increase the number of people who would have access to view the trestle. The LPA to Park Avenue would include development of a station near the trestle, in an area that is currently undeveloped. Other improvements for pedestrians and landscaping would also be made to SE Lake Road, and would include clearing brush and debris in areas adjacent to the trestle. These actions would mitigate some of the reduced views of the historic trestle by providing additional opportunities for people to see the trestle as they walk or drive along SE Lake Road.

The project is also developing design elements in the station area that would include interpretive displays in the adjacent Robert Kronberg Park, along SE Lake Road, or in the station area, which would illuminate the historic significance of the rail line and the trestle to the surrounding area.

With these measures incorporated within the project, FTA determined that the project would have no adverse effects under the Section 106 process, and the SHPO has subsequently concurred, meeting the requirements for a de minimis determination.
OREGON SHPO CLEARANCE FORM

SECTION 1: PROPERTY INFORMATION

SHPO Case Number: 07-2748

Use this form for projects subject to Oregon SHPO review under 36 CFR 800 (Section 106) or ORS 358.653

Fill all blanks completely and attach listed items on page 2. Use additional sheets if needed. Do not ARS in shaded areas.

Street Address: near Kenyon, Lake and E. Lake Road

City and County: Milwaukie, Clackamas County

Property or Project Name: 1. Alhambra (One of the UP RR tracks, Portland, Milwaukie, Clackamas County)

Owner: □ Private □ Local Gov □ State Gov □ Federal Gov □ Other

If there is not a street address, include the Township, Range, and Section, cross streets, or other address description.

Are there one or more buildings or structures? □ YES ☑ NO - If no, skip to Section 2 and append photos.

Is the property listed in the National Register of Historic Places? □ YES □ NO □ DON'T KNOW - If yes, the property IS HISTORIC

Is the property over 50 years old? □ YES □ NO □ DON'T KNOW

Skip if property is listed in the National Register:

Construction date: 1930

Roof 1ype(s) and Material(s): NA

Window Type(s) and Material(s): NA

Siding Type(s) and Material(s): NA

Has the property been physically altered or changed?

Skip if property is listed in the National Register:

☑ No Changes ☑ Few Changes ☒ Major / Many Changes

SECTION 2: APPLICANT DETERMINATION OF ELIGIBILITY - Check the appropriate box

Eligibility is based on age (50 years or older) and integrity (integrity of historic building features). The minimum qualifications for entry in the National Register. If choosing to contest the eligibility of a property the applicant must demonstrate that the property is not eligible for the National Register using the criteria listed in National Register Bulletin 75, "How to Apply the National Register Criteria for Evaluation".

☑ The property IS ELIGIBLE for listing in the National Register because it is 50 years old and has no or few changes, was determined eligible in a previous study, or is already HISTORIC (listed in the National Register of Historic Places).

☐ The property IS NOT ELIGIBLE for listing in the National Register because it is not yet 50 years old, or it is 50 years old but many major changes have been made.

Be sure to describe these changes in Section 4 for buildings that are at least 50 years old.

SECTION 3: APPLICANT DETERMINATION OF EFFECT - Check the appropriate box

☐ The project has NO EFFECT on a historic property, either because there is no eligible historic property involved or the historic property will not be impacted physically or visually.

☑ The project will have only a minor impact on the historic property. Therefore there is NO ADVERSE EFFECT to the historic property. Minor impacts include replacement of some, but not all, siding, doors, or windows, etc.

☐ The project will have a major impact on the historic property. Therefore there is an ADVERSE EFFECT to the historic property. Major impacts include full or partial demolition, complete removal, full window replacement, additions, etc.

STATE HISTORIC PRESERVATION OFFICE COMMENTS - Official use only

Eligibility:

☐ Concur with the eligibility determination above.

☐ Do not concur with the eligibility determination above.

Effect:

☐ Concur with the effect determination above.

☐ Do not concur with the effect determination above.

Signed: [Signature]

Date: 1/1/2023

Comments:
OREGON SHPO CLEARANCE FORM

SECTION 4: ALTERATIONS

Only complete this section for buildings that are at least 50 years old or older. Describe any material replacement including siding, windows, and doors, any additions, including garages; and any removal or addition of architectural details, such as brackets, columns, and trim. Attach additional pages as necessary.

The trestle was constructed in 1900 and has been repaired and maintained over the years but generally remains as built.

SECTION 5: PROJECT DESCRIPTION

Describe what work will be done, including what materials will be used and how they will be installed. Specifically identify what historic materials will be removed, restored, replaced, or covered. Include drawings, photos, CAD sheets (product specifications), additional sheets, and other materials as necessary. For verbal lists, please describe the intended use.

The project requires the use of railroad right of way, and would build a structure parallel and on the east side of the trestle, but does not physically alter the trestle. The new light rail bridge would be approximately 100 feet higher than the trestle and move it into view from the east side, but it would not make it more visible to the passengers riding the light rail and in the station area to the north. The traffic on NW 24th Avenue will still have a good view of the trestle.

The main aspects of integrity important to understanding the historic significance of the trestle are its Location (not being changed), Design (not being changed), Materials (not being changed), and associations (not being changed). While some views of the trestle will be altered, the visual characteristics are less important to the historic significance of the trestle.

Historic Setting of the Trestle:
- Topography: The trestle crosses from a bluff overlooking Kellogg Creek Lake to a hill on the south side of NE 25th Avenue. The trestle for the light rail bridge would be approximately 100 feet higher than the trestle and move it into view from the east side, but it would not make it more visible to the passengers riding the light rail and in the station area to the north. The traffic on NW 24th Avenue will still have a good view of the trestle.
- Design features, including relationship to open space of nearby public viewpoints, and settings influence on design: The trestle was designed for a rural area to the north of the established town. and was not a densely developed area during historic period. Open spaces or the standards park nearby is not a factor of setting that is particularly important to understanding the trestle's historic importance to railroad or community development. The trestle's design is unlikely to have been influenced by visual or functional aspects of the local setting, as there are no apparent design elements such as curves or aesthetic design features that are not typical of a wooden trestle, indicating that the setting was not important to the trestle's function, aesthetics.
- Design materials: The trestle is constructed through the use of standard trestle materials of the period, and will not be affected. The design materials do not appear to be uniquely affected by the setting required.
- Subsequent park development may have taken into consideration the trestle, but not the other way around. The subsequent development probably changed the vegetation, not the trestle.

Setting is therefore not a significant character-defining element for making the trestle eligible for the NHP or for understanding the significance of the structure. Topography, design features and design materials are the most important and are not being changed. The project would therefore not have an adverse effect on that topograpic aspect of integrity under 106.

REQUIRED

☐ 3 - 4 color, 4 x 5 photographs of the subject property, digital or print.
One photo is sufficient for vacant property

AS NEEDED

☐ Project area map, for projects including more than one tax lot
☐ Additional drawings, reports, or other relevant materials

SECTION 6: AGENCY CONTACT INFORMATION

Federal, State, or Local Agency Name: Federal Transit Administration

Contact Name and Title: _______________________________

Street Address, City, Zip: _______________________________

Phone: __________________ Email: __________________

SHPO Mailing Address: Review and Compliance, Oregon SHPO, 725 Summer St. NE, Suite C, Salem OR, 97301
ATTACHMENT 11

SECTION 4(F) DE MINIMIS IMPACT EVALUATION AND DETERMINATION – TROLLEY TRAIL

Property Description

The NCPRD is planning the Trolley Trail along a six-mile stretch of an historic corridor once used by a streetcar line traveling between Portland and Oregon City. Although the trolley corridor purchased by NCPRD and Metro in 2001 is approximately 40 feet wide, the trail plans call for a typical section that would be 20 feet wide, including a 16-foot trail and 4 feet of buffer area that in many locations includes swales for stormwater management.

The trail is expected to have an asphalt or concrete surface and soft shoulders to accommodate pedestrians, recreational and commuting bicyclists, and horses, wheelchairs, and other nonmotorized uses. The Trolley Trail will have 25 pedestrian access points from neighborhood roads. The trail will provide connections to community facilities, parks, and public transit. Intersection improvements will be designed to provide safe trail crossings at existing roads. The trail project will include safety and security features such as lighting and good definition between the trail and adjacent neighbors.

NCPRD was awarded federal funding to conduct preliminary engineering and design work for the entire trail and to construct the trail from Kellogg Creek south to Glen Echo Avenue. Design efforts were initiated in late 2007, and construction is expected to begin in 2010.

Locally Preferred Alternative (LPA) to Park Avenue

To extend light rail to a station and park-and-ride at SE Park Avenue, the LPA to Park Avenue would use right-of-way within part of the 40-foot corridor purchased for the trail. The LPA to Park Avenue design would place light rail on the west side of SE McLoughlin Boulevard, between the roadway and the planned Trolley Trail, which would be aligned along the western edge of the right-of-way originally purchased for the trail (see Figures 1, 2, and 3).

The LPA to Park Avenue would include a bridge over SE McLoughlin Boulevard, curving southeast to align with the western edge of SE McLoughlin Boulevard. Light rail would remain elevated to cross over SE 22nd Street and SE River Road, and then descend onto a retained fill structure to transition to at-grade. The trail would be alongside of the retaining wall and would cross under the bridge for the SE McLoughlin Boulevard overcrossing bridge.

Once light rail is at-grade beside SE McLoughlin Boulevard, a buffer area with a barrier would run between light rail and the trail. Light rail and trail operations will remain physically separated, avoiding conflicts between trains and trail users. In several locations, where topography and right-of-way allow, the buffer area widens to allow the trail to meander away from the light rail line.

The proposed shared use of the trail right-of-way would affect 0.6 miles of the 6-mile-long right-of-way, and will maintain the ability of Clackamas County to complete the Trolley Trail project.
Through coordination with NCPRD to define a plan for developing the trail cooperatively with the light rail project, the project has defined the measures to be taken to ensure that the trail’s function as part of a regional system is maintained. In several areas, the light rail project provides additional enhancements and benefits to the facility. Developing the trail and the light rail line together provides the opportunity to improve regional mobility and maximize the benefits of public investments, while still allowing the development of the trail in a manner that would be consistent with the Trolley Trail Master Plan.

The proposed integration of the two projects in the 0.6-mile section where they share right-of-way recognizes the considerable work that NCPRD and the community have invested in developing the Trolley Trail project. By developing the two projects within a shared alignment, the light rail project will minimize overall impacts to the development of the trail. The plan for developing the two projects concurrently includes project features, amenities, and a construction approach that both TriMet and Clackamas County have concluded will offer the highest benefits to the public, while preserving the essential attributes, features and activities of the future regional multi-use trail. The following features are the key elements of the plan:

- TriMet will purchase either property or a property easement from NCPRD, and this purchase will be based on an appraisal to be conducted after the record of decision.
- TriMet would construct the trail section between the park-and-ride at SE Park Avenue to SE River Road, as part of the light rail project civil construction contract.
- TriMet will be responsible for relocating the Portland General Electric utility at SE Park Avenue.
- TriMet has worked extensively with NCPRD to minimize the impacts on the trail by defining the following features as part of the project:
  - The design of the light rail project maximizes the amount of space for the trail. At a minimum, a six-foot planted buffer zone will be located between light rail and the trail. Where possible, the trail will be designed to utilize adjacent right-of-way to create an additional buffer zone.
  - The light rail project is designing the retaining walls required for the light rail project and trolley trail to include terracing and/or planted slopes to provide a natural setting adjacent to the trail.
  - The trail elevation will be designed relative to the light rail elevation in such a way as to maximize visibility to and from the trail to maintain safety and security using “Crime Prevention Through Environmental Design” (CPTED) principles.
  - For the trail section between SE Park Avenue and SE River Road, pedestrian-scale lighting will be provided under the light rail structure and adjacent to light rail. The design of the lighting may be incorporated into the light rail system or be within the trail section; details of this design will continue to be developed in partnership with the NCPRD.
  - The light rail project is designing fencing and other light-rail related utilities and features to be aesthetically compatible with the adjacent trail.
- Recognizing the importance of delivering the new regional trail connection envisioned for the Trolley Trail, TriMet, the City of Milwaukie, and the NCPRD have developed an
approach for completing the link from SE Park Avenue to Kellogg Creek prior to construction of the light rail in this area. Trail users for this section of trail would be directed to a sidewalk and bike lane on the east side of SE McLoughlin Boulevard from SE Park Avenue to the existing crosswalk at SE River Road until the light rail and trail construction are completed in this section. Pedestrians and bicyclists would be able to utilize existing bike lanes and sidewalk on the east side of SE McLoughlin Boulevard. TriMet will provide accommodations for gaps in the sidewalk on the east side of SE McLoughlin Boulevard between SE Park Avenue and SE River Road. This limit was identified as a project element because it will connect the two built elements of the Trolley Trail affected by the construction of the light rail project (SE River Road – SE Park Avenue).

- All parties recognize the desire to open the trail in its permanent location as soon as possible.
- Public access to the trail would be increased by providing a light rail station at SE Park Avenue. Further, access to the trail would be improved by allowing trail users to park in the Park Avenue park-and-ride structure in non-peak times.

Considering these factors, the FTA has determined that the development of the light rail project on the Trolley Trail’s currently undeveloped right-of-way is a *de minimis* impact. Clackamas County has concurred, and this concurrence is included as an Attachment to this document.
Portland-Milwaukie Light Rail Project

Trolley Trail

Figure 1

- Proposed LPA to Park Ave alignment
- Station platforms
- Construction Limit
- Proposed Trolley Trail
Portland - Milwaukie Light Rail Project

Trolley Trail - Various Cross Sections of Proposed Retaining Walls as part of LPA to Park Ave
Portland - Milwaukie Light Rail Project

Proposed Trolley Trail / Park Avenue Site Plan under the LPA to Park Ave
January 14, 2010

Ms. Bridget Wieghart
Metro
600 NE Grand
Portland, OR 97232

Dear Ms. Wieghart:

The North Clackamas Parks and Recreation District (NCPRD) concurs with the Section 4(f) de minimis finding involving the use of a portion of the Trolley Trail right of way for the construction and operation of the Portland Milwaukie Light Rail Project, while accommodating the development of the Trolley Trail. As the light rail project enters final design and continues toward permitting and construction, NCPRD looks forward to working with TriMet to finalize the terms and agreements needed to develop our projects in collaboration.

Based on the analysis and proposed features discussed by the project partners to date, we concur with the finding that the proposed activities would not adversely affect the long term activities and attributes envisioned for the trail, consistent with a de minimis use determination that allows a small or minimal action that will not “adversely affect the activities, features, and attributes” that make the Trolley Trail eligible for protection under Section 4(f). The specific findings in support of this concurrence include:

- TriMet will purchase either property or a property easement from NCPRD and this will be based on an appraisal to be conducted after the record of decision.
- TriMet would construct the trail section between the park-and-ride at SE Park Avenue to SE River Road, as part of the light rail project civil construction contract.
- TriMet will be responsible for relocating the PGE utility at SE Park Avenue.
- TriMet has worked extensively with NCPRD to minimize the impacts on the trail by defining the following features as part of the project:
  - A design that maximizes the amount of space for the trail. At a minimum, a six foot planted buffer zone will be located between light rail and trail. Where possible the trail will be designed to utilize adjacent right-of-way to create additional buffer zone.
  - The light rail project is designing the retaining walls required for the light rail project and trolley trail to include terracing and/or planted slopes to provide a natural setting adjacent to the trail.
  - By designing the trail elevation relative to light rail elevation to maximize visibility to and from the trail to maintain safety and security “Crime Prevention Through Environmental Design” (CPTED) principles.
For the trail section between SE Park Avenue and SE River Road, providing pedestrian-scale lighting under the light rail structure and adjacent to light rail. The design of the lighting may be incorporated into the light rail system or be within the trail section; details of this design will continue to be developed in partnership with the NCPRD.

The light rail project is designing fencing and other light-rail related utilities and features to be aesthetically compatible with the adjacent trail.

Recognizing the importance of delivering the new regional trail connection envisioned for the Trolley Trail, TriMet, City of Milwaukee and the NCPRD have developed an approach for completing the link from SE Park Avenue to Kellogg Creek prior to construction of the light rail in this area. Trail users for this section of trail would be directed to a sidewalk and bike lane on the east side of SE McLoughlin Boulevard from Park Avenue to the existing crosswalk at River Road until the light rail and trail construction are completed in this section. Pedestrians and bicyclists would be able to utilize existing bike lanes and sidewalk on the east side of SE McLoughlin Boulevard. TriMet will provide accommodations for gaps in the sidewalk on the east side of McLoughlin Boulevard between Park Avenue and River Road. This limit was identified as a project element because it will connect the two built elements of the Trolley Trail affected by the construction of the light rail project (River Road – Park Avenue).

All parties recognize the desire to open the trail in its permanent location as soon as possible.

Public access to the trail would be increased by providing a light rail station at SE Park Avenue. Further, access to the trail would be improved by allowing trail users to park in the Park Avenue park-and-ride structure in non-peak times.

NCPRD and TriMet are jointly drafting an Intergovernmental Agreement (IGA) further defining our shared understanding of our approach to developing our two projects in collaboration.

We support the project’s plan to allow our two projects to be developed together, and we believe it will have benefits to users of the Trolley Trail, as well as to the general public and the regional transportation system.

Sincerely,

Bob Austin, Vice Chair
Clackamas County Board of County Commissioners

cc:
Mark Turpel, Metro
Dave Unsworth, TriMet
Dan Zinzer, NCPRD
Michelle Healy, NCPRD
Property Description

This resource is located at 2313 SE Wren Street and was built in 1956. It is a good example of a mid-century Ranch-style house in Milwaukie. It is eligible for the NRHP under Criterion C, because it embodies the distinctive architectural characteristics of a type, period, or method of construction.

Locally Preferred Alternative (LPA) to Park Avenue

In order to develop the light rail project and the Trolley Trail within a shared alignment, the LPA to Park Avenue would require a corner of the backyard to this parcel, which slopes down to the Trolley Trail right-of-way (see Figure 1). The project would remove some mature trees and would construct a fence and retaining wall, and would provide replacement trees and landscaping. As part of the Section 106 process, FTA concluded that the project would not have an adverse effect, and the SHPO has concurred; this satisfies the requirements for a finding of de minimis impact of an historic resource.
Submit this Cover Sheet to the Oregon SHPO along with all survey materials (see checklist below).

Survey Project Name: Portland - Multnomah Light Rail
City: Portland
County: Multnomah
Survey Type: Section 106 H & N
Survey Sponsor: Port/Metro/InMst
Surveyor Name: Preservation Homeowner Cultural Resources, Specialized, Paramedics, 541 172A 2040

Survey Boundaries:
The survey was conducted on the street by SW 36th Ave. in Portland and extends approximately 7 mi along SW 36th Ave.

Survey Summary:
This survey was done to review potentially historic properties in the proposed ADP for the I-5, which builds upon the ADP used for the I-5 & I-405 projects. The Portland Multnomah Light Rail ADP submitted in 2000. The survey was conducted in compliance with the National Historic Preservation Act of 1966, as amended, by the Portland Light Rail Authority.

Survey Comments:

# Eligible Properties
# Ineligible Properties
Acreage Surveyed

106 Case

106 Comments:
- [List of eligible and ineligible properties, with dates and comments for each]
Submitted this Cover Sheet to the Oregon SHPO along with all survey materials (see checklist below).

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<th>City</th>
<th>County</th>
<th>SHPO Approval</th>
<th>Notes</th>
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<td>no effect</td>
</tr>
</tbody>
</table>

SHPO Evaluation of Survey Project
- Approval
  - Conditionally Approved
  - Not Approved

SHPO Comments on NR Eligibility Evaluations
- Not Approved
- Approved for Additional Data

SHPO Comments on Effect Determination
- Not Approved
- Approved for Additional Data

Checklist of Required Items:
1. Completed "Cover Sheet" (in data form and hard copy)
2. 106 Form Obtained from SHPO and Included on Form
3. Survey data submitted in electronic format
4. Photographs taken (digital photos with data included)
5. Property managed survey map
6. Copy of LIDDO Map Showing Location of Surveyed Area

Optional Items:
- Research done completed prior to survey
- Completed Survey Forms (Field Forms)
- Final Report

SHPO Staff Signature

Date / 3/17/11

Comments:
Appendix L

Background on Alternatives Development

Portland-Milwaukie Light Rail Project
APPENDIX L. BACKGROUND ON ALTERNATIVES DEVELOPMENT

L.1 TRANSPORTATION PROJECT DEVELOPMENT

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

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

L.1.1 Transportation Project Development Process

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

L.1.1.1 NEPA Requirements

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

Projects that receive federal funding are required to comply with NEPA, and projects that may have significant environmental impacts must complete an Environmental Impact Statement (EIS) to disclose those impacts. The NEPA regulations integrate the natural and social environmental
realms, along with the necessary engineering and economic considerations, into project planning and decision making. The objective is to balance infrastructure development, economic prosperity, health and environmental protection, community and neighborhood preservation, and quality of life. The potential impacts of the project must be disclosed in the EIS and avoided, minimized or mitigated. The NEPA process is complete when the FTA issues a Record of Decision (ROD), and the project may apply for federal design and construction funding through the FTA Section 5309 New Starts program.

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

- 1993 South/North Alternatives Analysis (1993 South/North AA)
- 2000 South Corridor Transportation Alternatives Study (2000 SCTAS)
- 2002 South Corridor Supplemental Draft Environmental Impact Statement (2002 South Corridor SDEIS)
- 2003 Downtown Amendment to the South Corridor Project Supplemental Draft Environmental Impact Statement (2003 Downtown Amendment)

**L.1.1.2 The Federal Transit Planning Process**

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

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

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

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

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

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

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

**L.1.2 South Corridor Project Development Process**

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

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

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

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

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

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

A scoping process included an evaluation, public comment, and narrowing process that included a series of eight mode and alignment workshops. Six modal alternatives were examined prior to and within Scoping: no-build, transportation system management, busway, commuter rail, river transit and light rail. Within the 30-day public comment period, four public scoping meetings were held to receive comments on the project’s proposed range of alternatives and impacts to be studied further.
Figure L-1: South/North Corridor and Portland Streetcar Loop Development Processes

**SOUTH/NORTH CORRIDOR**
- System Planning
  - South Corridor Pre-Alternatives Analysis - 1993
  - Portland CBD Pre-Alternatives Analysis - 1993
  - North Corridor Pre-Alternatives Analysis - 1993
- Alternatives Analysis
  - South/North Transit Corridor Major Investment Study - 1996
- Draft Environmental Impact Statement
  - South/North Transit Corridor DEIS - 1998

**NORTH CORRIDOR**
- Supplemental Draft Environmental Impact Statement
  - North Corridor SDEIS - 1999
- Preliminary Engineering/
  - Final Environmental Impact Statement
  - North Corridor Interstate MAX FEIS - 1999
- Final Design and Construction
  - North Corridor Interstate MAX
    - FFGA - 2000
    - Complete - 2004

**SOUTH CORRIDOR**
- Alternatives Analysis
  - South Corridor Transportation Alternatives Study - 2000
- Supplemental Draft Environmental Impact Statement
  - South Corridor SDEIS - 2002

**SOUTH CORRIDOR PHASE I**
- Downtown Amendment to South Corridor SDEIS - 2003
- Preliminary Engineering/
  - Final Environmental Impact Statement
    - I-205 / Mall FEIS - 2004
- Final Design and Construction
  - I-205 / Mall Transit Project
    - Complete - 2009

**SOUTH CORRIDOR PHASE II**
- Supplemental Draft EIS
  - S. Corridor Phase II:
    - Portland-Milwaukie 2008
- Preliminary Engineering/
  - Final Environmental Impact Statement
    - Portland-Milwaukie LRT
    - Commence - 2009
- Final Design and Construction
  - Portland-Milwaukie LRT
    - Commence - 2010

**PORTLAND STREETCAR**
- Eastside Transit Alternatives Analysis
  - Problem Statement, Evaluation Plan and Initial Alternatives (March 2006)
  - LPA Report (July 2006)
- Portland Streetcar Loop Project
  - Environmental Assessment (January 2008)
  - Finding of No Significant Impact (June 2008)
The North and South Corridors were evaluated separately. Portland-Milwaukie and I-205 alignment alternatives were evaluated in the South Corridor. For the Milwaukie Corridor, the analysis evaluated a light rail alignment connecting downtown Portland and Milwaukie, then branching in a “Y” configuration to the Clackamas Regional Center and Oregon City.

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

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

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

**L.1.2.2 1998 South/North Draft Environmental Impact Statement**

The purpose of the Tier II phase of the study was to prepare and publish the South/North DEIS and to select a locally preferred alternative. Work on the South/North DEIS was initiated in January 1996. In December 1996, before completion of the DEIS, the South/North Steering Committee and the Metro Council evaluated the defeat of a November 1996 ballot measure that would have provided State of Oregon funding for a portion of the cost of the South/North Project. In response to the election results, project staff was directed to undertake a cost-cutting process, which included over 200 public meetings, and which resulted in the Metro Council’s adoption of the *Cost-Cutting Measures Final Report* (Metro 1997). The cost-cutting process helped to further refine the set of alternatives and options would be studied within the South/North corridor.
In response to the loss of local funding, elected officials in the region held a series of listening posts, where they invited the public to comment on how to best meet the future transportation needs of the region. In response, for the South Corridor, a wide range of HCT alternatives, including river transit, high occupancy vehicle (HOV) lanes, high occupancy toll (HOT) lanes, bus rapid transit and busway, but not light rail, were evaluated in the 2000 South Corridor Transportation Alternatives Study (2000 SCTAS).

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

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

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

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

This section documents the decisions that led to the mode and alignment alternatives and options selected for study in the Portland-Milwaukie Project SDEIS. The criteria used to analyze, evaluate, and select mode and alignment alternatives have been based on goals and objectives, which are based on the Purpose and Need. The Purpose and Need for a transportation improvement project in the corridor was first identified during the 1993 AA for the South/North Corridor. It has remained the same for each subsequent process.
The evaluation and selection of alternatives is based on their ability to meet the project Purpose and Need and its related objectives. There are criteria for each objective and measures for each criterion. Objectives based on the Purpose and Need were established during the 2002 South Corridor SDEIS. These remained the objectives used to select the LPA for the Portland-Milwaukie Light Rail Project. See Chapter 1, Purpose and Need for additional discussion of the Purpose and Need for the project; see Chapter 5, Financial Analysis and Evaluation of Alternatives for the evaluation criteria and measures for the Portland-Milwaukie Project. For more details on the previous analysis, evaluation, recommendations, and decisions, refer to documents cited.

The process of selecting alternatives involves decisions on:

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

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

**L.2.1 Evaluation and Selection of Modes 1993-2003**

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

- No-Build and Transportation System Management (TSM)
- River transit
- Commuter rail
- High Occupancy Toll (HOT) and High Occupancy Vehicle (HOV) lanes
- Busway
- Bus Rapid Transit (BRT) including intelligent transportation management (ITS)
- Light rail
Figure L-2
Narrowing and Refinement of Modal Alternatives
1993-2003

Tier 1 Scoping
- Light Rail
  - Busway
- River Transit

Tier 2 DEIS
- Light Rail

Wide Range of Alternatives
- No-Build
- Bus Rapid Transit
- Busway
- Commuter Rail
- High Occupancy Vehicle Lanes
- High Occupancy Toll Lanes
- River Transit

Narrowing of Alternatives Decision
- No-Build
- Bus Rapid Transit
- Busway
- High Occupancy Vehicle Lanes
- Commuter Rail
- High Occupancy Toll Lanes
- River Transit

Refinement of Alternatives Phase
Refine:
- No-Build
- Bus Rapid Transit
- Busway
Determine Feasibility of:
- Milwaukie Light Rail
- I-205 Light Rail

Alternatives Evaluated in the SDEIS
- Baseline (No-Build)
- Bus Rapid Transit
- Busway
- Light Rail

Locally Preferred Alternative
Preliminary Engineering/FEIS:
- I-205 Light Rail
SDEIS:
- Milwaukie Light Rail
Table L-1 summarizes which study process evaluated each mode.

<table>
<thead>
<tr>
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</tbody>
</table>

3 South Corridor Study Wide Range of Alternatives Report (Metro 2000), South Corridor Transportation Alternatives Study Evaluation Report (Metro 2000).
4 South Corridor Supplemental Draft Environmental Impact Statement (Metro 2002).

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

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

**Transportation System Management**

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

During Tier I, through consultation with the FTA, it was determined that the financially constrained transit network in the RTP, which would be analyzed in the DEIS as the No Build Alternative, would serve in lieu of the TSM. This agreement was based on the recognition that the financially constrained transit network included service increases and service improvements...
typically found in a TSM Alternative (see the *Major Investment Study Final Report*, pp.42-44; Metro 1995).

**River Transit**

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

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

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

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

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

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

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

**Commuter Rail**

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

Commuter rail was evaluated during the *1993 South/North AA* and the *2000 SCTAS*. The *1993 South/North AA* study evaluated a 47.4-mile corridor between Canby, Oregon, and Ridgefield,
Two commuter rail alignment alternatives were considered during the 2000 SCTAS. One was a corridor connecting Oregon City to Clackamas Regional Center, Milwaukie, and Portland via the Union Pacific Railroad (UPRR) main line. The line would terminate near the Oregon Museum of Science and Industry (OMSI), where dedicated shuttle buses would carry passengers across the Hawthorne Bridge to the transit mall and the center of downtown Portland. The line could only operate during peak periods because the UPRR main line is heavily used by Amtrak and freight operations.

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

Reasons for removing Commuter Rail Alternatives from further study included:

- Commuter rail attracted only 5 percent of the ridership projected for light rail in the same corridor.

- Commuter rail would not directly serve the main trip generators in the corridor such as Clackamas Regional Center, downtown Milwaukie, North Macadam/RiverPlace, Portland South Downtown/Portland State University (PSU), Portland Central Downtown, and the Rose Quarter.

- Distribution of trips in downtown Portland would be slow, with transfers required either at Union Station or at a Hawthorne Bridge/OMSI station.

- Commuter rail would be unlikely to influence land use in the same manner as light rail given that stations would be located in heavy rail corridors, while light rail would offer more flexible station locations that could be integrated into the built environment.

- While implementation costs would be less than for light rail, the cost-effectiveness of commuter rail in the South/North Corridor would be poor due to the low ridership potential.

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

- Optimize the transportation system

- Support land use goals

- Be fiscally responsive
High Occupancy Vehicle Lanes and High Occupancy Toll Lanes

HOV lanes are reserved for vehicles that have a minimum number of passengers, including the driver. An HOV is a transit bus, vanpool, or any other vehicle that meets the minimum occupancy requirements. An HOT lane would charge a toll to single occupant vehicles (SOVs) for access to a HOV lane. High occupancy lane alternatives were studied in the 2000 SCTAS. This alternative would increase transit capacity in the corridor by the addition of HOV lanes along SE McLoughlin Boulevard and OR 224. Bus service would be expanded between Milwaukie and Oregon City to meet the demand for transit service in the corridor, and buses would operate in the HOV lane. Two-person carpools would also be allowed to use the HOV lanes.

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

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

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

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

HOV and HOT lanes therefore are not a reasonable alternatives in terms of meeting the project purpose and need statements to:
• Be environmentally sensitive
• Optimize the transportation system
• Support land use goals
• Reflect community values

L.2.1.2 Modes Evaluated in the 2002 South Corridor SDEIS

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

No-Build

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

Bus Rapid Transit

Bus Rapid Transit (BRT) was studied in the 2000 SCTAS and in the 2002 South Corridor SDEIS. BRT describes a variety of capital improvements designed to reduce transit travel time and improve transit system reliability. BRT components studied have included exclusive bus lanes, simplified fare payment methods, special vehicles, limited stations with amenities, and intelligent transportation systems (ITS). ITS elements included real-time customer information, automatic bus stop announcement, and bus priority at traffic signals. The BRT Alternative evaluated in the 2002 South Corridor SDEIS crossed the Willamette River on the Hawthorne Bridge and would have operated on SE Grand Avenue, SE Martin Luther King, Jr. Boulevard and SE McLoughlin Boulevard (OR 99E), connecting the Downtown Portland Transit Mall, Milwaukie, and Oregon City as well as connecting Milwaukie and the Clackamas Regional Center.

The reasons for eliminating the BRT Alternative in the 2003 LPA decision were that, compared to the other alternatives, BRT had:
• The fewest number of corridor transit trips
• The worst reliability due to the lack of separated right-of-way
The least number of protected intersections
The least travel time savings for most major origin and destination locations
The second smallest reduction in vehicle miles traveled and vehicle hours of delay
The greatest number of hazardous materials sites near the alignment
Little public support

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

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

**Busway Alternative**

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

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

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

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

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

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

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

**Light Rail**

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

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

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

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

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

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

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

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

Streetcar

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

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

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

Streetcars would not offer the higher speeds or reliability that light rail would in this congested corridor. Light rail operates primarily in exclusive right-of-way and streetcars operate in mixed traffic; therefore, speed and reliability are affected by adjacent autos, thus slowing travel time and affecting reliability considerably compared to light rail. In addition, streetcars would contribute to increased congestion in the corridor. In a congested corridor with longer trips, it would be preferable to operate in a separated right-of-way rather than in mixed traffic. Streetcars are smaller and have significantly less capacity than light rail. The ridership forecast of 22,000 to
27,000 trips per day in this corridor exceeds the ability of streetcars to provide service efficiently. Meeting this demand would mean accommodating an afternoon peak demand of 1,300 to 2,280 passengers per hour in the peak direction. This would require eight light rail trains consisting of two light rail vehicles or 22 streetcars. The addition of the 22 streetcars per hour would increase congestion in the corridor.

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

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

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

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

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

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

**L.2.2.1 Portland Alignments**

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

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

**Downtown Portland**

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

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

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

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

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

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

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

Figure L-7

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

December 2009

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

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

**Willamette River Crossing**

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

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

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

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

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

The other options were eliminated because they did not:

- Support land use goals because they had worse development potential.
- Optimize the transportation system because they would provide worse transit access and service to inner east side neighborhoods and had slower travel times
• Were not fiscally responsive because they had higher costs

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

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

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

Southeast Portland

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

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

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

Options that have been studied on the east side of the Willamette River and not advanced include:
• SE McLoughlin Boulevard, studied in the 1998 South/North DEIS. This alignment was combined with the Ross Island river crossing option and would use the former Portland Traction Company right-of-way and SE McLoughlin Boulevard between the crossing and Sellwood.

• East Brooklyn Yards, studied in the 1998 South/North DEIS. This alignment would have run to the east of and parallel to the Brooklyn Yard from SE Powell Boulevard to south of the rail yard.

• West Brooklyn Yards, studied in the 1998 South/North DEIS and the 2002 South Corridor SDEIS. This alignment would have run to the east of and parallel to the Brooklyn Rail Yards. This option was selected as the 1998 LPA.

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

• **Support land use goals** because it would be closer to the Brooklyn neighborhood and provide better station environments and pedestrian access and serve more of the transit-supportive land uses located along SE 17th Avenue

• **Reflect community values** because it was strongly supported by the Brooklyn neighborhood and would avoid displacements to large employers

• **Be fiscally responsive** because it would avoid railroad property that would otherwise be an impediment to timely and cost-effective implementation

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

**Milwaukie Alignments**

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

In the North Milwaukie Industrial Area there have been two primary alignment alternatives—the Southgate Crossover on SE Main Street/SE McLoughlin Boulevard and the Tillamook Branch Railroad Line. These are essentially the same alignments studied in the Portland-
Milwaukie Light Rail Project SDEIS. The Tillamook Branch line alignment was developed during the 1993 South/North AA and studied in the 1998 South/North DEIS and the 2002 South Corridor SDEIS as well.

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

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

- **Support land use goals** because it would provide better access to jobs and residents, providing access to 1,500 more jobs and 50 more residents within a quarter-mile of a light rail station than the Tillamook Branch line alignment option.

- **Optimize the transportation system** because it would result in more transit ridership due to an additional station and park-and-ride and a more convenient transit center location that could better accommodate increases in transit service than the other options. It would provide 600 additional park and-ride spaces compared to the Tillamook Branch Line alignment option.

- **Reflect community values** because it would locate a transit center at the Southgate site (Milwaukie Station). Southgate was preferred over the Milwaukie Middle School Transit Center site, which would have been a component of the Tillamook Branch line alignment option.

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

- Recommending a permanent site for the bus transit center in Milwaukie

- Developing a traffic and parking mitigation plan for the adopted LPA in the industrial area, including revisiting the Tillamook alignment (which had been studied in the 2002 South Corridor SDEIS).

The Transit Working Group developed nine alignment and design options on SE Main Street and SE McLoughlin Boulevard and along the Tillamook Branch line to mitigate for the loss of parking and access to businesses in the North Milwaukie Industrial Area. Figure L-8 shows the alignments evaluated by the Transit Working Group.
The group recommended a Tillamook Branch line alignment in the North Milwaukie Industrial Area, with a transit center south of Kellogg Lake to replace the park-and-ride capacity that would be lost because this alignment option would not include the park-and-ride at the Southgate Theater site. The Transit Working Group’s recommendation was adopted by the Milwaukie City Council in 2004. However, the city later learned that the property at Kellogg Lake was not available for a transit center and park-and-ride. Therefore, park-and-ride locations were revisited during the Refinement Study, which was initiated in 2006.

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

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

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

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

Metro and its project partners conducted public outreach through the winter and spring of 2007 to inform interested parties about the project status and obtain input on the design options. Key stakeholders, including property owners, institutions, and neighborhood and business association representatives were contacted. In Milwaukie, an open house was held on March 5, 2007, which had over 150 attendees. This was followed by three meetings focused on different segments of the alignment: south of downtown Milwaukie, the downtown Milwaukie area, and the area between downtown Milwaukie and the Tacoma Station.
9 options were studied as part of the Milwaukie Working Group in 2003-2004.
Figure L-9. The 2003 LPA and the Refinement Study Areas
The project hosted an open house to review the Willamette Crossing options on April 9, 2007, and it was attended by 70 people. In addition, project representatives made presentations and obtained feedback at numerous other community meetings, including neighborhood and business associations throughout the corridor.

L.2.3.1 Willamette River Crossing Area

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

In order to provide better transit service to the South Waterfront area, during the 2007 Refinement Study several options between the Marquam Bridge and the Ross Island Bridge were developed and evaluated to identify the options that would be most promising in terms of meeting the project purpose and need. The alignment options evaluated during the 2007 Refinement Study are shown in Figure L-10.
There were two alignment options between SW Lincoln Street and the South Waterfront area in the Refinement Study, one along SW Naito Parkway and the other along the former Lake Oswego trolley alignment. One option would have run just to the north of the Ross Island Bridge. The bridge locations on the east side of the river included SE Caruthers Street, SE Division Place, and just north of the Ross Island Bridge. All options were designed to accommodate pedestrians and bicycle facilities and could accommodate streetcars and buses as well as light rail.

There was considerable interest among the public in improved service to the South Waterfront area. There were also concerns expressed about any options that would reduce service to, or otherwise negatively impact, eastside neighborhoods. Public comment generally supported including options that continued to serve the Central Eastside Industrial District (CEID) and OMSI.
Table L-2 summarizes the evaluation of the river crossing options.

Table L-2. Willamette River Crossing Summary Matrix*

<table>
<thead>
<tr>
<th></th>
<th>LPA</th>
<th>Meade / Caruthers</th>
<th>Porter / Division</th>
<th>Ross Island Bridge</th>
<th>Naito Parkway</th>
</tr>
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<tbody>
<tr>
<td>Cost</td>
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<td>□</td>
<td>□</td>
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<td>○</td>
</tr>
<tr>
<td>Direct connection to key land uses - Eastside</td>
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<td>□</td>
<td>□</td>
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</tbody>
</table>

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

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

- Potentially significant impact to the historic Ross Island Bridge
- Lack of service to the CEID and OMSI
- Substantial property impacts on the east side
- Elevated station in South Waterfront District
- High cost
The Ross Island Bridge alignment option is therefore not a reasonable alternative to meet the project purpose statements to:

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

The SW Naito Parkway option had the following issues:

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

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

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

Based on the evaluation of the Refinement Study options, in May 2007, the Portland-Milwaukie Steering Committee recommended that two design options be developed in the area from SE Sherman Street to SE Division Place, and SW Arthur Street and SW Porter Street for study in the Portland-Milwaukie SDEIS. See Figure L-11.
In response, the City of Portland, TriMet, and Metro staff worked to develop the two most promising options based on the Refinement Study evaluation and community input, that would best meet the purpose of and need for the project and proposed two primary options and two sub-options. The study team felt that the sub-options were a necessary addition to the project, because they would allow the project to respond to a series of master planning activities by OHSU and OMSI. The two primary options would allow the project to study the two most logical combinations among the four potential street alignments preferred by the project team and stakeholders. The sub-options represented variations, with two possible street network configurations in the South Waterfront District. An alignment on SE Division Place was eliminated because other options had fewer traffic and property impacts and would better serve OMSI and the CEID. An alignment one block north of SE Caruthers Street at SE Sherman Street appeared to have more potential to meet the project purpose and need.

The Portland-Milwaukie Steering Committee at its July 2007 meeting approved the study of four river crossing options that were considered to have the best potential to meet the purpose of and
need for the project for evaluation in the *Portland-Milwaukie SDEIS*. These options, which are described in Chapter 2, Section 2.3.1, Selection of Willamette River Crossing Alignment Option, include:

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

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

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

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

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

The Portland-Milwaukie Steering Committee recommended that both the Tillamook Branch line alignment recommended by Milwaukie Working Group and the adopted 2003 LPA alignment be combined with the extension to SE Park Avenue to be studied further in the SDEIS. Figure L-14 shows the LPA and the two proposed design options, with associated stations and park-and-ride locations, proposed for further study in the SDEIS in this portion of the alignment. Park-and-ride options included locations and parking capacity ranges at SE Sparrow Street and SE Park Avenue. Additional work was to be completed to determine the capacities at these locations.
Figure L-12. Refinement Study: Alignments Tacoma Station to Project Terminus

Figure L-13. Downtown Milwaukie station options
The design options were intended to allow further study of key choices in terms of alignment, locations, and amount of park-and-ride capacity and stations. For example, to accommodate park-and-ride demand, both design options increased the proposed amount of park-and-ride capacity at the Tacoma Station to 1,000 spaces, while the LPA remained with 600 spaces. One design option eliminated a SE Lake Road park-and-ride in favor of a park-and-ride at SE Sparrow Street to test the trade-offs between these choices. Due to the public preference for the station at SE Monroe Street over the station at SE Harrison Street that was expressed at public meetings, both design options incorporated Monroe Station and only the 2003 LPA included the Harrison Station.

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

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

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

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

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

Refinement Study Light Rail Alignments: Additional Downtown Milwaukie Alignments

Figure L-14

Alignment Options

- 2003 LPA
- Extension to Park Ave.

McLoughlin Options

- McLoughlin double-track
- McLoughlin/Main couplet

Main Street Options

- Main double-track
- Main/21st couplet

Railroad
L-15 Southern Terminus Study Options

PROPOSED EIS STUDY DESIGN OPTIONS

Locally Preferred Alternative (adopted by Milwaukee City Council April 2003)

Locally Preferred Alternative with extension to Park

Tillamook Alignment to Park

Milwaukee: 1000 spaces

Tacoma: 600 spaces

Harrison

Lake: 270 spaces

TOTAL PARK AND RIDE: 1475

TOTAL PARK AND RIDE: 2375 - 2675

TOTAL PARK AND RIDE: 1700 - 2200

These station and park and ride locations are proposed for study in a SDEIS. The final alternative could incorporate elements from several options.
L.2.3.3 Other Refinement Study Recommendations

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

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

This appendix summarizes mitigation measures described in Chapters 3 and 4 of this FEIS, the Biological Assessment for the project, the Appendix K Final 4(f) Evaluation, and the Memorandum of Agreement defined through the project’s Section 106 consultations regarding Historic, Cultural, and Archaeological Resources. Section M.1 lists the mitigation measures proposed for adverse long-term effects in Chapter 3, Environmental Analysis and Consequences, Section M.2 lists the mitigation measures proposed for short-term (construction) effects in Chapter 3, Environmental Analysis and Consequences, and Section M.3 lists the mitigation and enhancement measures proposed in Chapter 4, Transportation.

This appendix has been structured to focus on the additional mitigation measures the project will undertake, after taking into account the avoidance, minimization measures already incorporated within the project, and compliance with applicable local, state, and federal permits and regulations. When FTA produces its Record of Decision for the project, the mitigation commitments of the project will be listed. During final design and as part of construction planning, the project will continue to consider opportunities to design the project to further reduce environmental impacts through avoidance. The mitigation measures for the project may also be refined in response to other project permitting or approval requirements, or as a result of other agency or public comments received by FTA following the FEIS publication.

M.1 LONG-TERM MITIGATION: ENVIRONMENTAL RESOURCES

This section presents mitigation measures for long-term impacts for the environmental resources described in Chapter 3 of the FEIS. Table M-1 summarizes the mitigation commitments for all resources except for noise and vibration; these mitigation measures are summarized in Tables M-2 and M-3, respectively.

<table>
<thead>
<tr>
<th>Chapter/Section</th>
<th>Measure/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Acquisitions and Displacements</td>
<td>TriMet will conduct property acquisitions and provide for relocation of displaced parties in compliance with 49 CFR Part 24 Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended. Advisory Services will be offered to relocated businesses, including coordination with Portland Development Commission, Portland State University, Portland Community College, State of Oregon, and other business planning services.</td>
</tr>
<tr>
<td>3.2 Land Use and Economy</td>
<td>No land use or economic mitigation is required.</td>
</tr>
<tr>
<td>3.3 Community Impact Assessment and Environmental Justice</td>
<td>Mitigated with the project’s commitments in other environmental areas and through TriMet’s public involvement programs to provide outreach and communications to a variety of populations, including those whose primary language is not English.</td>
</tr>
</tbody>
</table>
## Table M-1
### Long-Term Mitigation: Environmental Resources

<table>
<thead>
<tr>
<th>Chapter/Section</th>
<th>Measure/Description</th>
</tr>
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<tr>
<td><strong>3.4 Visual Quality and Aesthetics</strong></td>
<td>For areas identified as having high impacts (South Waterfront and Willamette River, Hosford-Abernethy, historic Milwaukie, Island Station, and Oak Lodge), TriMet will continue to work during final design in coordination with local jurisdictions and neighborhood representatives to develop project elements that minimize effects to neighborhood scale and character. This will include coordination with the City of Portland’s Design Review Process and the City of Milwaukie Design and Landmarks Committees.</td>
</tr>
<tr>
<td><strong>3.5 Historic, Archaeological, and Cultural Resources</strong></td>
<td><strong>Historic Resources</strong>&lt;br&gt;The Project will have three adverse effects to historic resources (Royal Foods Warehouse and Office, 2425 SE 8th Avenue, Portland, Westmoreland Park, 7605 SE McLoughlin Boulevard, and R. Derwey House, 2206 SE Washington Street, Milwaukie). Mitigation for the adverse effects will be conducted in accordance with the signed formal Memorandum of Agreement (MOA) with the SHPO, TriMet and FTA and executed for inclusion in the FEIS (See Appendix N, Agency Coordination and Correspondence).&lt;br&gt;Secondary impacts to five additional historic built environment resources at 2405 SE Harrison, 2326 SE Monroe, 2313 SE Wren, and 2206 SE Washington streets in Milwaukie and 1635 SE Rhone Street in Portland due to noise and vibration will be mitigated in accordance with the terms of the MOA.&lt;br&gt;<strong>Archaeological Resources</strong>&lt;br&gt;Potential adverse impacts to archaeological resources due to construction will be mitigated by the identification, avoidance, monitoring, minimization, and treatment procedures defined in the MOA. (See Appendix N, Memorandum of Agreement).</td>
</tr>
<tr>
<td><strong>3.6 Parks and Recreational Resources</strong></td>
<td>During Final Design, FTA and TriMet will continue to coordinate with Portland Parks and Recreation (PP&amp;R), the City of Milwaukie, Metro and the North Clackamas Parks and Recreation Department (NCPRD) to develop project design and construction details consistent with the letters of understanding and mitigation commitments included within Appendix K, Section 4(f) Final Evaluation. The project will meet the City of Portland and the City of Milwaukie applicable permitting requirements for development within the Greenway Zone.</td>
</tr>
<tr>
<td><strong>3.7 Geology and Soils</strong></td>
<td>No mitigation required.</td>
</tr>
<tr>
<td><strong>3.8 Ecosystems</strong></td>
<td>The Biological Opinion issued by National Oceanic and Atmospheric Administration (NOAA) Fisheries for the project (June 23, 2010) identifies mitigation measures and terms and conditions for construction and operation of the project. The project will comply with these measures, terms, and conditions. See Section M.4 for a listing. &lt;br&gt;<strong>Wetlands</strong>&lt;br&gt;The project will meet the requirements of Section 404 permit conditions to be approved by the United States Army Corps of Engineers (USACE) and Oregon Division of State Lands (DSL). Unavoidable impacts to wetlands will be mitigated through compensatory wetland mitigation (CWM). Wetlands mitigation requirements will be met through partial funding of the City of Portland’s Westmoreland Park Duck Pond Restoration Project, and in compliance with the permitting requirements of the USACE and the Oregon DSL. If for some reason the Westmoreland Park Restoration Project is not a feasible means to mitigate wetland and fish passage impacts, the Portland-Milwaukie Light Rail Project plans to purchase necessary credits at the Foster Creek wetland mitigation bank.</td>
</tr>
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### Table M-1
**Long-Term Mitigation: Environmental Resources**

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<th>Chapter/Section</th>
<th>Measure/Description</th>
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| 3.8 Ecosystems (cont.) | **Wildlife**  
Provide for nesting and roosting habitats where practicable for native birds and bats.  
**Vegetation, Waterways and Fisheries**  
The project will mitigate detrimental effects to vegetation, waterways and fisheries, including impacts to both habitat quality and quantity, through compliance with federal, state, and local regulations and permitting requirements, including the conservation recommendations and terms and conditions stipulated in the Biological Opinion, and as described below for Water Quality and Hydrology.  
The project will mitigate for impacts to the Willamette River and its associated habitat by partnering with the City of Portland on a planned city project that will provide creation and enhancement of shallow water and active channel areas at a site located south (upstream) of the Ross Island Bridge on the western bank (and adjacent to two derelict pile fields that are proposed to be removed by the project). The site is known as the Central District and is part of the planned South Waterfront Greenway and consists of two properties. The city’s project will upgrade an existing path to meet City of Portland greenway standards (two separated paths for bicycles and pedestrians), while excavating the existing bank to provide approximately 25,500 square feet of shallow-water beach habitat and 17,400 square feet of re-naturalized riverbank. In addition, 20,000 square feet of derelict piles will be removed.  

| 3.9 Water Quality and Hydrology | Hydrologic and water quality impacts will be minimized by following the City of Portland’s stormwater management program and 2008 Stormwater Management Manual; the project will meet the City of Portland’s stormwater criteria along the entire light rail alignment. The City of Portland criteria were developed to manage stormwater to meet EPA’s Clean Water Act and Safe Drinking Water Act. Through the application of the City’s Stormwater Management Manual, the project will incorporate design criteria, best practices and standards that will protect water quality in rivers and streams (including 303(d) listed waters), and protect watershed health as well as protect groundwater as a drinking water resource.  
To address a net rise in the base flood elevation of the Willamette River, TriMet will obtain a Conditional Letter of Map Revision (CLOMR) in consultation with the City of Portland and FEMA.  
The project will provide floodplain cut and fill balancing at Crystal Springs Creek, Johnson Creek, and Kellogg Lake for removal and fill within the floodplain. |
| 3.10 Noise and Vibration | See Tables M-2 and M-3 for noise and vibration mitigation measures. |
| 3.11 Air Quality | No mitigation is required. |
| 3.12 Energy | No mitigation is required. |
| 3.13 Hazardous Materials | Properties proposed for lease or acquisition will be evaluated in further detail using Environmental Site Assessments (ESAs) for the potential for encountering hazardous materials or incurring environmental liability. All hazardous materials encountered during construction will be addressed in accordance with applicable state and federal regulations. |
| 3.14 Utilities | No significant long term impacts to utilities are expected and no additional mitigation measures are required. |
| 3.15 Public Services | No mitigation required. |
| 3.16 Safety and Security | TriMet will apply its existing safety and security programs to include the project. |
| 3.17 Section 4(f) | Impacts to Section 4(f) properties will be addressed in accordance with the mitigation commitments defined in the Final Section 4(f) Evaluation and its accompanying letters of concurrence and agreements. |
Table M-2 summarizes required noise mitigation measures for light rail, bus, streetcar, warning bell, and traffic noise for the LPA to Park Avenue and the MOS to Lake Road.

<table>
<thead>
<tr>
<th>Rec. #¹</th>
<th>Area Description²</th>
<th>Impact Type³</th>
<th>Noise Levels</th>
<th>Criteria</th>
<th>Mitigation⁶</th>
<th>Exterior Level with mitigation⁷</th>
<th>Residual Impacts⁸</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Downtown Portland</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TR1</td>
<td>Village at Lovejoy Fountain 2nd &amp; 3rd floors</td>
<td>Traffic</td>
<td>65</td>
<td>67</td>
<td>65 (FHWA)</td>
<td>Sound Insulation</td>
<td>67</td>
</tr>
<tr>
<td>TR1a</td>
<td>Village at Lovejoy Fountain 4th &amp; 5th floors</td>
<td>Traffic</td>
<td>65</td>
<td>66</td>
<td>65 (FHWA)</td>
<td>Sound Insulation</td>
<td>66 Interior (0) Exterior (17)</td>
</tr>
<tr>
<td>TR2</td>
<td>American Plaza Ground &amp; 2nd floors</td>
<td>Traffic</td>
<td>65</td>
<td>68</td>
<td>65 (FHWA)</td>
<td>Sound Insulation</td>
<td>68</td>
</tr>
<tr>
<td>TR2a</td>
<td>American Plaza 3rd, 4th &amp; 5th floors</td>
<td>Traffic</td>
<td>65</td>
<td>67</td>
<td>65 (FHWA)</td>
<td>Sound Insulation</td>
<td>67</td>
</tr>
<tr>
<td>D1</td>
<td>Digital One/Mission Control</td>
<td>LRT/Bus</td>
<td>66</td>
<td>63</td>
<td>62</td>
<td>Sound Insulation</td>
<td>63 Interior (0) Exterior (1)</td>
</tr>
<tr>
<td><strong>SE Powell Boulevard Overpass to Tacoma Station</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TR15</td>
<td>2-SFR on SE 17th Ave. at SE Rhone St.</td>
<td>Traffic</td>
<td>65</td>
<td>67</td>
<td>65 (FHWA)</td>
<td>Sound Insulation</td>
<td>67 Interior (0) Exterior (2)</td>
</tr>
<tr>
<td><strong>Highway 224 to Lake Road Station (MOS to Lake Rd.)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R33</td>
<td>North of SE Harrison St. (east – SFR)</td>
<td>Bells/LRT</td>
<td>62</td>
<td>63</td>
<td>59</td>
<td>Sound Insulation (or walls) and directional bells</td>
<td>63 None Exterior (1 on Harrison)</td>
</tr>
<tr>
<td>R34</td>
<td>North of SE Harrison St. (west – SFR)</td>
<td>Bells/LRT</td>
<td>62</td>
<td>64</td>
<td>59</td>
<td>Sound Insulation (or walls) &amp; directional bells with shrouds</td>
<td>63 None Exterior (1 on Harrison)</td>
</tr>
<tr>
<td>R35</td>
<td>Spring Creek Apartments (closest MFR to tracks)</td>
<td>Bells/LRT</td>
<td>62</td>
<td>61</td>
<td>59</td>
<td>Insulation and directional bells with shrouds</td>
<td>61 Interior (0) Exterior (6)</td>
</tr>
<tr>
<td>R36</td>
<td>Spring Creek Apartments (closest MFR to crossing)</td>
<td>Bells/LRT</td>
<td>62</td>
<td>60</td>
<td>59</td>
<td>Insulation and directional bells</td>
<td>58 None</td>
</tr>
<tr>
<td>R37</td>
<td>SE Monroe St. (SFR nearest tracks)</td>
<td>Bells</td>
<td>62</td>
<td>64</td>
<td>59</td>
<td>Insulation and directional bells</td>
<td>61 None exterior (1)</td>
</tr>
</tbody>
</table>
### Table M-2
Summary of Noise Mitigation Measures for Light Rail, Bus, Streetcar, Warning Bell, and Traffic Noise

<table>
<thead>
<tr>
<th>Rec. #&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Area Description&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Impact Type&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Noise Levels&lt;sup&gt;4&lt;/sup&gt;</th>
<th>Criteria&lt;sup&gt;5&lt;/sup&gt;</th>
<th>Mitigation&lt;sup&gt;6&lt;/sup&gt;</th>
<th>Exterior Level with mitigation&lt;sup&gt;7&lt;/sup&gt;</th>
<th>Residual Impacts&lt;sup&gt;8&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>R37A</td>
<td>SE Monroe St. (SFR 2nd home)</td>
<td>Bells</td>
<td>62 (existing) 63</td>
<td>59</td>
<td>Insulation and directional bells</td>
<td>60 None exterior (1)</td>
<td></td>
</tr>
<tr>
<td>R37B</td>
<td>SE Monroe St. (SFR 3rd home)</td>
<td>Bells</td>
<td>62 (existing) 62</td>
<td>59</td>
<td>Insulation and directional bells</td>
<td>59 None exterior (1)</td>
<td></td>
</tr>
<tr>
<td>R38</td>
<td>SE Lake Rd. (SFR)</td>
<td>LRT</td>
<td>62 (existing) 60</td>
<td>59</td>
<td>Noise wall or Insulation</td>
<td>59 None with Wall</td>
<td>Exterior (1 w/insulation)</td>
</tr>
<tr>
<td>Lake Road Station to Park Avenue Station (LPA to Park Ave.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R42</td>
<td>SE Wren St. (closest SFR)</td>
<td>LRT</td>
<td>68 (existing) 64</td>
<td>63</td>
<td>Noise wall</td>
<td>59 None</td>
<td></td>
</tr>
<tr>
<td>R43</td>
<td>SE Wren St. (other SFR)</td>
<td>LRT</td>
<td>65 (existing) 61</td>
<td>61</td>
<td>Noise wall</td>
<td>56 None</td>
<td></td>
</tr>
<tr>
<td>R47</td>
<td>SE 27&lt;sup&gt;th&lt;/sup&gt; Ave.</td>
<td>LRT</td>
<td>65 (existing) 62</td>
<td>61</td>
<td>Noise wall</td>
<td>57 None</td>
<td></td>
</tr>
<tr>
<td>R48</td>
<td>SE 27&lt;sup&gt;th&lt;/sup&gt; Ave.</td>
<td>LRT</td>
<td>65 (existing) 61</td>
<td>61</td>
<td>Noise wall</td>
<td>56 None</td>
<td></td>
</tr>
<tr>
<td>R49</td>
<td>SE 27&lt;sup&gt;th&lt;/sup&gt; Ave.</td>
<td>LRT</td>
<td>65 (existing) 61</td>
<td>61</td>
<td>Noise wall</td>
<td>56 None</td>
<td></td>
</tr>
<tr>
<td>Ruby Junction Facility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ruby</td>
<td>NW Eleven Mile Rd. (SFR Near Ruby Junction)</td>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td>50 (nighttime) City of Gresham</td>
<td>Noise insulation or acquisition and relocation</td>
<td>N/A None</td>
</tr>
</tbody>
</table>

---
<sup>1</sup> Receiver numbers as shown on Figure 3.10-6 in the FEIS.

<sup>2</sup> General description of sensitive receiver.

<sup>3</sup> Impact type: LRT = Light rail; Bells = warning bells at crossing gates; traffic = traffic noise impact; bus = bus traffic.

<sup>4</sup> Existing $L_{eq}$ for Category 2 and $L_{dn}$ for Category 1 or 3 land uses.

<sup>5</sup> Project $L_{dn}$ for Category 2 and $L_{eq}$ for Category 1 or 3 land uses. **Bold**-typeface exceeds criteria.

<sup>6</sup> Proposed mitigation methods.

<sup>7</sup> Noise level with mitigation measures.

<sup>8</sup> Number of remaining noise impacts with mitigation.

<sup>9</sup> City of Gresham Noise Ordinance Applied. Existing and combined noise levels are not applicable.

Interior noise levels will be mitigated to meet HUD standards, reducing the impact. Exterior noise levels will exceed FTA criteria.

Table M-3 shows the light rail vibration mitigation measures for the LPA to Park Avenue and the MOS to Lake Road.
### Table M-3
Light Rail Vibration Mitigation Measures

<table>
<thead>
<tr>
<th>Rec. #</th>
<th>Area Description 1</th>
<th>Land Use Type 2</th>
<th>Vibration Criteria 3</th>
<th>Vibration Level 4</th>
<th>Mitigation 5</th>
<th>Level with Mitigation 6</th>
<th>Impacts with Mitigation 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>Unitus Credit Union/PSU Classrooms 6</td>
<td>3</td>
<td>75</td>
<td>79</td>
<td>Flange bearing crossover</td>
<td>74 9</td>
<td>0</td>
</tr>
<tr>
<td>R1</td>
<td>Lovejoy Fountain Apartments (MFR)*</td>
<td>2</td>
<td>72</td>
<td>72</td>
<td>Rail boot</td>
<td>68</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Downtown Portland</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S1</td>
<td>Lovejoy Fountain Apartments (MFR)*</td>
<td>2</td>
<td>72</td>
<td>72</td>
<td>Rail boot</td>
<td>68</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R1</td>
<td>Lovejoy Fountain Apartments (MFR)*</td>
<td>2</td>
<td>72</td>
<td>72</td>
<td>Rail boot</td>
<td>68</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>East Bank Waterfront to SE Powell Boulevard Overpass</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O1</td>
<td>Portland Opera</td>
<td>1</td>
<td>75</td>
<td>80</td>
<td>Flange bearing crossover</td>
<td>75 9</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE Powell Boulevard Overpass to Tacoma Station</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R15</td>
<td>SE Rhone St. and SE 17th Ave. (SFR)</td>
<td>2</td>
<td>72</td>
<td>74</td>
<td>Ballast mats</td>
<td>63</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highway 224 to Lake Road Station (MOS to Lake Rd.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R32</td>
<td>North of SE Harrison St. (west – SFR)</td>
<td>2</td>
<td>72</td>
<td>73</td>
<td>59</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>R34</td>
<td>North of SE Harrison St. (east – SFR)</td>
<td>2</td>
<td>72</td>
<td>82</td>
<td>72</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R35</td>
<td>South of SE Harrison St. (closest MFR to track)</td>
<td>2</td>
<td>72</td>
<td>83</td>
<td>72</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>R36</td>
<td>South of SE Harrison St. (MFR)</td>
<td>2</td>
<td>72</td>
<td>75</td>
<td>Tire derived aggregate</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>R37</td>
<td>SE Monroe St. (SFR)</td>
<td>2</td>
<td>72</td>
<td>76</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>S9</td>
<td>SE Washington St. &quot;L&quot; Bldg</td>
<td>3</td>
<td>75</td>
<td>82</td>
<td>72</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>S10</td>
<td>Tartan and Thistle Restaurant</td>
<td>3</td>
<td>75</td>
<td>76</td>
<td>65</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>S11</td>
<td>SE Washington St. (Center)</td>
<td>3</td>
<td>75</td>
<td>82</td>
<td>72</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>S12</td>
<td>SE 21st at SE Adams St. (Jenco Scientific and Electrodyne Inc.)</td>
<td>3</td>
<td>75</td>
<td>82</td>
<td>71</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>R38</td>
<td>SE Lake Rd. (SFR by structure)</td>
<td>2</td>
<td>72</td>
<td>72</td>
<td>Resilient fasteners</td>
<td>69</td>
<td>0</td>
</tr>
</tbody>
</table>
Table M-3
Light Rail Vibration Mitigation Measures

<table>
<thead>
<tr>
<th>Rec. #</th>
<th>Area Description</th>
<th>Land Use Type</th>
<th>Vibration Criteria</th>
<th>Vibration Level</th>
<th>Mitigation</th>
<th>Level with Mitigation</th>
<th>Impacts with Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>R47</td>
<td>SE 27th Ave. (SFR south of displacement)</td>
<td>2</td>
<td>72</td>
<td>73</td>
<td>Ballast mats</td>
<td>63</td>
<td>0</td>
</tr>
<tr>
<td>R48</td>
<td>SE 27th Ave. (SFR south of displacement)</td>
<td>2</td>
<td>72</td>
<td>74</td>
<td>Spring frog</td>
<td>59</td>
<td>0</td>
</tr>
<tr>
<td>R49</td>
<td>SE 27th Ave. (SFR near switch)</td>
<td>72</td>
<td>73</td>
<td></td>
<td></td>
<td>58</td>
<td>0</td>
</tr>
</tbody>
</table>

1 General description of sensitive receiver location: SFR = single-family residence / MFR = multifamily residence / Comm = commercial.
2 Land use by FTA criteria.
3 FTA vibration criteria.
4 Predicted maximum vibration level during train pass-by – Bold typeface indicates a vibration impact.
5 Potential vibration mitigation measures pending additional testing during final design.
6 Vibration levels with proposed mitigation.
7 Residual vibration impacts.
8 Additional testing will be performed at the Unitus Credit Union building, Lovejoy Fountain Apartments, and Portland Opera building, and all residential structures to determine the level of mitigation required.
9 Assumes a 5 VdB reduction for special trackwork.

M.2 SHORT-TERM MITIGATION: ENVIRONMENTAL RESOURCES

Table M-4 presents short-term (construction) mitigation measures.

Table M-4
Short-Term Mitigation: Environmental Resources

<table>
<thead>
<tr>
<th>Chapter/Section</th>
<th>Measure/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Acquisitions and Displacements</td>
<td>None proposed.</td>
</tr>
<tr>
<td>3.2 Land Use and Economy</td>
<td>• Develop and implement a construction outreach plan that will ensure that impacted community members such as local residents, businesses, community members, institutions, and property owners are fully informed about potentially major disruptions such as temporary street closures; utility relocations; out of the ordinary construction noise, vibration, light, or glare; changes in transit service; and parking availability.</td>
</tr>
<tr>
<td></td>
<td>• Make a plan to establish effective communication with residents and businesses through means such as holding public meetings with project team members and the contractor and producing materials and processes to distribute information about construction updates, alerts, and construction schedules.</td>
</tr>
<tr>
<td></td>
<td>• Provide outreach to impacted community members such as affected business owners, institutions, chambers of commerce, merchants associations, ethnic community organizations, and others on measures to assist impacted businesses maintain their customer base during construction; this could include promotional programs and other marketing or advertising programs to encourage patronage during construction.</td>
</tr>
<tr>
<td></td>
<td>• Provide clear signage to identify and make accessible paths to and from major transportation facilities, such as designated pedestrian routes, bicycle lanes, bus stations, and bus stops.</td>
</tr>
</tbody>
</table>
Table M-4
Short-Term Mitigation: Environmental Resources

<table>
<thead>
<tr>
<th>Chapter/Section</th>
<th>Measure/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3 Community Impact Assessment and Environmental Justice</td>
<td>None proposed</td>
</tr>
<tr>
<td>3.4 Visual Quality and Aesthetics</td>
<td>None proposed</td>
</tr>
<tr>
<td>3.5 Historic, Archaeological, and Cultural Resources</td>
<td>None proposed.</td>
</tr>
<tr>
<td>3.6 Parks and Recreational Resources</td>
<td>During final design, short-term mitigation measures will be coordinated with park owners, and will incorporate the terms and agreements defined in the FEIS Appendix K, Final Section 4(f) evaluation. Mitigation measures will include providing detour routes around construction areas and temporarily modifying access points to maintain access to park resources where possible. Construction duration around park facilities will be minimized to the extent possible.</td>
</tr>
<tr>
<td>3.7 Geology and Soils</td>
<td>None proposed.</td>
</tr>
</tbody>
</table>
| 3.8 Ecosystems                                       | The project will comply with terms and conditions in the Biological Opinion issued for the project. See Section M.4 for a listing. Other construction period impact mitigation for fisheries, wetlands, and Endangered Species are incorporated within the mitigation measures and permit compliance commitments established for long term impacts. Wildlife
  The project will comply with the requirements of the Migratory Bird Treaty Act and will provide protection for active bird nests by conducting preconstruction surveys and either avoiding or relocating nests that could be affected by vegetation removal and other clearing or grading conducted for the project. In addition to protection for bird nests, the project will further define during final design and construction planning specific mitigation measures to avoid or reduce potential impacts, including the following:
  - Avoid removal of native vegetation.
  - Where native vegetation removal is unavoidable, perform clearing activities outside of the bird nesting season (approximately March 1 to September 1), and leave cut trees and large shrubs on-site to provide cover for small mammals, ground-nesting birds, reptiles and amphibians.
  - If clearing is necessary during the bird nesting season, have a qualified biologist survey the clearing areas for migratory bird nests prior to clearing.
  - Retain snags, downed woody material, and forest floor duff to the greatest extent possible.
  - Avoid disturbing bats during the breeding season (May to September). If this is not feasible and if approved by the Project Manager, apply exclusionary methods prior to this date to exclude bats from accessing suitable habitat. An exclusionary device is any method that denies bats physical access to the nest site area (for example: nets and hole blockers).
  - Exclusionary devices must be installed a minimum of 30 days before the bat breeding season.
  - Inspect, maintain, and repair bat exclusionary devices to prevent active occupancy by bats during the breeding season. |
Table M-4
Short-Term Mitigation: Environmental Resources

<table>
<thead>
<tr>
<th>Chapter/Section</th>
<th>Measure/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.9 Water Quality and Hydrology</td>
<td>The light rail project will mitigate its potential short-term impacts through full compliance with applicable regulations including the erosion control manuals and National Pollutant Discharge Elimination System (NPDES) permitting requirements of the local jurisdictions.</td>
</tr>
<tr>
<td>3.10 Noise and Vibration</td>
<td>None proposed</td>
</tr>
<tr>
<td>3.11 Air Quality</td>
<td>Construction contractors will comply with state regulations (OAR 340-208-0210) requiring that reasonable precautions be taken to avoid dust emissions. TriMet is assessing the use of incentives with the contractors to encourage best management practices with regard to air quality and diesel powered construction equipment. This includes incentives for using low-sulfur fuel for diesel equipment, cleaner fuels for other equipment, properly maintaining equipment, reducing idling, retrofitting diesel engines with verified technologies, and replacing older equipment and engines.</td>
</tr>
<tr>
<td>3.12 Energy</td>
<td>None proposed.</td>
</tr>
<tr>
<td>3.13 Hazardous Materials</td>
<td>Lead and asbestos surveys will be conducted prior to the acquisition of buildings and structures, consistent with OAR 248, and abatement will be conducted prior to demolition, renovation or repair. The project will comply with all other applicable state and federal regulatory and permitting requirements for the handling of hazardous materials, and no additional mitigation is proposed.</td>
</tr>
<tr>
<td>3.14 Utilities</td>
<td>None proposed.</td>
</tr>
<tr>
<td>3.15 Public Services</td>
<td>TriMet will coordinate with the police departments, fire and rescue providers, schools, USPS, and hospitals regarding construction detours and changes that will occur as a result of project construction.</td>
</tr>
<tr>
<td>3.16 Safety and Security</td>
<td>None proposed.</td>
</tr>
<tr>
<td>3.17 Section 4(f)</td>
<td>Construction period impacts to Section 4(f) properties will be addressed in accordance with the mitigation commitments defined in the Final Section 4(f) Evaluation and its accompanying letters of concurrence and agreements.</td>
</tr>
</tbody>
</table>

M.3 TRANSPORTATION MITIGATION

This section presents mitigation for transportation impacts related to the proposed project. Section M.3.1 describes potential mitigation related to pedestrian, bicycle, and off-street parking, Sections M.3.2 summarizes mitigation proposed for vehicle operations by geographic area (Subareas A through D), Section M.3.3 addresses freight concerns, and Section M.3.4 presents mitigation measures for construction impacts.
M.3.1 Pedestrian and Bicycle Facilities

Pedestrian Facilities

The following section summarizes measures that mitigate pedestrian conditions within each sub-area of the project corridor.

Table M-5 summarizes the mitigation that is designed as part of the project near proposed stations (within a 500-foot radius).

Table M-5
Pedestrian Mitigation by Transit Station

<table>
<thead>
<tr>
<th>Location</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinton Station</td>
<td>Provide new traffic signals with crosswalks in the SE 11th Avenue/SE 12th Avenue/SE and alternate bicycle crossing for Clinton Street area to address gaps in the pedestrian and bicycle systems.</td>
</tr>
<tr>
<td>Rhine Station</td>
<td>Provide sidewalks, crosswalks, and pedestrian facilities for the new 17th Avenue overcrossing of SE Powell Blvd.</td>
</tr>
</tbody>
</table>

Bicycle Facilities

Table M-6 identifies project mitigation related to bicycle facilities and connectivity.

Table M-6
Bicycle Mitigation by Transit Station

<table>
<thead>
<tr>
<th>Location</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinton Station</td>
<td>Provide bicycle access along SE Clinton Street for the portion of roadway that crosses SE 11th Avenue and SE 12th Avenue. This would provide direct access to the Clinton Station to/from the west.</td>
</tr>
<tr>
<td>Rhine Station</td>
<td>Provide multi-use path for the new SE 17th Avenue overcrossing of SE Powell Boulevard.</td>
</tr>
</tbody>
</table>
Parking Mitigation

Table M-7 identifies project mitigation-related to parking.

<table>
<thead>
<tr>
<th>Location</th>
<th>LPA to Park Ave.</th>
<th>MOS to Lake Rd.</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lincoln Station</td>
<td>•</td>
<td>•</td>
<td>Consistent with real property acquisition commitments (Section M-1), compensate the property owner for the loss of approximately seven off-street parking spaces at 2000 SW 5th Avenue.</td>
</tr>
<tr>
<td>OMSI Station</td>
<td>•</td>
<td>•</td>
<td>Consistent with real property acquisition commitments (Section M-1), compensate the Portland Opera for the loss of up to nine off-street parking spaces.</td>
</tr>
<tr>
<td>Clinton Station</td>
<td>•</td>
<td>•</td>
<td>Consistent with real property acquisition commitments (Section M-1), compensate the property owner for the loss of approximately twenty off-street parking spaces between SE 11th and SE 12th, south of SE Clinton Street.</td>
</tr>
<tr>
<td>17th Avenue/Holgate Station</td>
<td>•</td>
<td>•</td>
<td>Replace TriMet's off-street parking supply or undertake a combination of relocation and parking management strategies that address loss of parking for TriMet's Center Street facilities. Consistent with real property acquisition commitments (Section M-1), compensate the property owners for the loss of other off-street lots.</td>
</tr>
<tr>
<td>Tacoma Station</td>
<td>•¹</td>
<td></td>
<td>Coordinate with the City of Portland and the City of Milwaukie to monitor for increases in parking activity in station area neighborhoods and, if impacts occur, apply the cities’ existing parking management program measures.</td>
</tr>
<tr>
<td>Lake Road Station</td>
<td>•</td>
<td>•</td>
<td>Coordinate with the City of Milwaukie to apply its existing parking management strategies and maximize station access benefits to minimize effects of parking removal.</td>
</tr>
<tr>
<td>Park Avenue Station</td>
<td>•¹</td>
<td></td>
<td>Coordinate with Clackamas County to monitor for increases in transit-related parking activity in station area neighborhoods, and, if impacts occur, apply parking management strategies.</td>
</tr>
</tbody>
</table>

* - Indicates alternative with project-related improvements.

*¹ – LPA Phasing Option
M.3.2 Motor Vehicle Impacts and Mitigation

Tables M-8 through M-11 summarize the mitigation proposed to for the LPA to Park Avenue and MOS to Lake Road and to allow for operations similar to the No-Build Alternative.

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Operations</th>
<th>Queueing</th>
<th>Access</th>
<th>Warrants</th>
<th>Measures</th>
<th>Criteria to Meet</th>
<th>No-Build</th>
<th>Proposed Project (Mitigated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPA to Park Ave. and MOS to Lake Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Increase green time for the northbound movement for the AM peak hour</td>
<td>500 ft</td>
<td>n/a</td>
<td>Queue lengths: PM peak &lt;325 ft AM peak &gt;500 ft</td>
</tr>
<tr>
<td>SW Naito Parkway/SW Harrison Street</td>
<td></td>
<td>✗</td>
<td></td>
<td></td>
<td>Provide vehicle queue detection northbound at SW Lincoln Street and provide a northbound clear-out phase; this clear-out phase will need to consider the northbound vehicle queue to the Hawthorne Bridge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE Water Avenue/light rail alignment</td>
<td></td>
<td>✗</td>
<td></td>
<td></td>
<td>Install signals at the east and west ends of the OMSI Station that are triggered when buses and light rail trains are entering and leaving the station</td>
<td>safety</td>
<td>n/a</td>
<td>improved safety</td>
</tr>
<tr>
<td>SE 8th Avenue between SE Division Place and SE Division Street</td>
<td></td>
<td>✗</td>
<td></td>
<td></td>
<td>Add gates on SE 8th Avenue at the light rail tracks to prevent conflicting movements between light rail and vehicles</td>
<td>n/a</td>
<td>n/a</td>
<td>improved safety</td>
</tr>
<tr>
<td>SE 8th Avenue/SE Division Street</td>
<td></td>
<td>✗</td>
<td></td>
<td></td>
<td>Include a clear-out phase for vehicles on SE 8th Avenue to avoid conflicts with trains and light rail</td>
<td>n/a</td>
<td>n/a</td>
<td>queue clear-out</td>
</tr>
<tr>
<td>SE 8th Avenue/SE Division Place</td>
<td></td>
<td>✗</td>
<td></td>
<td></td>
<td>Include a clear-out phase for vehicles on SE 8th Avenue to avoid conflicts with trains and light rail</td>
<td>100 ft</td>
<td>n/a</td>
<td>queue clear-out</td>
</tr>
<tr>
<td>Intersection</td>
<td>Type of Impact</td>
<td>Measures</td>
<td>Criteria to Meet</td>
<td>Operations</td>
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<td></td>
<td>Operations</td>
<td></td>
<td></td>
<td>No-Build</td>
<td>Proposed Project (Mitigated)</td>
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<tr>
<td></td>
<td>Queuing</td>
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<td></td>
<td>Access</td>
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<td></td>
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<tr>
<td></td>
<td>Warrants</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>SE 11&lt;sup&gt;th&lt;/sup&gt; Avenue/SE Division Street</td>
<td>✦ ✦</td>
<td>Signal timing at this intersection will need to be coordinated with the other signals in the near vicinity (12&lt;sup&gt;th&lt;/sup&gt;/Division, 11&lt;sup&gt;th&lt;/sup&gt;/Clinton, 12&lt;sup&gt;th&lt;/sup&gt;/Clinton, Milwaukie/Gideon, 8&lt;sup&gt;th&lt;/sup&gt;/Division Street, and 8&lt;sup&gt;th&lt;/sup&gt;/Division Place); advanced traffic signal control strategies and/or other innovative software and hardware may be necessary.</td>
<td>LOS D</td>
<td>LOS C</td>
<td>LOS E&lt;sup&gt;1&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SB 2000 ft</td>
<td>SB 1125 ft</td>
<td>SB 900 ft</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>EB 400 ft</td>
<td>EB 775 ft</td>
<td>EB 375 ft</td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>WB 200 ft</td>
<td>WB 150 ft</td>
<td>WB 175 ft</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>SE 12&lt;sup&gt;th&lt;/sup&gt; Avenue/SE Division Street</td>
<td>✦</td>
<td>Improve intersection to allow larger trucks to turn northbound to westbound. The new street improvement will allow for adequate turning radii for WB-67 trucks (with 53 foot trailers). Signal timing at this intersection will need to be coordinated with the other signals in the near vicinity (11&lt;sup&gt;th&lt;/sup&gt;/Division, 11&lt;sup&gt;th&lt;/sup&gt;/Clinton, 12&lt;sup&gt;th&lt;/sup&gt;/Clinton, Milwaukie/Gideon, 8&lt;sup&gt;th&lt;/sup&gt;/Division Street, and 8&lt;sup&gt;th&lt;/sup&gt;/Division Place).</td>
<td>LOS D</td>
<td>LOS C</td>
<td>LOS C</td>
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</tr>
<tr>
<td>SE 11&lt;sup&gt;th&lt;/sup&gt; Avenue/SE Clinton Street</td>
<td>✦</td>
<td>Implement advanced traffic signal control strategies to coordinate signal timing and allow for progression of southbound movement at this intersection with the traffic signals at SE 11&lt;sup&gt;th&lt;/sup&gt; Avenue/SE Division Street and SE Milwaukie Avenue/SE Powell Boulevard to operate with a clear-out phase as trains approach the at-grade crossing on SE 11&lt;sup&gt;th&lt;/sup&gt; Avenue New signals in this area should include 2070 controllers or conform to the most up-to-date City of Portland standards.</td>
<td>275 ft SB</td>
<td>n/a</td>
<td>150 ft SB&lt;sup&gt;1&lt;/sup&gt;</td>
<td></td>
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</tr>
<tr>
<td>SE Clinton Street/SE 12&lt;sup&gt;th&lt;/sup&gt; Avenue</td>
<td>✦</td>
<td>Implement advanced traffic signal control strategies to coordinate signal timing and allow for progression of vehicles along SE 11&lt;sup&gt;th&lt;/sup&gt; and 12&lt;sup&gt;th&lt;/sup&gt; avenues and adequate clear-out phasing for vehicles to get off the light rail tracks as trains approach.</td>
<td>200 ft NB</td>
<td>n/a</td>
<td>100 ft NB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intersection</td>
<td>Type of Impact</td>
<td>Measures</td>
<td>Criteria to Meet</td>
<td>Operations</td>
<td></td>
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</tr>
<tr>
<td>SE Milwaukie Avenue/SE Gideon Street</td>
<td>✲</td>
<td>New signals in this area should include 2070 controllers or conform to the most up-to-date City of Portland standards</td>
<td>LOS D</td>
<td>n/a</td>
<td>LOS C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE Milwaukie Avenue/SE Powell Boulevard</td>
<td>✲</td>
<td>Restripe the second eastbound lane as a shared through/left. By providing the left-turn capability from both lanes, queuing and operations will improve in this short connecting segment. New signals in this area should include 2070 controllers or conform to the most up-to-date City of Portland standards.</td>
<td>LOS D</td>
<td>n/a</td>
<td>250 ft SB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE 8th Avenue/SE Woodward Street</td>
<td>✲</td>
<td>Extend striping of southbound left-turn pocket north to approximately SE Gideon Street. Roadway cross section would also include bicycle lanes on both the east and west sides of the roadway in this section. Install a traffic signal at this intersection Install advance queue warning detectors and flashing beacons for the northbound SE McLoughlin Boulevard exit ramp onto Powell Boulevard.</td>
<td>950 ft SB 200 ft EB2 0.99 without signal or 0.85 with signal</td>
<td>1000 ft SB (PM peak) 300 ft EB (PM peak)</td>
<td>300 ft SB (PM peak) 500 ft EB (AM peak)3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: Jurisdictional operational standard. LOS = Level of service based on average intersection delay. V/C = Volume to capacity ratio. 1 The results shown here are based on VISSIM analysis that do not account for the possibility of adaptive signal timing or other advanced signal timing methods. As part of the final engineering design phase, the 11th/12th/Division/Clinton area will continue to be analyzed using specialized signal timing methods. 2 The length of the roadway segment is about 1,000 feet between the gore area on SE McLoughlin Boulevard and SE 8th Avenue/SE Woodward Street; however, for adequate sight distance around the exit ramp, the maximum queue length is 200 feet. Due to the limited sight distance, an end of queue warning system is recommended for the exit ramp. 3 The eastbound queue may increase due to downstream congestion at SE 8th Avenue/SE Powell Boulevard and westbound across the Ross Island Bridge. There is a westbound merge on SE Powell Boulevard at the east end of the Ross Island Bridge from three lanes to two lanes. This merge area creates westbound vehicle queues, particularly during the AM peak period, that impact the eastbound vehicle queue at SE 8th Avenue/SE Woodward Street by limiting vehicles from flowing freely onto SE Powell Boulevard.
### Table M-9

**Sub-area B - SE Powell Boulevard to SE Tacoma Street**  
**Summary of 2030 Motor Vehicle Operation Mitigation**

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Operations</th>
<th>Queuing</th>
<th>Access</th>
<th>Warrants</th>
<th>Measures</th>
<th>Criteria to Meet</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Types of Impact</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LPA to Park Ave. &amp; MOS to Lake Rd.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17th Ave./SE Pershing Street</td>
<td>Operations</td>
<td>Queuing</td>
<td>Access</td>
<td>Warrants</td>
<td>Traffic control to provide a safe crossing for motor vehicles, light rail, and pedestrians/bikes is required. A gated crossing is anticipated to provide safe operations with minimal queuing and delay.</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>
| SE 17th Ave./SE Holgate Blvd. | Operations | Queuing | Access | Warrants | Provide a minimum of 300 feet for the southbound left turn.  
Provide a minimum of 300 feet for the westbound left turn.  
Provide a minimum of 100 feet for the eastbound left turn.  
Operate intersection with a 110-second cycle length  
Coordinate light rail operations with north-south vehicle phases. | SBL 300 ft  
WBL 300 ft  
EBL 100 ft | LOS D | SBL 275 ft  
WBL n/a  
EBL n/a  
LOS D | SBL 300 ft  
WBL 300 ft  
EBL 25 ft  
LOS D |
Add pedestrian crossing on west leg of intersection.  
Provide a minimum of 300 feet for the westbound right-turn lane.  
Adjust signal timing to optimize southbound left-turn lane green time without impacting green time along SE McLoughlin Boulevard. | SBL 400 ft  
WBR 300 ft  
V/C 1.10 | SB Queue >500 ft  
WBR n/a  
V/C 1.17 | SB Queue >500 ft  
WBR 300 ft  
V/C 0.97 |

**Notes:**  
LOS = Level of service based on average intersection delay.  
V/C = Volume to capacity ratio.
<table>
<thead>
<tr>
<th>Intersection</th>
<th>Type of Impact</th>
<th>Measure</th>
<th>Operations</th>
<th>Queueing</th>
<th>Access</th>
<th>Warrants</th>
<th>Criteria to Meet</th>
<th>No-Build</th>
<th>Proposed Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPA to Park Ave.</td>
<td>Operations</td>
<td><strong>Consolidate business accesses south of park-and-ride with access road. Only allow right-in operations to minimize affects of weaving on SE McLoughlin Boulevard.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>990 ft</td>
<td>n/a</td>
<td>990 ft access spacing</td>
</tr>
<tr>
<td><strong>Tacoma Park-and-Ride south access</strong></td>
<td>Queuing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SE Tacoma St./SE McLoughlin Blvd. SB Off-Ramp</strong></td>
<td>Access</td>
<td><strong>Restripe for dual stage left turn onto SE Tacoma St. or Modify interchange and signalize intersection. or Do nothing and seek a design exception.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V/C = 0.85</td>
<td>V/C = 0.22</td>
<td>V/C = 0.50 V/C = 0.45³</td>
</tr>
<tr>
<td><strong>SE Tacoma St./SE McLoughlin Blvd. NB On-/Off-Ramp</strong></td>
<td>Access</td>
<td><strong>Restripe SE Tacoma Street between park-and-ride access and SE Tenino Drive to be a two-way center turn lane. Seek design exception to allow for operations over 0.85 V/C ratio rather than widen SE Tacoma Street to meet standards.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>150 ft</td>
<td>V/C = 0.85</td>
<td>V/C = 0.64</td>
</tr>
<tr>
<td><strong>SE Johnson Creek Blvd./SE 32nd Ave.</strong></td>
<td>Access</td>
<td><strong>Add westbound right-turn pocket of 100 feet.¹ Signalize intersection.¹</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LOS D</td>
<td>LOS F</td>
<td>LOS D</td>
</tr>
<tr>
<td>MOS to Lake Rd.</td>
<td>Operations</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tacoma Park-and-Ride south access</strong></td>
<td>Queuing</td>
<td><strong>Consolidate business accesses south of park-and-ride with access road. Only allow right-in operations to minimize affects of weaving on SE McLoughlin Boulevard.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>990 ft</td>
<td>n/a</td>
<td>990 ft access spacing</td>
</tr>
<tr>
<td><strong>SE Tacoma St./SE McLoughlin Blvd. SB /Off-Ramp</strong></td>
<td>Access</td>
<td><strong>Restripe for dual stage left turn onto SE Tacoma St. or Modify interchange and signalize intersection. or Do nothing and seek a design exception.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V/C = 0.85</td>
<td>V/C = 0.22</td>
<td>V/C = 0.53 V/C = 0.48³</td>
</tr>
<tr>
<td>Intersection</td>
<td>Type of Impact</td>
<td>Measure</td>
<td>Criteria to Meet</td>
<td>Operations</td>
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</tr>
<tr>
<td>SE Tacoma St./SE McLoughlin Blvd. NB On- /Off-Ramp</td>
<td>Operations Queuing Access Warrants</td>
<td>Restripe westbound left-turn lane to be back to back with eastbound left-turn lane at SE Tacoma St./SE Tenino Dr. Seek design exception to allow for operations over 0.85 V/C ratio rather than widen SE Tacoma Street to meet standard.</td>
<td>150 ft V/C = 0.85</td>
<td>LOS D</td>
<td>150 ft storage V/C = 0.98</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE Johnson Creek Blvd./SE 32nd Ave.</td>
<td>Operations Queuing Access Warrants</td>
<td>Add westbound right-turn pocket of 100 feet. Signalize intersection.</td>
<td>LOS D</td>
<td>LOS F</td>
<td>LOS D</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Notes:
1. LOS = Level of service based on average intersection delay.
2. V/C = Volume to capacity ratio.
3. Improvement needed under No-Build Alternative as well to meet jurisdictional standard.
### Table M-11
Sub-Area D - Highway 224 to SE Park Avenue
Summary of 2030 Motor Vehicle Operation Improvements

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Type of Impact</th>
<th>Measures</th>
<th>Criteria to Meet</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPA to Park Ave.</td>
<td></td>
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<tr>
<td><strong>SE Park Ave./SE Oatfield Rd.</strong></td>
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<tr>
<td></td>
<td></td>
<td>Signalization Add eastbound right-turn pocket Add northbound left-turn lane Add southbound left-turn lane</td>
<td>LOS D</td>
<td>LOS F</td>
</tr>
<tr>
<td><strong>SE Park Ave. between SE 27th Ave. and SE McLoughlin Blvd</strong></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Stripe for back to back left turns slight side by side left turns in middle of section to accommodate eastbound and westbound queuing</td>
<td>280 ft</td>
<td>EBL Queue = 250 ft WBL Queue = n/a</td>
</tr>
<tr>
<td>LPA Phasing Option</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>SE Park Ave./SE McLoughlin Blvd</strong></td>
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<tr>
<td></td>
<td></td>
<td>Retain southbound approach Modify eastbound approach to be separate left-turn pocket and shared through right-turn lane</td>
<td>V/C 0.99</td>
<td>V/C = 1.00</td>
</tr>
<tr>
<td><strong>SE Park Ave./SE Oatfield Rd.</strong></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Add eastbound right-turn pocket Retain east-west stop controlled intersection Retain southbound, northbound, and westbound approaches</td>
<td>LOS D</td>
<td>LOS F</td>
</tr>
<tr>
<td><strong>SE Park Ave. between SE 27th Ave. and SE McLoughlin Blvd</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Stripe for back-to-back left turns/slight side-by-side left turns in middle of section to accommodate eastbound and westbound queuing</td>
<td>280 ft</td>
<td>EBL Queue = 250 ft WBL Queue = n/a</td>
</tr>
<tr>
<td>MOS to Lake Rd.</td>
<td></td>
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<tr>
<td><strong>SE Harrison St./SE Main St.</strong></td>
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<tr>
<td></td>
<td></td>
<td>Signalize intersection or Add eastbound right-turn lane</td>
<td>LOS D</td>
<td>LOS F</td>
</tr>
<tr>
<td><strong>SE McLoughlin Blvd./SE Washington St.</strong></td>
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<tr>
<td></td>
<td></td>
<td>Add second westbound left-turn lane or Remove and relocate west leg of intersection (currently City of Milwaukie is pursuing this)</td>
<td>d/c ratio = 1.10 Queue Storage ~500 ft</td>
<td>d/c ratio = 1.10 SB Queue = 450 ft</td>
</tr>
<tr>
<td>Intersection</td>
<td>Type of Impact</td>
<td>Measures</td>
<td>Criteria to Meet</td>
<td>Operations</td>
</tr>
<tr>
<td>------------------------------</td>
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<td>--------------------------------------------------------------------------</td>
<td>-------------------------------------------------------</td>
<td>----------------------------</td>
</tr>
</tbody>
</table>
| SE McLoughlin Blvd./SE Park Ave. | Operations     | Add westbound right-turn pocket  
|                              | Queuing         | Improve signal timing  
|                              | Access          |                              
|                              | Warrants        |                              | d/c ratio = 0.99  
|                              | Measures        |                              | d/c ratio = 1.00  
|                              |                 |                              | d/c ratio = 1.00  
| SE Washington St./SE Oak St.. | Operations     | Signalize  
|                              | Queuing         | or  
|                              | Access          | Roundabout  
|                              | Warrants        | or  
|                              | Measures        | Restrict eastbound left turns  
|                              |                 | or  
|                              |                 | Seek a design exception  
|                              |                 |                              | d/c ratio = 1.10  
|                              |                 | Queue Storage ~500 ft  
|                              |                 |                              | d/c ratio = 1.10  
|                              |                 | Queue Storage 450 ft  
|                              |                 |                              | d/c ratio = 1.10  
|                              |                 | SB Queue = 300 ft  
|                              |                 |                              | d/c ratio = 1.06  
|                              |                 | SB Queue = 175 ft  

Notes:  
LOS = Level of service based on average intersection delay.  
1 Improvement needed under No-Build Alternative as well to meet jurisdictional standard.
M.3.3 Freight Mitigation

None required.

M.3.4 Construction Mitigation

During final design, further definition of the following construction mitigation measures will be defined to help minimize construction impacts by area. The following is a list of the potential construction mitigation measures to be employed.

- During construction, affected transit stops will be temporarily relocated to the nearest possible location on the same transit route without interfering with the construction process.
- During construction, temporary sidewalks and/or pathways will be provided to replace any sidewalks and/or trails adjacent to the project that are affected by construction.
- To minimize the amount of truck excavation trips to and from the sites, efforts will be made to recycle as much of the excavated earth from the project sites as practical.
- A comprehensive public outreach program will be developed to inform local residents and businesses of potential delays and impacts to the local street network due to temporary construction.
- To help minimize on-street parking impacts and where available, temporary parking will be identified to mitigate the temporary loss of on-street parking due to construction.
- Where available, staging areas will be used to help minimize the impact of materials and equipment intruding into surrounding residential or commercial areas.
- If Portland Spirit mooring impacts cannot be avoided and to avoid the potential for permanent displacements and relocation as described in Section 3.1, the project would provide off-site temporary mooring facilities so that Portland Spirit may dock its two largest vessels at another location during construction, while still maintaining operations.

M.4 CONDITIONS OF THE BIOLOGICAL OPINION

The Portland-Milwaukie Light Rail Project is being designed to first avoid and then minimize and compensate for all unavoidable impacts. The project has avoided and minimized impacts through many years of project planning and design, including the design and analysis of alternatives and alignment options that were considered but not advanced due to impacts to ecosystem and other resources (see Chapter 2). Certain alignment options and design specifics also have been modified to reduce impacts to resources. These avoidance and minimization efforts will continue (with ongoing agency input) through final design and construction, and as a result of the project’s incorporation of the requirements for local, state, and federal regulations and permit conditions, including the conservation recommendations and terms and conditions stipulated in the Biological Opinion issued by NOAA Fisheries on June 23, 2010. These regulatory and permit requirements involve the following:
• In-Water Work Periods. All work within the active channels of project waterways will be completed in accordance with the Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources (ODFW 2008). Specific to this project, these in-water work periods are: Johnson Creek and tributaries (Crystal Springs, Crystal, and Spring creeks), July 15 to August 31; Kellogg Creek and tributaries (Courtney Springs Creek), July 15 to September 30; and Willamette River, July 1 to October 31 (July 15 to October 15 for pile driving operations).

• Cessation of Work. Project operations shall cease under high-flow conditions that may result in inundation of the project area, except for efforts to avoid or minimize resource damage. The project shall ensure that cofferdams are not overtopped.

• Piling Installation. When possible, a vibratory hammer shall be used to install pilings. If the use of an impact hammer is necessary to install the piling to the load-bearing depth, the piling will be installed first with a vibratory hammer, until it proves no longer effective, and then proofed with an impact hammer. When using an impact hammer to drive or proof steel piles, one of the following sound attenuation devices must be used to reduce sound pressure levels by a minimum of 10 dB: (1) Completely isolate the pile from flowing water by dewatering the pile. (2) If water velocity is 1.6 feet per second or less, surround the piling being driven by an unconfined bubble curtain that will distribute small air bubbles around 100% of the piling perimeter for the full depth of the water column. (3) If water velocity is greater than 1.6 feet per second, surround the piling being driven by a confined bubble curtain (e.g., a bubble ring surrounded by fabric or metal sleeve) that will distribute air bubbles around 100% of the piling perimeter for the full depth of the water column.

• Bubble Curtain. For each pile to be driven in the water, install and operate a bubble curtain with the following specifications: (1)General - A confined bubble curtain is composed of an air compressor(s), supply lines to deliver the air, distribution manifolds or headers, perforated aeration pipe(s), and a means of confining the bubbles. (2) The confinement shall extend from the substrate to a sufficient elevation above the maximum water level expected during pile installation such that when the air delivery system is adjusted properly, the bubble curtain does not act as a water pump (i.e., little or no water should be pumped out of the top of the confinement system). (3) The confinement shall contain resilient pile guides that prevent the pile and the confinement from coming into contact with each other and do not transmit vibrations to the confinement sleeve and into the water column (e.g. rubber spacers, air filled cushions). (4) In water less than 15 meters deep, the system shall have a single aeration ring at the substrate level. In waters greater than 15 m deep, the system shall have at least two rings, one at the substrate level and the other at mid-depth. (5) The lowest layer of perforated aeration pipe shall be designed to ensure contact with the substrate without sinking into the substrate and shall accommodate for sloped conditions. (6) Air holes shall be 1.6 mm (1/16-inch) in diameter and shall be spaced approximately 20 mm (3/4 inch) apart. Air holes with this size and spacing shall be placed in four adjacent rows along the pipe to provide uniform bubble flux. (7) The system shall provide a bubble flux of 2.0 cubic meters per minute per linear meter of pipe in each layer (21.53 cubic feet per minute per linear foot of pipe in each layer). The total volume of air per layer is the product of the bubble flux and the circumference of the ring: \( V_t = 2.0 \text{ m}^3/\text{min/m} * \text{Circ of the aeration ring in m} \) or \( V_t = \)
21.53 ft³/min/ft * Circ of the aeration ring in feet (8) Flow meters shall be provided as follows: (a) Pressure meters shall be installed at all inlets to aeration pipelines and at points of lowest pressure in each branch of the aeration pipeline. (b) Flow meters shall be installed in the main line at each compressor and at each branch of the aeration pipelines at each inlet. In applications where the feed line from the compressor is continuous from the compressor to the aeration pipe inlet the flow meter at the compressor can be eliminated. (c) Flow meters shall be installed according to the manufacturer’s recommendation based on either laminar flow or non-laminar flow.

- Contaminated Sediments. Resuspension of contaminated sediments in the water column will be minimized during in-water work at the Willamette River and Kellogg Lake. Sediments within the footprint of the work bridges or areas of riverbed disturbance at the Willamette River would be capped with a clean sand layer prior to pile installation. At Kellogg Lake, similar measures may be taken if deemed necessary.

- Hydroacoustic Monitoring. Hydroacoustic monitoring of impact pile installation will occur according to a protocol approved by NMFS.

- Pile Driving Monitoring. The FTA shall prepare a pile driving monitoring plan, as described in WSDOT (2009), at least 60 days before pile driving commences, and submittal. Pile driving shall be monitored at a minimum of two locations, approximately 30 feet and 521 feet (Willamette) and 154 feet (Kellogg) from the piles. At Johnson and Crystal Springs Creek pile driving will be monitored in water, in line with the crossing. During construction, pile driving activities shall be monitored. If an impact hammer is used and hammer strikes are exceed, contact NMFS immediately at 503-231-2307 or Christina.fellas@noaa.gov. Piling Removal. Temporary piles shall be removed with a vibratory hammer and shall never be intentionally broken by twisting or bending. Except when piles are hollow and when they were placed in clean, sand-dominated substrate, the holes left by the removed pile shall be filled with clean, native sediments immediately following removal. No filling of holes shall be required when hollow piles are removed from clean, sand-dominated substrates.

- Fish Capture and Release. In accordance with an approved fish salvage plan, a qualified biologist will capture and remove fish in any area that is to be isolated from the active channel of any project waterway.

- Sick, injured, or dead fish. The applicant posts the following notice prominently at the work site: NOTICE: If a sick, injured or dead specimen of a threatened or endangered species is found in the project area, the finder must notify NMFS through the contact person identified in the transmittal letter for this Opinion, or through the NMFS Office of Law Enforcement at 1-800-853-1964, and follow any instructions. If the proposed action may worsen the fish’s condition before NMFS can be contacted, the finder should attempt to move the fish to a suitable location near the capture site while keeping the fish in the water and reducing its stress as much as possible. Do not disturb the fish after it has been moved. If the fish is dead, or dies while being captured or moved, report the following information: (1) NMFS consultation number; (2) the date, time, and location of discovery; (3) a brief description of circumstances and any information that may show the cause of death; and (4) photographs of the fish and where it was found. The NMFS also suggests that the finder coordinate with local biologists to recover any tags or other
relevant research information. If the specimen is not needed by local biologists for tag recovery or by NMFS for analysis, the specimen should be returned to the water in which it was found, or otherwise discarded. Fish Passage. Fish passage must be provided for any adult or juvenile fish within the action area during construction, unless passage did not exist prior to construction. After construction, fish passage that meets NMFS’s fish passage criteria (NMFS 2008a) must be provided for the life of the project.

- Fish Screens. NMFS must review and approve all fish screens for surface water diverted by gravity or pumps that exceeds the flow rate of 3 cubic feet per second. Each fish screen must be installed, operated, and maintained according to NMFS’s fish screen criteria (NMFS 2008a).

- Surface Water Diversion. Surface water may be diverted only if water from developed sources is unavailable or inadequate. When surface water is diverted, water shall only be taken from the source with the greatest flow, and a fish screen that meets the above criteria shall be utilized. No water will be diverted from Crystal Springs Creek, Johnson Creek, Crystal Creek, Spring Creek, or Courtney Springs Creek.

- Construction Discharge Water. All water discharged during construction (e.g., concrete washout, pumped water for work area isolation, and drilling fluids) shall be treated with the best available technology in order to remove any contaminants, sediments, debris, etc. Pollutants such as green concrete, contaminated water, silt, welding slag, sandblasting abrasive, or grout cured less than 24 hours shall not be allowed to contact any wetland, waterbody, or stream channel below OHW.

- Staging Areas. The environmental impacts of heavy machinery on-site will be minimized to the greatest extent possible. A vehicle staging area will be located 150 feet or more from any waterbody or in an isolated hard zone. Vehicles will be fueled, maintained, and stored in this location. Vehicles and equipment will be inspected daily for fluid leaks before operation within 50 feet of any waterbody, and will be repaired, if necessary, before leaving the staging area. Inspections will be documented in a record that will be available for review on request. Vehicles will be steam-cleaned before operation below OHW and as often as necessary to ensure that mud, grease, external oil, and other contaminants do not enter surface water. Generators, pumps, cranes, and any other stationary equipment operated within 150 feet of waterbodies shall be diapered, contained, and maintained as necessary to prevent contaminants from entering surface waters.

- Preconstruction Activity. Before significant alteration to the action area, the clearing limits shall be flagged, and erosion and sediment controls shall be installed and properly functioning.

- Site Preparation. Native materials found on-site (e.g., large wood, vegetation, topsoil, and channel bed materials) shall be preserved to the greatest extent possible and used in restoration.

- Pesticide-Treated Wood. Pesticide-treated wood will not be installed below OHW. During the removal of pesticide-treated wood piers on-site, no wood debris shall be allowed to fall into the water, and any debris falling into the water shall be removed.
immediately. Pesticide-treated wood and debris will be disposed of properly, and will be stored in a dry place away from OHW until disposal.

- Erosion and Sediment Control Plan and Pollution Control Plan. These plans shall describe practices that will be used to: contain and control a spill of hazardous materials; avoid or minimize pollution and erosion at all roads, stream crossings, drilling sites, construction sites, borrow pits, equipment and material storage sites, fueling operations, and staging areas; control dust pollution; prevent construction debris from dropping into any waterbody, and to remove any material that does drop with a minimum of disturbance; avoid or minimize resource damage if the action area is inundated by precipitation or high stream flow; stabilize all disturbed soils following any break in work, unless construction will resume within four days; and inspect erosion and sediment controls, monitor in-stream turbidity, and make repairs to best management practices that are not functioning correctly.

- Site Stabilization. All disturbed areas shall be stabilized following any break in work unless construction will resume within four days.

- Work Area Isolation. Any action, except for piling installation or removal, that involves a substantial amount of excavation, backfilling, embankment construction, or similar work below OHW where adult or juvenile fish are reasonably certain to be present, or 300 feet or less upstream from spawning habitats, must be effectively isolated from the active stream. A work area isolation plan will be developed and reviewed by NMFS before the commencement of this work.

- Site Restoration. Any action that results in significant disturbance of riparian vegetation, soils, streambanks, or the stream channel must clean up and restore those features after the action is complete. If disturbance is to occur, a notification shall be sent to NMFS explaining how site restoration will be completed.

- Scour Protection. Permanent scour protection will be necessary at the Willamette River bridge’s two in-water tower structures. The scour protection installed around the western tower will minimize potential disturbance to the Zidell Companies’ sediment cap and to contaminated materials within their sediment management area. Scour protection will also be provided for the west work bridge piles below OHW inside Zidell’s sediment management area, in addition to the scour protection around the western tower. Permanent scour protection at the eastern tower will prevent the undermining of the City of Portland’s 36-inch critical water line and other nearby utility lines.

The project would mitigate its potential short- and long-term impacts through full compliance with all applicable regulations as summarized in Table 3.8.1. It should be noted that further refinement of mitigation designs, including determination of the size and location of mitigation features, would occur during final design and project permitting. Discussions with federal, state, and local agencies to determine appropriate mitigation measures have been initiated and will continue during the final design and permitting.
MEMORANDUM OF AGREEMENT

AMONG
THE FEDERAL TRANSIT ADMINISTRATION,
TRI-COUNTY METROPOLITAN TRANSPORTATION DISTRICT (TRIMET), AND OREGON STATE
HISTORIC PRESERVATION OFFICE (SHPO)

IMPLEMENTING
SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT

REGARDING THE PORTLAND-MILWAUKIE LIGHT RAIL PROJECT

RECITALS:

By the authority granted in ORS 190.110 and 283.110, state agencies may enter into agreements with units of local government or others state agencies for the performance of any or all functions and activities that a party to the agreement, its officers, or agents have the authority to perform.

By the authority granted in ORS 366.558, the State of Oregon may enter into cooperative agreements with the United States Federal Government for the performance of work on projects with the allocation of costs on terms and conditions and

WHEREAS the Portland-Milwaukie Light Rail project (Project) involves the development of light rail extending from Portland, Oregon, to the City of Milwaukie and north Clackamas County, and includes a new Willamette River Bridge and other facilities needed in support of the light rail system; and

WHEREAS the Project has involved the preparation of Draft, Supplemental and Final Environmental Impact Statements (DEIS, SDEIS and FEIS), in accordance with the National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321 et seq.), as amended, and pursuant to 23 Code of Federal Regulations (CFR) Part 771, for the development of light rail extending from Portland, Oregon, to the City of Milwaukie and north Clackamas County, and including a new Willamette River Bridge and other facilities needed in support of the light rail system; and

WHEREAS the Federal Transit Administration (FTA) is the NEPA lead agency for the Portland-Milwaukie Light Rail Project, located in Multnomah and Clackamas Counties, Oregon, with Metro and TriMet as local lead agencies; and

WHEREAS, FTA has determined that the Project is an undertaking, as defined in 36 CFR § 800.16(y), subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f and its implementing regulations, 36 CFR § 800; and

WHEREAS, FTA has determined that construction and operation of the Project will result in effects to historic properties and has consulted with the Oregon State Historic
Preservation Office (SHPO) and the Advisory Council on Historic Preservation (ACHP) pursuant to 36 CFR Parts 800.6 and 800.14; and

WHEREAS, “Signatories” means the required and invited signatories (FTA, Oregon SHPO, TriMet); “Concurring Parties” means Consulting Parties that have signed this Memorandum of Agreement (Agreement); and “Consulting Parties” means Signatories, Concurring Parties, all interested and affected tribes, and other interested parties consulted on the Project, regardless of whether they agreed to sign the Agreement; and

WHEREAS, the Federal Transit Administration and the Oregon SHPO have agreed to be signatory parties to this Agreement; and

WHEREAS, federally recognized tribes including the Confederated Tribes of the Grand Ronde Community of Oregon, Confederated Tribes of the Siletz Indians, Confederated Tribes of the Warm Springs Reservation of Oregon, and Cowlitz Indian Tribe, and a non-federally recognized tribe, the Chinook Indian Tribe, have been consulted early in and throughout the Section 106 process and regarding this Agreement and invited to concur in the Agreement; and

WHEREAS, FTA has consulted with the above-listed Indian tribes for which the Area of Potential Effect (APE) has cultural significance, and have invited the tribes to sign this Agreement as concurring parties; and

WHEREAS, FTA in consultation with the Oregon SHPO and the interested tribes have defined the undertaking’s APE in accordance with 36 CFR 800.16(d) to cover all construction or operation activities associated with the undertaking as well as those areas needed for wetland mitigation, stormwater facilities, staging and casting yards; and

WHEREAS, the FTA, in conjunction with Metro and TriMet, and in consultation with the Oregon SHPO, conducted cultural resource studies in accordance with 36 CFR 800 as part of project planning and the preparation of the FEIS to identify and evaluate historic properties, which are resources listed on or eligible for listing in the National Register of Historic Places (National Register), that are located within the APE; including archaeological surveys to facilitate archaeological site evaluation and assessment of effects in the area where ground-disturbing activities might affect archaeological historic properties; and inventory, evaluation and assessment of effects to historic buildings and structures that are historic properties identified within the areas of potential effects; and

WHEREAS, research investigations for the FEIS, employing professional techniques defined in a research design agreed to by Oregon SHPO, determined the likely presence of archaeological historic properties and outlined their potential character (predictive assessment), providing reasonable estimates of the potential adverse effects (e.g., likelihood that potential resources would need to be protected in place, and that opportunities exist to avoid, minimize and/or mitigate impacts); and

WHEREAS, access to conduct archaeological investigations necessary to discover potential buried historic properties is restricted in portions of the Project due to the actively and intensively used urban landscapes, such as roadways, sidewalks, existing buildings, and parking lots, and conducting archaeological subsurface excavations in these areas is practically and logistically problematic or prevented; and
WHEREAS, some private properties within the direct effect area of the APE have not been surveyed due to access restrictions or are occupied by existing structures; and

WHEREAS, execution and implementation of this Agreement satisfies the responsibilities of the National Historic Preservation Act Section 106 process, as codified in 36 CFR 800 Subpart B; and

WHEREAS, FTA and the Oregon SHPO have agreed that the undertaking will have an adverse effect upon three historic properties and FTA has consulted with the Oregon SHPO in accordance with Section 106 of the National Historic Preservation Act (16 U.S.C. 470f) and its implementing regulations (36 CFR 800) to mitigate the Adverse Effect on these properties; and

WHEREAS, FTA has determined, and SHPO has concurred, that the undertaking will have no adverse effect upon certain other historic properties, as outlined in the FEIS and associated technical reports; and

WHEREAS, Metro and TriMet have participated in the consultation with tribes; and other information gathering has not identified any Traditional Cultural Properties in the Project area; and

WHEREAS, while background research and related archaeological investigations have not identified human remains in the APE, an Inadvertent Discovery Plan to address the potential discovery of human remains during construction has been negotiated among signatories and consulting parties and is in place for the Project; and

WHEREAS, in accordance with 36 CFR 800.6(a) (1), FTA has notified the ACHP of its adverse effect determination and the ACHP has chosen not to participate in the consultation pursuant to 36 CFR 800.6(a) (1) (iii); and

WHEREAS, pursuant to 36 CFR 800.4(b)(2), 800.5(a)(3) and 800.6(c)(6), and because access to some areas is practically and logistically restricted due to factors such as property-owner consent, the presence of buildings, or due to the active use of roads that prevent or preclude full identification and evaluation of archaeological resources that may be historic properties prior to the approval of the undertaking, FTA, Metro, TriMet, and the Oregon SHPO, in consultation with consulting parties and the ACHP, have chosen to implement a phased process and have developed procedures in this Agreement to ensure that the identification and evaluation of archaeological historic properties, assessment of effects, and development of treatment and mitigation plans for unforeseen effects to properties discovered during implementation of the undertaking are properly coordinated with all phases of the design, construction, and operation of the undertaking; and

WHEREAS, in accordance with 36 CFR 800.2(d)(3), FTA used procedures under the NEPA and NHPA to involve the public in the undertaking and solicit their views on historic properties and has distributed the SDEIS and FEIS to appropriate state and federal agencies as well as other stakeholders, partners, and the public; and
WHEREAS, pursuant to 36 CFR 800.13, FTA, TriMet, the Oregon SHPO and the ACHP have developed procedures in this Agreement to ensure that the identification and evaluation of historic properties, assessment of effects, and development of treatment and mitigation plans for unforeseen effects to previously identified historic properties and/or properties discovered during implementation of the undertaking are properly coordinated with all phases of the design and construction of the undertaking; and

WHEREAS, the FTA will issue a Record of Decision (ROD) following the publication of the FEIS issued by the FTA, anticipated in Spring/Summer 2010; and

NOW, THEREFORE, FTA, TriMet and Oregon SHPO agree that the undertaking will be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties.

-STIPULATIONS-

FTA, in cooperation with Metro and TriMet, will ensure that the following measures are carried out:

I. GENERAL REQUIREMENTS

A. As a condition of the award of any assistance under the Federal-Aid Highway and the New Starts 5309 Programs, FTA shall require that Metro and TriMet carry out the requirements of this Agreement, and all applicable laws.

B. Signatories and Consulting Parties shall keep sensitive cultural resources information confidential to the extent allowed by state and federal law. Information concerning archaeological sites is exempted from the Freedom of Information Act (FOIA) as per ORS 192.501(11) and should be excluded from all public documents and stipulations placed upon confidential documents that only approved personnel and/or qualified archaeologists [as defined by ORS 390.235(6)(b)] can access.

C. Activities carried out pursuant to this Agreement shall meet the Secretary of the Interior’s Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716 as revised) as well as existing standards and guidelines for historic preservation activities established by the Oregon SHPO.

D. FTA, Metro, and TriMet will ensure that all work carried out under this Agreement is conducted by or under the direct supervision of a person or persons meeting the Secretary of the Interior’s Professional Qualification Standards (36 CFR 61).

E. All resource management documents as specified under this Agreement will be completed prior to any construction and within two months of the release of the 90% design documents for the Project. Nothing in this Agreement shall be construed as indicating acceptance by the Consulting Parties of the resource management documents, which have yet to be developed.
FTA shall in good faith attempt to reach a consensus on the contents of the resource management documents with the Consulting Parties.

The confidential resource management documents, available to approved personnel, pertain to the archaeological portion of the Project and include the following.

1. Monitoring Plan & Inadvertent Discovery Plan (Attachment A).
2. Documentation for archaeological investigations not yet completed.
   a. High Probability Areas to be tested and archaeological sites that were not investigated prior to the FEIS completion due to access.
   b. Archaeological sites found during construction monitoring. (This report would be done during or by the end of construction in 2015.)
3. Mitigation/treatment plans for significant archaeological sites.
   a. For sites found during High Probability Area testing and archaeological sites that were not investigated prior to the FEIS completion due to access, if they are found to be significant resources.
   b. Archaeological sites found during construction monitoring. (This report would be done during or by the end of construction in 2015.)

F. FTA shall retain ultimate responsibility for complying with all federal requirements pertaining to direct government-to-government consultation with Indian tribes. Notwithstanding any other provision of this stipulation, FTA shall honor the request of any of the Indian tribes listed herein for direct government-to-government consultation regarding the Project.

G. Study of portions of the Project’s APE have been sufficiently completed for Section 106 review prior to the publication of the FEIS and, notwithstanding the Project’s need to comply with inadvertent discovery requirements, no further Section 106 activities are expected to be conducted in those areas where cultural resource studies have been completed and SHPO has concurred that no further archaeological investigations are necessary. Attachment A is based on the Section 106 Technical Report, including its inventory report, and defines those areas where additional steps, such as archaeological monitoring during construction, are needed.

H. Definitions in 36 CFR 800.16 will be used for purposes of this Agreement.

II. PUBLIC PARTICIPATION
FTA, Metro, and TriMet have ensured that public participation in the Section 106 review process has been carried out in a manner that has also been integrated with FTA’s public participation and review requirements pursuant to 23 CFR Part 771, leading to the publication of the FEIS. Documentation on historic and archaeological properties (some with locational information removed) have been made available for review to the general public offices as part of the SDEIS and FEIS publication and related public review. In accordance with Section 304 of the National Historic Preservation Act of 1966, as amended, the signatories and participating Concurring Parties to this Agreement will withhold from disclosure to the public, information about the location, character, or ownership of a historic property if it is determined that disclosure may (1) cause a significant invasion of privacy, (2) risk harm to a historic property, or (3) impede the use of a traditional religious site by practitioners (4) contains archaeological site description or location information.
The views of the Metro, TriMet, interested parties, and the general public will be considered by FTA with respect to the terms of this Agreement. Should any member of the public raise a timely and substantive objection pertaining to the manner in which the terms of this Agreement are carried out, at any time during its implementation, the FTA shall take the objection into account by consulting with the objector to resolve the objection. When FTA responds to an objection, it shall notify Metro and TriMet of the objection and the manner in which it was resolved. FTA may request assistance of the Metro and TriMet to resolve objections.
III. MITIGATING ADVERSE EFFECTS TO SPECIFIC HISTORIC PROPERTIES

A. Royal Foods Warehouse and Office, 2425 SE 8th Ave. Portland
The warehouse is eligible for the National Register of Historic Places (NRHP) and will be adversely affected by demolition. Mitigation measures include:

a. Documentation shall be done according to the Oregon SHPO documentation standards by June 2013. Provide two complete sets of documentation to the Oregon SHPO, including photos, for deposit at the Oregon Historical Society and the Allied Arts and Architecture Library at the University of Oregon. Send a third set without photos to be archived at the SHPO office. Photos should be printed on proof sheets. A fourth full set may be required in cases where there is a local repository that is interested in receiving the materials. The following items are required for all state level documentation:

1. Architectural description of the building: Description should not be less than 500 words and use appropriate architectural terms.
2. Building history: History of not less than 500 words discussing at least when the building was constructed and by whom, the building or structure’s use over time, and any important persons or events associated with the resource. The project shall contact the Oregon SHPO for research suggestions.
3. Bibliography: Include a bibliography of all resources used in the preparation of the document, including sources for appended archival materials described in item 8.
4. United States Geological Survey (USGS) Map with the location of the property marked: A portion of the entire map may be printed for free from a website such as topoquest.com and marked by hand.
5. Scale site plan of the subject building or structure and adjacent buildings and structures on the same tax lot: Drawing may be done by hand as long as it reasonably to scale. Include the name of the person completing the map, date the map was completed, map scale, and north arrow on the map. The name and/or use of each building, structure, object, and adjacent streets on the map should be labeled.
6. Scale Floor plans for each floor of the subject building or structure: Drawing may be done by hand as long as it reasonable to scale. Include the name of the person completing the map, date the map was completed, map scale, and north arrow on the map. The name and/or use or each space should be labeled.
7. Photographs of the building or structure interior and exterior: Photos may be taken as 35mm black-and-white 4x6 images or as color digital images. Digital and print images and prints must meet all aspects of the Oregon SHPO Digital Photo Checklist available at the SHPO website: http://www.oregonheritage.org/OPRD/HCD/NATREG/nrhp_documents.shtml
8. Archival materials: If available, include original architectural drawings or maps, brochures, photos, newspaper clippings, or other archival items of interest relating to the history of the building or structure.

B. Westmoreland Park, 7605 SE McLoughlin
Westmoreland Park has been determined eligible as a NRHP Historic District and will be adversely affected by converting the Duck Pond into a riparian area. Mitigation measures include:
a. Documentation for Westmoreland Park shall be done according to the Oregon SHPO documentation standards by June 2013. Provide two complete sets of documentation to the Oregon SHPO, including photos, for deposit at the Oregon Historical Society and the Allied Arts and Architecture Library at the University of Oregon. Send a third set without photos to be archived at the SHPO office. Photos should be printed on proof sheets. A fourth full set may be required in cases where there is a local repository that is interested in receiving the materials. The following items are required for all state level documentation:

1. Architectural description of the building [property]: Description should not be less than 500 words and use appropriate architectural terms.
2. Building [property] history: History of not less than 500 words discussing at least when the building was constructed and by whom, the building [property] or structure’s use over time, and any important persons or events associated with the resource. The project shall contact the Oregon SHPO for research suggestions.
3. Bibliography: Include a bibliography of all resources used in the preparation of the document, including sources for appended archival materials described in item 8.
4. United States Geological Survey (USGS) Map with the location of the property marked: A portion of the entire map may be printed for free from a website such as topoquest.com and marked by hand.
5. Scale site plan of the subject building or structure and adjacent buildings and structures on the same tax lot: Drawing may be done by hand as long as it reasonably to scale. Include the name of the person completing the map, date the map was completed, map scale, and north arrow on the map. The name and/or use of each building, structure, object, and adjacent streets on the map should be labeled.
6. Scale Floor plans for each floor of the subject building or structure: Drawing may be done by hand as long as it reasonable to scale. Include the name of the person completing the map, date the map was completed, map scale, and north arrow on the map. The name and/or use or each space should be labeled.
7. Photographs of the building or structure interior and exterior: Photos may be taken as 35mm black-and-white 4x6 images or as color digital images. Digital and print images and prints must meet all aspects of the Oregon SHPO Digital Photo Checklist available at the SHPO website: http://www.oregonheritage.org/OPRD/HCD/NATREG/nrhp_documents.shtml
8. Archival materials: If available, include original architectural drawings or maps, brochures, photos, newspaper clippings, or other archival items of interest relating to the history of the building or structure.

b. Publish documentation, as described above, of the park’s history on the City of Portland website for duration of not shorter than June 2013 to December 2015. The website will be professionally designed.

c. As additional mitigation, the Project will develop an interpretive panel or display at the Bybee Station, describing the historic attributes and features of Westmoreland Park, including the Duck Pond and its relationship to WPA-era projects, and also the general timeline for development of Westmoreland Park and adjacent neighborhoods of the City by date of Project completion (December 2015). The Project will consult with a historian that meets Secretary of Interior Standards and will ask SHPO to comment to the design.

d. The Project, with the City of Portland, will prepare National Register nomination materials for a different park within the City, and will formally submit these materials to the SHPO for approval. The Project will (i) consult with SHPO to determine whether the selected property is indeed eligible, (ii) provide draft documents to SHPO for comment, and (iii) make all
necessary revisions to meet the requirements of the National Park Service for National Register nominations. Nomination materials are to be completed within 24 months of the execution of this agreement. This stipulation will be considered complete once the SHPO has found the nomination to be complete and ready for submission to the Keeper of the National Register.

e. TriMet will execute an interlocal agreement with the City of Portland incorporating the above conditions prior to providing funds for construction within Westmoreland Park.

C. **Derwey House, 2206 SE Washington, Milwaukie**
The R. Derwey House has been determined eligible for the NRHP and will be adversely affected by changing the setting and acquiring approximately 10 feet of land from the side yard near the railroad tracks. Mitigation measures include:

a. Documentation shall be done according to the Oregon SHPO documentation standards by June 2013. Provide two complete sets of documentation to the Oregon SHPO, including photos, for deposit at the Oregon Historical Society and the Allied Arts and Architecture Library at the University of Oregon. Send a third set without photos to be archived at the SHPO office. Photos should be printed on proof sheets. A fourth full set may be required in cases where there is a local repository that is interested in receiving the materials. The following items are required for all state level documentation:

1. **Architectural description of the building:** *Description should not be less than 500 words and use appropriate architectural terms.*

2. **Building history:** *History of not less than 500 words discussing at least when the building was constructed and by whom, the building or structure’s use over time, and any important persons or events associated with the resource. The project shall contact the Oregon SHPO for research suggestions.*

3. **Bibliography:** *Include a bibliography of all resources used in the preparation of the document, including sources for appended archival materials described in item 8.*

4. **United States Geological Survey (USGS) Map with the location of the property marked:** *A portion of the entire map may be printed for free from a website such as topoquest.com and marked by hand.*

5. **Scale site plan of the subject building or structure and adjacent buildings and structures on the same tax lot:** *Drawing may be done by hand as long as it reasonably to scale. Include the name of the person completing the map, date the map was completed, map scale, and north arrow on the map. The name and/or use of each building, structure, object, and adjacent streets on the map should be labeled.*

6. **Scale Floor plans for each floor of the subject building or structure:** *Drawing may be done by hand as long as it reasonable to scale. Include the name of the person completing the map, date the map was completed, map scale, and north arrow on the map. The name and/or use or each space should be labeled.*

7. **Photographs of the building or structure interior and exterior:** *Photos may be taken as 35mm black-and-white 4x6 images or as color digital images. Digital and print images and prints must meet all aspects of the Oregon SHPO Digital Photo Checklist available at the SHPO website: [http://www.oregonheritage.org/OPRD/HCD/NATREG/nrhp_documents.shtml](http://www.oregonheritage.org/OPRD/HCD/NATREG/nrhp_documents.shtml)*
8. Archival materials: If available, include original architectural drawings or maps, brochures, photos, newspaper clippings, or other archival items of interest relating to the history of the building or structure.

D. Other Historic Resources
Some historic properties have been found to have “no adverse effect” by the Project and will be minimally affected. For those NRHP-eligible resources the following measures are included:

1) According to the Noise and Vibration Technical Report for the FEIS, projected increases in noise and vibration require mitigation for four (4) additional historic built environment resources at 1635 SE Rhone in Portland, and 2405 SE Harrison, 2326 SE Monroe, and 2313 SE Wren in Milwaukie. After mitigation, these impacts would be reduced to levels that have “no adverse effect.” The mitigation measures would not alter the characteristics for which the properties are considered eligible for the NRHP. However, because mitigation for the impacts may require residential sound insulation such as window replacement, the mitigation action could have adverse effects to the historic buildings if done inappropriately. This Agreement requires that all noise and vibration impacts meet the Secretary of the Interior Standards for Rehabilitation and be finished by December 2014. This includes:
   a) Replace in kind an entire window using the same sash and pane configuration and other design details.
   b) Retrofit the existing windows to meet noise mitigation criteria if possible.
   c) The property owner must be consulted
   d) SHPO must approve any mitigation measures.

2) For 2313 SE Wren in Milwaukie and 1635 SE Rhone in Portland where a small right of way acquisition is required, the property owners will be fully compensated in accordance with FTA policy and the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Where landscaping will be removed from the properties due to construction, replacement landscaping shall be offered to mitigate the visual impact by December 2014.

IV. MITIGATING ADVERSE EFFECTS TO SPECIFIC ARCHAEOLOGICAL SITES
Identification of archaeological and historic archaeological properties and assessment of effect have been completed for areas within which investigations were allowed by landowners and access has been secured by the Project. No archaeological resources that are eligible for listing in the NRHP have yet been identified within the portion of the Project APE where there may be direct impacts. If any archaeological sites are discovered that may be eligible for listing on the National Register of Historic Place, then consultation with SHPO regarding documentation, evaluation, assessment, and mitigation measures, if necessary, will be necessary.

V. PRINCIPLES TO COMPLETE ARCHAEOLOGICAL INVESTIGATIONS
Archaeological excavations have not been completed for all areas of the Project where there may be construction activities within the APE. Some areas have been investigated and some areas contain archaeological resources that may require additional archaeological investigations. The preliminary field findings and recommendations to complete inventory, resource evaluations, and assessment of effect on archaeological historic properties are included in Attachment A.
Circumstances dictate that some of the activities needed to complete all steps of the Section 106 process will be carried out after the FEIS/ROD is issued, and will follow the protocols established in Attachment A.

VI. PROGRAMMATIC APPROACH FOR ARCHAEOLOGICAL RESOURCES

A. FTA will ensure that if completion of any additional subsurface testing, inadvertent discovery, and site eligibility determinations result in additional findings of effect, these findings will be reviewed by the Oregon SHPO and consulting Tribes. The Oregon SHPO shall review all information regarding site eligibility. If SHPO concurs that there are no archaeological sites eligible for listing on NRHP and/or there are no effects or adverse effects to significant archaeological resources, then no further archaeological investigations will be necessary. If the findings reveal there may be an adverse effect to a significant archaeological resource, then the FTA will notify SHPO and the appropriate Tribes and continue consultation to resolve the adverse effects. FTA will review the effects and provide a mitigation plan with a range of solutions to be considered for implementation as well as the level of effort for the data recovery, analysis, curation, and interpretation options and provide this information to SHPO and the appropriate Tribes for concurrence.

B. The options to be considered will take into account whether the significance of the resource calls for preservation in place, data recovery, and documentation through monitoring, further research, or other mechanisms. All proposed mitigation options will be compatible with the historic qualities and characteristics that qualify the property as eligible for listing in the National Register, and will be developed in consultation with the Signatories to this Agreement.

C. Archaeological treatment plans will be developed for any sites that are determined eligible for listing on the National Register and that may be adversely affected by the Project. To minimize the adverse effect to eligible archaeological sites the plan will consider a variety of protective measures such as construction modifications, buffering, protective walls or fencing and construction monitoring. For those archaeological sites determined to be eligible and where adverse impacts are unavoidable, a mitigation plan is necessary. This plan may include a variety of measures such as data recovery plan or other alternatives.

D. Following the completion of the mitigation phase of the process, FTA will ensure that the applicable analysis, documentation, and report preparation and submittal is completed on the mitigation prior to the start or continuation of construction in affected locations. All cultural material recovered and data produced on public non-federal land as a result of the Project will be curated in a permanent curation facility approved by the Oregon SHPO in accordance with 36 CFR 79 and tribal consultation, as dictated by the SHPO permit. Artifacts collected on private land will be curated as dictated by the SHPO permit. All curation actions shall be completed by June 2015.

VII. REVIEW OF FUTURE DESIGN CHANGES

If any design changes having the potential to cause effects to historic properties are made to the undertaking outside the current APE, including additional staging, construction access, wetland or stormwater mitigation sites, FTA, in consultation with Metro and TriMet, will conduct a
cultural resources assessment as required by 36 CFR 800, to identify and evaluate the effects upon historic properties, and will consult to resolve any additional adverse effects.

FTA will ensure that avoidance of adverse effects to historic properties is the preferred treatment during the design phase and will utilize all feasible, prudent and practicable measures to avoid adverse effects. All design enhancements that may affect historic properties in the Project corridor will be subject to review and concurrence by FTA, Metro and TriMet. The Project final mitigation plan will address potential design modifications and aesthetic treatments foreseen in final design.

VIII. ARCHAEOLOGICAL RESOURCES NOT PREVIOUSLY IDENTIFIED

This section describes procedures to be followed by the construction contractors and Project engineers, which ensure appropriate consideration of archaeological resources if encountered during construction. The FTA and Project contractors shall:

1) Discuss pre-construction requirements, including:
   a) Educational briefings by professional archaeologists,
   b) Briefing materials for construction contractor personnel and FTA engineers and inspectors;
   c) Protocol for inadvertent discovery, including contact telephone numbers for contractor personnel and FTA engineers and inspectors as per ORS 97.740-97.760 (Indian Graves and Protected Objects) and ORS 358.905-358.955 (Archaeological Objects and Sites).

2) Provide background information on the context of anticipated resources within the Project to the construction contractor;

3) Identify in lay terms the nature of primary archaeological resources indicators (e.g. high densities of fire modified rock; high density historical municipal or industrial middens) that may represent a significant resource and which require consideration by professional archaeologist and consideration by Consulting Parties;

4) Identify relevant procedures and contractor responsibilities for the inadvertent discovery of archaeological objects or sites (ORS 358.905-.955); including site protection and evaluation by a qualified archaeologist; and

5) Ensure that the Project plans and documents note the areas to be included in construction monitoring under the supervision of a qualified archaeologist and that all archaeological site locations are kept confidential.

IX. INADVERTENT DISCOVERY OF HUMAN REMAINS

If human remains are encountered during the implementation of the Project activities, all activity in the vicinity of the discovery will cease and the appropriate authorities notified as outlined in the Inadvertent Discovery Plan as per ORS 97.740-.760

(Attachment A).
X. DISPUTE RESOLUTION

Should any Signatory or Concurring Party to this Agreement object at any time to any actions proposed or the manner in which the terms of this Agreement are implemented, the Signatory parties will consult with such party to resolve the objection. If FTA determines that such objection cannot be resolved, FTA will:

Forward all documentation relevant to the dispute, including the FTA’s proposed resolution, to the ACHP. The ACHP will provide FTA with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Prior to reaching a final decision on the dispute, FTA will prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP, Signatories and Concurring Parties, and provide them with a copy of this written response. FTA will then proceed according to its final decision.

If the ACHP does not provide its advice regarding the dispute within the thirty (30) day time period, FTA may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, FTA will prepare a written response that takes into account any timely comments regarding the dispute from the Signatories and Concurring Parties to the Agreement, and provide them and the ACHP with a copy of such written response.

FTA’s responsibilities to carry out all other actions subject to the terms of this Agreement that are not the subject of the dispute remain unchanged.

XI. AMENDMENTS

This Agreement may be amended when such an amendment is agreed to in writing by all Signatories. The amendment will be effective on the date a copy signed by all of the Signatories is filed with the ACHP.

XII. DURATION AND TERMINATION

This Agreement will take effect immediately upon execution by the Signatory parties. FTA will send a copy of the executed Agreement to the ACHP, regardless of ACHP participation in the process. The terms of this Agreement will be satisfactorily fulfilled upon completion of the Project. Prior to such time, FTA may consult with the other participating parties to reconsider the terms of the Agreement and propose its amendment. Unless terminated, this Agreement will be in effect until December 2015 or such time as FTA, in consultation with all Signatory and Concurring Parties, determines that all of its terms have been satisfactorily fulfilled, whichever is later.

If any Signatory to this Agreement determines that its terms will not or cannot be carried out, that party will ensure immediately consult with the other parties to attempt to develop an amendment per Stipulation XI above. If within thirty days (30) days (or another time period agreed to by all Signatories) an amendment cannot be reached, any signatory may terminate the Agreement upon written notification to the other Signatories.
Once the Agreement is terminated, and prior to work continuing on the undertaking, FTA must either (a) execute a Memorandum of Agreement pursuant to 36 CFR 800.6 or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR 800.7. FTA will notify the Signatories as to the course of action it will pursue.

XIII. Archeological Resources Retrieved and Preserved.

If archeological resources are retrieved and deemed by the SHPO to be significant and worthy of preservation, any costs associated with such resource retention shall be the responsibility of TriMet.

XIV. Compliance with Section 106.

With the execution and implementation of this Agreement the responsibilities the National Historic Preservation Act Section 106 process, as codified in 36 CFR 800 Subpart B are deemed satisfied.
SIGNATORIES:

Federal Transit Administration

Mr. Richard Krochalis, Region X Administrator  
Date 6/17/10

Oregon State Historic Preservation Officer

Roger Roper, Assistant Director, Heritage Programs  Date 6/15/10

Tri-County Metropolitan Transportation District of Oregon

Fred Hansen, General Manager  Date 6/14/10
MOA attachments regarding archaeological resources are privileged information not for public disclosure; complete documentation is on file with TriMet and FTA.
O.1 WILLAMETTE RIVER BRIDGE PROPOSAL

O.1.1 Overview of Bridge and Willamette River

The Portland-Milwaukie Light Rail Project (“Project”) proposes constructing a new multi-use Bridge (Bridge) across the Willamette River, between the Marquam (I-5) and Ross Island (Hwy 26) Bridges, and between Oregon Health and Science University’s (OHSU) future South Waterfront campus on the west bank and Oregon Museum of Science and Industry (OMSI) on the east bank. The Bridge will link vital employment, education, and research centers in downtown Portland, South Waterfront, and inner Southeast Portland with Milwaukie and Clackamas County. The Bridge will be a cable-stayed structure that accommodates light rail, streetcars, buses, pedestrians, and bicycles, and will be accessible to emergency vehicles. Buses, light rail vehicles, and streetcars will share a set of paved tracks in the center of the Bridge. Two, 14-foot multi-use paths would be on each side of the Bridge, separated from the transit vehicles and tracks by safety barriers.

The lower Willamette River is within a highly urbanized area with many adjacent residential, commercial, industrial, and recreational uses. This portion of the River is largely channelized, with much of its banks either constrained by riprap or the Portland sea wall. Most of the River’s

1 Figure O-1 shows the proposed location of the Bridge within the region, and Figure O-2 provides a more detailed view of the alignment. Figure O-3 shows the proposed Bridge design.
original off-channel and floodplain habitats have been eliminated or are highly degraded, and its channel largely lacks topographic and habitat diversity.

Upstream from Oregon City, the River is regulated by 11 multipurpose flood control/recreation/hydropower reservoirs operated by the U.S. Army Corps of Engineers (USACE or Corps). These facilities have substantially altered the hydrology of the River compared to its original state. The approximate wetted width (the distance between the water’s edge on each side of the stream as measured perpendicular to streamflow) at the location of the proposed Bridge is approximately 1500 feet. The estimated average flow and Federal Emergency Management Agency (FEMA) 100-year flood flow are 32,000 and 400,000 cubic feet per second, respectively.

The Willamette River flows into the Columbia River, which has one of the most developed hydroelectric systems in the world, with 11 major dams on the mainstem in the U.S. and Canada, and many more on its major tributaries.

The Bridge will provide approximately 77.52 feet vertical clearance as measured from the Columbia River Datum (CRD) for approximately 150 feet in the middle of the center span of the Bridge. The Bridge will have two towers, both approximately 180 feet high (from Ordinary High Water - OHW) and 780 feet apart, connecting to cables extending down to the Bridge deck. Each of the towers will be anchored in foundations provided by concrete-capped pier structures in the water. The Bridge towers, including the capped pier structures are designed to have approximately 694 feet of waterway between them.

O.1.2 Purpose and Content

The purpose of this Appendix is to: (1) summarize the detailed design, engineering, and river user survey information developed during the course of the EIS; (2) summarize the permitting process for the Bridge; and (3) summarize the Bridge’s anticipated effects on navigation. To that end, this FEIS appendix summarizes the documents listed below. This summary and the technical source documents can be found under a separate cover in the Portland-Milwaukie Light Rail Project Navigation Technical Report (TriMet 2010).

- River User Survey Final Report and Additional River User Interviews, concerning existing activity levels, and planned future navigational needs of river users;
- Navigational Passage Analyses, predicting the number of vessels that would be accommodated at varying navigational heights and river levels;
- Technical Memorandum, compiling the best available information on the potential effects of climate change on Willamette River levels over time;

2 As with all bridges on the Willamette River and other river systems, the vertical navigational clearance fluctuates as river levels change.
Willamette River bridge will include light rail, bus, and streetcar.

**Figure O-1**

- **Light Rail**
- **Shared Transitway**
  - Station
  - Future Station
  - Park-and-Ride
  - MOS Park-and-Ride
- **Existing Light Rail**
- **Existing Streetcar**
- **Under Construction, Streetcar**
- **Portland Aerial Tram**
- **Railroad**
- **County Line**

Note: For details on Park-and-Ride capacity please see Table 2.1-1.
Vertical and horizontal clearance alternatives analyses, including a landside implications summary and a review of other functional and regulatory requirements used to define Bridge design alternatives;

Current and Future Navigational Needs Research, including City of Portland and Port of Portland maps and studies of land use and port/water-dependent activities and future trade and freight/commodity transport activities dependent on the Willamette River;

A study of Federal Navigational Channel Conditions, including the status of Columbia and Willamette River dredging activities, and an assessment of future activities that may increase the size of vessels using the Willamette River;

Correspondence and presentation materials developed in response to public comments on the Bridge height initially proposed in the SDEIS;

Historic River levels analysis;

Technical review of how the existence of dams affects flows and water levels on the Columbia and Willamette River systems;

Vertical clearance analysis, including how the height and corresponding slope of the Bridge would affect individuals with disabilities using the multi-use path; and

Vertical clearance analysis of potential future navigation uses.

O.1.3 Regulatory Context

Federal authority to permit new bridges is delegated to the United States Coast Guard (USCG) pursuant to Section 9 of the Rivers and Harbors Act of 1899 and the General Bridge Act of 1946. The purpose of the two Acts is to preserve the public’s reasonable right of navigation and to prevent interference with interstate and foreign commerce. The Willamette River to River Mile (RM) 183.2 is designated a navigable waterway by the USCG. None of the other streams crossed by the Project is navigable. TriMet will need to obtain a permit from the USCG for the Willamette River Bridge pursuant to the above-cited authorities. TriMet will also need to obtain a Section 10 of the Rivers and Harbor Act of 1889 permit for work being conducted in the river in coordination with the Section 404 permit.

One of the criteria the USCG evaluates in issuing a bridge permit is whether the bridge unreasonably interferes with navigational use (33 U.S.C. Sec. 512). TriMet does not need to accommodate all navigation needs, just those needs that are reasonable. Id.; Gerosa Inc. v. Dole, 576 F. Supp. 344 (S.D.N.Y. 1983). This consideration includes looking at current and reasonably expected future uses, such as vessel heights, location of onshore facilities, frequency of use, seasonality of use, and availability of alternative facilities or operations, as well as the reasonable needs of land traffic (highway and rail).
TriMet applied to the USCG for the Bridge permit in July 2010. As part of its process to issue the permit and set the Bridge height, the USCG will look to, among others, this FEIS and NOAA Fisheries’ Biological Opinion’s evaluation of how the Bridge construction will affect listed threatened or endangered salmonids.

In the vicinity of the Project corridor, the vertical navigational clearance is established by a number of existing fixed-span bridges, including:

- I-5/Marquam Bridge: 120 feet vertical clearance
- Ross Island Bridge: 120 feet vertical clearance
- Sellwood Bridge: 72/75 foot (charted/actual) vertical clearance
- Railroad Bridge: 74 foot vertical clearance
- I-205/Abernathy Bridge: 76 foot vertical clearance
- Oregon City Bridge: 74 foot vertical clearance

To the north of the Project, a number of other bridges feature lift spans, which provide higher clearance, but also impact land transportation when they are raised. The lift span of the Hawthorne Bridge has the highest clearance at 159 feet when the deck is raised. Operators raise the Hawthorne Bridge an average of 200 times per month (300 times per month in the summer).

The lowest vertical clearance in the area is upstream at the Sellwood Bridge at 75 feet. The Sellwood Bridge is scheduled for replacement/renovation through a separate project; however, the new Sellwood Bridge is proposed to be designed with the same 75 feet of vertical clearance. No final decision has yet been made on its height.

River levels on the Willamette River have been extensively measured since 1879, providing a long term view of the seasonal and historic variations within the Willamette River watershed. The variability of the River’s levels has declined substantially following the construction of dams within the Willamette and Columbia River systems. For example, the standard deviation for the CRD at the Morrison Bridge is only 2.45 feet, as measured since 1978 when the last major dam affecting the river system was developed.

### O.2 NAVIGATIONAL USES

#### O.2.1 Current Navigational Uses

Navigation on the Willamette River through Portland Harbor has historically focused on the movement of cargo, particularly barges. Today, most marine cargo operations are confined to Port of Portland terminals and private terminals downstream of the Steel Bridge, but significant barge operations still continue along the River. Remaining waterfront industrial facilities upstream of the proposed Bridge include Ross Island Sand & Gravel and Zidell Company’s
Sand and gravel are the most common commodities shipped today. While River use for industrial commerce has declined, there has been growth in the cruise, excursion, and chartered boat market on the Willamette River in the past 15 years. There are at least seven passenger and excursion vessel companies operating in the Willamette River, operating about a dozen vessels.

In early 2008, TriMet conducted an assessment of existing vessel traffic and corresponding clearance requirements (River Users Survey Report, TriMet 2008) (First Study). TriMet contacted numerous commercial and recreational vessel owners to obtain information on their vessel dimensions and transit patterns in the River reach affected by the Bridge. This First Study led TriMet to initially propose a Bridge with a 75 feet vertical clearance. This vertical clearance would allow most, but not all, river users to pass under the proposed Bridge at most river levels.

Following the release of the SDEIS in 2008 and TriMet’s receipt and analysis of public comments on its initial navigation survey, TriMet conducted an additional survey of navigation needs on the River in the fall of 2008 (Second Study). After conducting this Second Study, TriMet increased its proposed vertical Bridge clearance 2.52 feet to 77.52 feet to maximize navigation clearance passage rates while still minimizing land side impacts, environmental concerns, and the resulting increase in costs. As part of the Second Study, TriMet focused on eight potentially affected river users (Existing River User Follow-Up Final Report, Riverwise, January 2009). Their feedback is discussed in more detail in section O.5.

Commercial river users of the Willamette reach consist of two primary groups: (1) marine industrial (whose businesses and/or product delivery rely on water transportation); and (2) cruise and excursion. The users within each of these groups have unique operation patterns and requirements.

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<td></td>
<td>RISG, Willamette - concrete batch plant</td>
<td>daily</td>
</tr>
<tr>
<td></td>
<td>Derrick barge/Dredge</td>
<td>79</td>
<td>72</td>
<td></td>
<td>in N. Portland Harbor; other various</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Barges</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zidell Marine Corp</td>
<td>Barges</td>
<td>50</td>
<td></td>
<td>10</td>
<td>Downriver from 1500’ above Ross Island Bridge</td>
<td>4-6 annual</td>
</tr>
</tbody>
</table>

This survey was mailed to approximately 75 known river users. The information provided in Table O-1 below is a compilation of the responses received.
## Table O-1
### River Users Survey Response

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Crane barge</td>
<td></td>
<td>75</td>
<td>17</td>
<td></td>
<td></td>
<td>4-6 annual</td>
</tr>
<tr>
<td><strong>Shaver Transportation</strong></td>
<td><strong>Willamette Tug</strong></td>
<td>55</td>
<td>11</td>
<td></td>
<td>Willamette RM 8 to Zidell; occasional trips above Sellwood Bridge</td>
<td>2-3 annual</td>
</tr>
<tr>
<td>Deschutes Tug</td>
<td></td>
<td>55</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cascade Tug</td>
<td></td>
<td>55</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clearwater Tug</td>
<td></td>
<td>50</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vancouver Tug</td>
<td></td>
<td>22</td>
<td>11.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Various barge configurations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combined Forestry &amp; Marine Svs Inc</td>
<td>LCI 713</td>
<td>65</td>
<td>65</td>
<td>5</td>
<td>Project dependent; upriver through locks to Newberg.</td>
<td>2-10 month; sometimes more</td>
</tr>
<tr>
<td>Various crane barges</td>
<td></td>
<td>40-60</td>
<td>40-60</td>
<td>3</td>
<td>Typical tow breadth: 45-60'</td>
<td></td>
</tr>
<tr>
<td>Floating homes</td>
<td></td>
<td>40</td>
<td>40</td>
<td>4-8</td>
<td>Maximum Tow Breadth: 86-90'</td>
<td></td>
</tr>
<tr>
<td>Tugboats</td>
<td></td>
<td>30-50</td>
<td>50</td>
<td>4-9</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Larson's Marine Services</strong></td>
<td><strong>Tugboat</strong></td>
<td>20</td>
<td>12</td>
<td>5</td>
<td>Lake Oswego-Milwaukie-West Linn - Wilsonville-Newberg</td>
<td>4 month</td>
</tr>
<tr>
<td>Crane Barge</td>
<td></td>
<td>75</td>
<td>30</td>
<td>4</td>
<td>Typical tow breadth: 50'</td>
<td></td>
</tr>
<tr>
<td>Boat house</td>
<td></td>
<td>38</td>
<td>38</td>
<td>5</td>
<td>Maximum Tow Breadth: 70'</td>
<td></td>
</tr>
<tr>
<td><strong>Portland Spirit</strong></td>
<td><strong>Portland Spirit</strong></td>
<td>44</td>
<td>44</td>
<td>7</td>
<td>Between Willamette Mouth and Champoeg Park at Wilsonville</td>
<td>10 daily on Willamette</td>
</tr>
<tr>
<td>Willamette Star</td>
<td></td>
<td>40</td>
<td>42</td>
<td>5.5</td>
<td>&quot;</td>
<td></td>
</tr>
<tr>
<td>Crystal Dolphin</td>
<td></td>
<td>44</td>
<td>44</td>
<td>6.5</td>
<td>&quot;</td>
<td></td>
</tr>
<tr>
<td>Outrageous</td>
<td></td>
<td>22</td>
<td>20</td>
<td>2</td>
<td>&quot;</td>
<td></td>
</tr>
<tr>
<td>Columbia Gorge</td>
<td></td>
<td>58</td>
<td>58</td>
<td>7</td>
<td>Columbia and Willamette Rivers</td>
<td></td>
</tr>
</tbody>
</table>
### Table O-1
River Users Survey Response

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Oregon Maritime Museum - non-profit</td>
<td>Sternwheeler Steamer</td>
<td>65</td>
<td>65</td>
<td>7</td>
<td>Planned excursions all from Portland Seawall; downriver and upriver to Milwaukie, Lake Oswego and Oregon City</td>
<td>4 annual</td>
</tr>
<tr>
<td></td>
<td>Portland</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portland Rose</td>
<td>Sternwheeler</td>
<td>NA</td>
<td></td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Portland Rose</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cruise West</td>
<td>Spirit of Discovery</td>
<td>NA</td>
<td></td>
<td>12</td>
<td>Upriver to Riverplace Marina only</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spirit of Alaska</td>
<td></td>
<td></td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lindblad Expeditions/Nat'l Geographic</td>
<td>Sea Lion</td>
<td>55</td>
<td></td>
<td>11.1</td>
<td>Upriver to Riverplace Marina only</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sea Bird</td>
<td>53</td>
<td></td>
<td>11.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Majestic America Lines [incl America Steamboat Co.]</td>
<td>No operations in subject reach</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Promise Charters LLC</td>
<td>Sailboat Promise</td>
<td>68</td>
<td>68</td>
<td>6</td>
<td>Varies between Oregon City and Astoria</td>
<td>10 annual</td>
</tr>
<tr>
<td>Grays Harbor Historical Seaport Authority</td>
<td>Lady Washington</td>
<td>87</td>
<td></td>
<td>10.8</td>
<td></td>
<td>40 annual [June]</td>
</tr>
<tr>
<td></td>
<td>Hawaiian Chieftain</td>
<td>75.5</td>
<td></td>
<td>8.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreational-Private</td>
<td>Lavine A Linker</td>
<td>Sailboat Prospector</td>
<td>65</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bernard's Moorage</td>
<td>Various vessels</td>
<td>65</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### O.2.2 Land Use and Commerce Factors Affecting Navigation

In addition to the navigation surveys discussed above, TriMet conducted research focusing on marine and multimodal-dependent facilities along the Willamette River, primarily using studies by the City of Portland and the Port of Portland. The infrastructure relied on most by these marine and multimodal-dependent facilities, primarily rail and highway, is located downstream of the Broadway Bridge. Plans for future development of marine and multimodal-dependent
facilities along the River are limited due to increasing regulation over effects on endangered species and water quality.

Figures O-4 and O-5 provides the City of Portland “River Atlas” information, which maps the major land uses along the Willamette River, showing that the largest concentration of industrial and port lands is to the north of the proposed Project. The maps also encompass the City of Portland’s plans for the South Waterfront area, once a heavily water-dependent use area, which Figure O-4 is now envisioned as a mixed-use neighborhood with integrated shoreline and near shore habitat restoration elements, more typical of waterfront land use trends both locally and nationally.

O.3 FUTURE NAVIGATION

In addition to looking at minimum horizontal and vertical clearances for current navigational activities, TriMet has been analyzing reasonable future navigational uses. TriMet looked at recent and prospective growth changes at the Port of Portland and the City of Portland, maintenance of the Federal Navigational Channel (e.g., dredging), and relevant US Department of Transportation (USDOT), USACE and USCG regulations. In general, as the region experiences economic growth, there will be growth in the navigational use of the river. Marine cargo levels are predicted by the Port to nearly double by 2035, much of which is expected to focus on the port facilities downstream of the proposed Bridge site and on terminals on the Columbia River.

O.3.1 Federal Navigation Channel

The Federal Navigational Channel stretches from the mouth of the Columbia River near Astoria, Oregon to the railroad bridge between Portland, Oregon and Vancouver, Washington; and from the mouth of the Willamette River to the Broadway Bridge, which is downriver from the proposed Bridge site. The Corps began work on a Dredge Material Management Plan for the existing 40-foot deep Lower Willamette River navigation channel in 2007-2008. In September 2008, the Corps suspended work on the Plan pending the outcome of the Portland Harbor Superfund investigation and cleanup. The Environmental Protection Agency is expected to select the final cleanup remedy in 2012. The Willamette’s navigation channel was last maintained by the Corps in 1997.
O.4 NAVIGATIONAL ANALYSIS PROCESS

In developing the design concept for the proposed Bridge, TriMet initiated a review of current and future navigational needs, beginning with the SDEIS efforts in 2007 and 2008, and continuing through the preparation of this FEIS.

The Project proposal considered in this FEIS was developed through a NEPA process that began in 1993 for the South/North Corridor Project, resulting in the issuance of a 1998 DEIS. Since then, several other studies and supporting NEPA documents have helped shape the development of the current proposal for the Project and the proposed Bridge over the Willamette River. This includes the South Corridor Project SDEIS (2002), the Downtown Amendment to the South Corridor Project SDEIS (2003), and the South Corridor FEIS (2004).

Most recently, the Portland-Milwaukie Light Rail Project SDEIS (2008) focused on a set of light rail alternatives that serve the South Corridor between downtown Portland, the City of Milwaukie, and northern Clackamas County. In preparation for the SDEIS, Metro and TriMet conducted a Refinement Study beginning in 2006 that focused on bridge alignments and resulted in the addition of four potential bridge alignments. This analysis and process are documented in the Portland-Milwaukie Light Rail Project Refinement Study (Metro 2007). Subsequently, the Locally Preferred Alternative (LPA) helped define the location where transit service would be provided on both sides of the Willamette River, including the South Waterfront District and RiverPlace, and helped determine the crossing location of the new Bridge.

O.4.1 Selection of Willamette River Crossing Alignment Option

During the SDEIS process, the City of Portland convened the Willamette River Partnership, a committee of local property owners, river users, businesses, and agencies in the vicinity of the proposed Bridge crossings. The committee was charged with coordinating private development plans and investments with City of Portland utility, street, and park improvements, and the Project.

In July 2008, the Citizen Advisory Committee, the Portland-Milwaukie Steering Committee, and the Metro Council followed the recommendation of the Willamette River Partnership and adopted the refined Porter-Sherman alignment as the LPA, shown in Figure 2.3-2.

O.4.2 Identification of the Bridge Alignment

The Metro Council identified the following key reasons behind its selection of the LPA and Bridge alignment. The LPA and Bridge alignment would:

- Serve almost 3,000 more residents and more than 4,000 additional employees;
- Add 1,200 to 1,400 light rail trips a day between downtown Portland and Milwaukie or Oak Grove;
• Reduce total transit travel time to South Waterfront by five minutes;
• Have fewer noise impacts and impact one less park than the previous alignment;
• Be most likely to serve as a catalyst for development in the area;
• Provide substantial travel time benefits for buses, with over 13,000 riders gaining benefits;
• Avoid the greater impacts to eastside industrial business compared to other options;
• Be compatible with the OHSU and OMSI master plans;
• Be more compatible with the South Waterfront Willamette River Greenway plans for natural habitat area between SW Porter Street and the Marquam Bridge; and
• Offer a short walk connection to the Portland Aerial Tram, which provides access to more than 10,000 jobs on Marquam Hill.

O.4.3 Willamette River Bridge Type Selection Process

After adoption of the 2008 LPA and the selection of the bridge alignment, TriMet focused on several issues related to the bridge height and type. Given the multi-use purpose of the Bridge, its location, and its importance to the Project, TriMet asked a committee of design, engineering, transportation, business, and community leaders to study all bridge types, and recommend types appropriate for the context and the budget. The following types were considered: trusses, arches, cable supported, movable, and girder.

The Willamette River Bridge Advisory Committee (WRBAC) agreed on the selection criteria to be used for the Bridge. These criteria considered, among others, cost, risk, navigation, fundamental performance, architecture, urban context, greenways, sustainability, operations, and environmental opportunities. Environmental opportunities include, for example, which bridge types are best at treating stormwater, supporting wildlife and fish habitat, and incorporating alternative energy.

The cable-stayed Bridge type was selected over other types because:

• It is efficient at spanning long distances, which allowed the number of piers in the water to be reduced, and increased both vertical and horizontal navigational clearances;
• Fewer in-water piers would reduce the long-term environmental impact of the structure;
• The cantilevered construction process used would reduce environmental impact during construction; and
• It can be designed with thinner decks than other Bridge types, allowing a more transparent structure on the city skyline and a greater vertical navigation clearance.
In determining the necessary and appropriate clearances for the proposed Bridge and where the piers should be placed, TriMet conducted detailed computer simulation modeling, 3-D visual simulations, field investigations, and statistical analyses. TriMet also engaged navigational safety experts and experienced river pilots with knowledge of tug and barge operations between the Ross Island and Marquam Bridges.

In February 2009, after seven working group meetings (technical staff from partner jurisdictions), two public workshops and public forums and ten WRBAC committee meetings, the WRBAC recommended that the Project conduct further analysis of cable-stayed bridge types. In May 2009, the committee recommended that the Project proceed with designing a four-pier cable-stayed Bridge type. Additional information about the Bridge study process is available in Portland-Milwaukie Light Rail Project Willamette River Bridge Type Selection Process Report (TriMet 2009).

O.5 NAVIGATIONAL EFFECTS

O.5.1 Horizontal Clearance

The proposed Bridge is designed so that the in-water piers will be nearly 780 feet apart with 694 feet of waterway between their support pier structures. This design will satisfy the horizontal clearance needs for River users in the Project area, including users coming from the Holgate Slough and main stem Willamette River south of the Ross Island Bridge.

O.5.2 Vertical Clearance

Vertical clearance is the primary concern of river users. As noted above, among the bridges in the vicinity of the proposed crossing, the lift span of the Hawthorne Bridge has the highest clearance at 159 feet, when the deck is raised. The Ross Island and Marquam Bridges (which would be immediately adjacent to the proposed Bridge) have maximum vertical clearances of 120 feet. The lowest vertical clearance is the Sellwood Bridge, upstream of the proposed Bridge, which has a clearance of 75 feet.

The bridge types assumed for the SDEIS analysis would provide either a 72-foot vertical clearance (cable-stayed through truss) or a 65-foot vertical clearance (concrete segmental). The SDEIS noted that initial results indicated that a clearance of approximately 75 feet may be required to accommodate river users. To further analyze this element, TriMet considered many alternatives for vertical clearance of the proposed Bridge (ranging from 65 to 120 feet) and examined over 30 years of river data. TriMet found that water levels in the most recent 30 years are statistically different than water levels from more than 30 years ago. This is because data from the most recent 30 years includes the effect on river levels resulting from operation of the existing dams on the Columbia and Willamette Rivers and their tributaries.

As noted above, the initial user survey in early 2008 (First Study) showed that a 75 foot clearance would allow most, but not all, river users to transit the proposed Bridge at most river levels anticipated (see Table O-1). Some river users expressed concern regarding this height in the 2008 user’s survey and in comments on the SDEIS. TriMet then did a Second Study that
focused on eight river users who had been identified as being partially impacted by a 75 foot vertical clearance. These users were:

- Portland Spirit: 44 foot Portland Spirit; and 58 foot Columbia Gorge
- Oregon Maritime Museum (OMM): 67 foot tall Sternwheeler Steamer Portland
- Shaver Transportation: four tugs, clearance of 22 to 55 feet
- Promise Charters: 51 ft ketch rigged sailboat Promise
- L.A. Linker, Sailboat Prospect: 65 foot masted sailboat Prospect
- Lindblad Explorations: 53 foot Sea Lion and 55 foot Sea Bird
- SDS Lumber, Captain Gary Collins 55 foot tall Dauby
- Combined Forest & Marine Services, Clark Caffall
- Bernard’s Moorage (Bernard’s Moorage did not respond to contacts for follow up discussions or reviews of the Bridge proposal)

Each of these river users indicated that the 75 foot vertical clearance was acceptable, except for OMM and Portland Spirit. OMM requested a vertical clearance of 84 feet. Portland Spirit requested 85 foot vertical clearance with ADA-compliant ramps and landings.

TriMet’s Second Study found that a 77.52 foot vertical clearance for approximately 150 feet would allow for the passage of nearly 99 percent of the anticipated Bridge traffic. Any restrictions in passage would be primarily in the winter, during high water events, and could be minimized or reduced through existing river management systems, including dams and control devices on the Columbia River and Willamette River. This estimate of the current and future passage rates reflects an additional 3.4-foot allowance for safety and river level fluctuations, including the potential future effects on river levels as a result of global climate change. The Climate Change Technical Memorandum (Parametrix 2010) recommendation of 3.9 feet included 0.5 feet for the influence of tides on the Willamette River stage. The data set used to analyze percent passage used the high gauge reading for each day, which includes the influence of tides. Therefore, the percent passage analysis used 3.4 feet for safety and river level fluctuations (3.9 feet less 0.5 feet).

The Second Study also looked at the same 30 years of river data. For two of the tallest potentially affected vessels, TriMet calculated the number of days that would be affected by a 77.52 foot vertical clearance plus a 3.4-foot safety allowance. TriMet extended this calculation to the Portland Spirit, which has expressed a future desire to operate through use of a wind powered turbine. While not required to consider this potential future use (since at this time it is nothing more than a speculative future possibility), if actualized, this future scenario would require an additional vertical clearance, for a total of 64 feet. The second tallest boat was the Sailboat Prospect, which requires a clearance of 65 feet. TriMet did not examine the Sailboat Prospect’s
use because the owners requested only that the Bridge have a clearance to match the Sellwood Bridge.

Table 2 below lists the approximate percentages and days that the vessels owned by the eight river users identified above would likely not be able to pass under the proposed Bridge. The number of days affected was also examined for the “months of interest” or most important months for each vessel. For example, the months of interest for the Sternwheeler Steamer Portland are April through November.

<table>
<thead>
<tr>
<th>Vessel</th>
<th>Percent passage</th>
<th>Number of Unusable Days in 30 years</th>
<th>Approximate Average Number of Days per Year Without Passage</th>
<th>Percent Passage during Months of Interest</th>
<th>Approximate Average Number of Days per Year Without Passage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columbia Gorge</td>
<td>99.9</td>
<td>9</td>
<td>0.3</td>
<td>99.8</td>
<td>0.3</td>
</tr>
<tr>
<td>Columbia Gorge</td>
<td>99.4</td>
<td>61</td>
<td>2.0</td>
<td>98.8</td>
<td>1.7</td>
</tr>
<tr>
<td>Portland Spirit without Wind Turbines (current configuration)</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>Same, year round service</td>
<td>Same, year round service</td>
</tr>
<tr>
<td>Portland Spirit with Wind Turbines</td>
<td>97.9</td>
<td>220</td>
<td>7.3</td>
<td>Same, year round service</td>
<td>Same, year round service</td>
</tr>
<tr>
<td>Portland Spirit with Wind Turbines</td>
<td>90.6</td>
<td>992</td>
<td>33.1</td>
<td>Same, year round service</td>
<td>Same, year round service</td>
</tr>
<tr>
<td>Sternwheeler Steamer, Portland</td>
<td>91.8</td>
<td>863</td>
<td>28.7</td>
<td>94.0</td>
<td>14</td>
</tr>
<tr>
<td>Sternwheeler Steamer, Portland</td>
<td>63.5</td>
<td>3,857</td>
<td>128.5</td>
<td>70.5</td>
<td>69.5</td>
</tr>
</tbody>
</table>

1. Out of 30 years (10,663 days) of river data.
2. The month of interest for the Columbia Gorge is November through March. There were 4,414 days of data for this period.
3. The months of interest for the Sternwheeler Steamer Portland are April – November (8 months). There were 7,143 days of river data for these months.
4. Without including 3.4 feet for climate change and safety.

The Columbia Gorge is owned by Cascade Locks and services the Columbia River from April through October. From November through March, the Columbia Gorge Vessel is leased to the Portland Spirit and services the Willamette River. As shown above, the Columbia Gorge may not be able to pass under the proposed Bridge approximately 0.3 to 1.7 days during its Willamette River service period or “months of interest.” The Sternwheeler Steamer Portland may not be able to pass under the Bridge 14 to 69.5 days during its “months of interest.” If the owners of the Portland Spirit installed wind turbines on its vessel, it would not be able to pass under the Bridge.
approximately 7.3 to 33 days per year. However, these vessels would also not be able to pass under the Sellwood Bridge.

In August 2010, as the FEIS was being completed, TriMet was contacted by an additional river user, the owner of a charter sail company, Sail Scovare Yachts & Expeditions, Inc., located near the Sellwood bridge. Both in a meeting and in a subsequent email to TriMet, the owner identified concerns regarding the project’s vertical navigation restrictions and potential passage rates for one of his three charter vessels. The affected vessel, which has a vertical clearance of 65.8 feet, began to operate in 2010. The owner is not among the parties that provided written comments during the public comment period for the 2008 SDEIS. In addition to the notices, meetings and public advertisements conducted for the SDEIS, TriMet’s river user outreach and survey process included notices at marinas along the Willamette River, and this party was not among the river users responding to the surveys. Sail Scovare’s promotional materials and website state the company has been operating since 2003, and it offers a range of excursion offerings, ranging from hourly to weekly or longer sailings, and sailing routes along the Willamette, the Columbia, as well as to the Puget Sound and the San Juan Islands. The company also offers custom excursions to Hawaii and other destinations. The owner reported a high demand for his cruises between his base north of the Sellwood bridge and downtown Portland, particularly in the summer months, and stated that the proposed bridge height would affect his ability to offer charter cruises.

In an August 2010 meeting with the owner, TriMet provided additional information about the project, including the bridge’s current specifications and construction plan, the background on the project’s bridge selection process, the permits required for bridge construction, and related opportunities for further public comment through the U.S. Coast Guard’s permit review process.

The emergence of a river user with a newly identified large sailing vessel that could be affected by navigation restrictions does not alter the overall conclusions of TriMet regarding the project’s effects on the reasonable needs of navigation. Based on information from the owner and his stated vertical clearance needs for the vessel and “months of interest” that include summer as well as winter holiday period sailings, the effects would be similar to other charter operations. The potential percent passage rates for Sail Scovare’s largest vessel, if it operates excursions requiring navigation beneath the new Willamette River Bridge, would be similar to those estimated for other tall vessels, ranging from 90 percent and above. These estimates are based on the conservative application of historic data and river level fluctuation factors, which incorporate the highest daily river level readings for past years, and also reflect passage rates during the highest effect months of winter. The owner, whose statements indicate he initiated the purchase and operation of the vessel after the project had proposed its original bridge height in the 2008 SDEIS and after the LPA bridge height was identified, would also have available a variety of options to minimize the impact of navigation restrictions on his charter operations. This includes obtaining predicted river levels that are available daily to Willamette River users, altering the site he uses to begin or end excursions when anticipated river levels could affect his clearance, modifying his vessel, using other vessels within his fleet, or altering his cruise routes.
O.5.3 Construction and Permanent Effects on Landside Access

The Project's proposed bridge alignment and type were designed to minimize impacts to Central Eastside Industrial District land uses, which includes properties with water-dependent uses and river navigation activities. Previous alternatives, including the Meade-Caruthers and Porter-Caruthers alignments in the SDEIS, required a direct acquisition of a property owned and used by the Portland Spirit for river cruise and charter ship operations; the SDEIS identified compensation and relocation measures that could be taken if acquisition of all or part of the property was required. While the LPA to Park Avenue does not require construction of light rail facilities on the property, the Bridge construction activities and the placement of the permanent capped piers for the east Bridge tower are close to the Portland Spirit’s mooring and loading dock. Accordingly, TriMet has identified impacts to Portland Spirit’s operations due to the location of the temporary construction bridge, associated construction activities on and near the temporary bridge, and the piers. These features would restrict the ability of some of the Portland Spirit vessels to access or maneuver to and from its dock. The construction facilities and activities affect more area and pose more restrictions to operations than the permanent bridge, but the permanent Bridge facility would also restrict the accessibility and maneuvering of some of the Portland Spirit vessels to and from the existing dock. This is considered to be a local landside access impact, and otherwise does not change the horizontal or vertical navigation characteristics or passage rates reported for the Portland Spirit vessels or other vessels navigating up and down the Willamette River after the project is constructed.

To address these vessel docking concerns, TriMet has been coordinating closely with Portland Spirit representatives from early conceptual planning though the preliminary engineering conducted for the FEIS. Further coordination will continue during final design to identify potential operating modifications, design measures, or mitigation strategies to allow the Portland Spirit to effectively maintain its operations in its current location. However, if some or all of Portland Spirit operations cannot be maintained at the existing Portland Spirit site during construction or permanently, the project will mitigate the impacts by providing compensation for the loss of property or property rights, which would include compensation for temporary or permanent relocation of the business. TriMet will also provide relocation assistance and other technical or advisory support to help the business owner obtain a suitable site for its relocated operations. As discussed in more detail in Section 3.1, Acquisitions and Displacements, TriMet will comply with the requirements of 49 CFR Part 24 Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended. Relocation options could include temporary operations during construction in locations where vessel moorage and loading are already permitted, or permanent relocation. The business owner could also elect to apply property or relocation compensation to develop an appropriate site for Portland Spirit’s operations, subject to applicable local, state, and federal regulations. As discussed in more detail in Section 3.2, Land Use and Economy, TriMet’s construction period mitigation for businesses affected during construction also includes outreach, assistance, and public information designed to assist impacted businesses in maintaining their customer base during construction; examples include promotional programs and other marketing or advertising programs to encourage patronage during construction.
O.5.4 Consideration of Other Potential Bridge Types or the Use of a Lift Bridge

Comments from several of the navigation users have also suggested the use of a lift bridge. Generally, lift bridges are required only when there would be a substantial navigational impact resulting from a lower fixed bridge height. TriMet did consider a lift bridge option and concluded that the significant cost for a lift bridge was outweighed by the rarity of times the Bridge would need to be lifted. In other words, significant financial resources would be required to construct the Bridge for it to be lifted a handful of times in any given year.

TriMet’s cost estimates for developing a bridge with a lift bridge mechanism were found to substantially exceed the project’s overall financial capacity, rendering the Project unable to fulfill its purpose and need. A moveable span would result in a Bridge costing nearly $205 million, requiring an additional $120 million in cost for the Project, or a 143% increase in the $84 million (in 2008 dollars) budgeted for the Bridge.

In addition, a lift bridge option would require significant alterations to the Bridge design, which would likely affect water elements and related environmental consequences. The environmental review documented in the FEIS indicates that the combination of Endangered Species habitat, contaminated sediments, and the potential for scour around any in-water structures supports a conclusion that the existing Bridge proposal reduces impacts compared to a bridge with larger or more numerous in-water structures. What’s more, the raising of the Bridge, as occurs at the existing Steel Bridge, would negatively affect transit operations. Additionally, the piers to support a movable span would need to be closer together and located in the center of the river and would likely reduce horizontal navigation clearances.

Other types of bridge mechanisms that could provide variable clearances, such as a swing bridge, were also examined and found unviable due to the need for additional in-water structures that would be required in the center of the waterway.

O.5.5 Landside and Operational Considerations of a Higher Bridge

Americans with Disabilities Act

TriMet is required to comply with the Americans with Disabilities Act in the construction and operation of its facilities. The USDOT and the Department of Justice require that when a new public transportation facility, such as a bridge, has a pedestrian walkway, that pedestrian walkway must be ADA compliant.

Pedestrian accessibility is a fundamental consideration of this Project because the Bridge will become a key link to the regional trails system. An 85-foot Bridge clearance, as requested by Portland Spirit, would result in a 23 percent increase in slope to the Bridge. This increased slope would cause technical and operational difficulties. Ramps and landings would need to be installed on the pedestrian pathway to maintain accessibility for individuals with disabilities. Yet, the bicycle pathway would need to be maintained at a constant slope for ease of ride, which would necessitate a defined separation between the pedestrian and bicycle paths. This defined separation would reduce the net available pathway and make the pathway too narrow for
maintenance or emergency vehicles. Emergency vehicles would have to use the center transit area, which causes disruption to the transit service.

**Other Operational Considerations for a Higher Bridge Clearance**

A vertical clearance of 85 feet would require an increased slope to the light rail trackway, as much as 5.85 percent. A slope this steep would negatively impact operations, service reliability, and significantly increase cost and time devoted to vehicle maintenance. The average speed of a bus or light rail vehicle would be reduced due to the increased slope, which affects service reliability.

**O.5.6 Columbia River and Willamette River Dams**

The mainstem Willamette River contains 11 federally owned dams, all operated by the Corps. There are also 11 Federal dams on the Columbia River. No federally owned dam on the Columbia or Willamette River is beyond its design life and none is slated for removal.

The Condit dam is owned by PacifiCorp and is on the White Salmon River, a tributary to the Columbia. The Condit dam has been proposed for removal as early as October 2010, but the environmental reviews are still underway and no decision has been made. The environmental documents for that proposal indicate that removal will have a negligible effect on Columbia River flows compared to today.

Even if a Federal dam on either the Columbia or Willamette were to be removed, TriMet does not expect any appreciable change in the Willamette River elevation. This is because the Corps, which has oversight on the dams and river systems, can adjust the river flows to accommodate for, among others, flood control.

**O.5.7 Climate Change Considerations**

TriMet considered the effects that global climate change may have on the water surface level of the Willamette River (Parametrix 2010). In general, the level of the Willamette River at the Project site is affected by the flow rate of the Willamette River, the stage of the Columbia River, and tidal elevation. As noted above, the flows on these river systems are heavily managed. Best available science suggests that there are uncertainties inherent in global climate change models and underlying variables, and how those variables intersect to change weather patterns, temperatures, and precipitation. To address these uncertainties, conservative values were used for this evaluation.

The review of best available science on the potential changes in Willamette River levels due to climate change forces yielded the following conclusion. During winter months (generally November to April):

- The potential increase in Willamette River water level may range from 1.8 to 2.5 feet;
The effects of increased sea level may affect the Willamette River by 0.1 to 1.0 foot, with less increase at higher river stages, such as when flooding is expected to occur; and

The potential effect of change in the Columbia River elevation could not be quantified.

Based on the data, a conservative estimate of increase in the Willamette River level due to global climate change is 3.9 feet by 2099. The frequency of these increased water levels is not predictable based on best available science. In addition, it is likely that summer flow would be lower than currently measured.

TriMet also conducted an analysis of the potential change in vessel passage rates using the higher river levels that could result because of climate change. The analysis (which included a variance for safety considerations) found that passage rates would remain very similar to those predicted for the Project without climate change factored in.

**O.6 SUMMARY**

The new Bridge is being designed to maintain reasonable current and future navigational use of the River. The Bridge would provide 77.52 feet vertical clearance as measured from the Columbia River Datum (CRD) for approximately 150 feet in the middle of the center span of the Bridge. It would provide 694 feet horizontal clearance between piers.

Of the existing river users, only two vessels would be affected by a height of 77.52 feet (which includes an additional 3.4 feet to account for climate change and safety). However, the majority of river users would be able to safely pass under this Bridge 99 percent of days.

TriMet has determined that based on detailed engineering and constructability considerations, land-side urban fit, visual and aesthetic appeal, and cost, this vertical clearance best accommodates the reasonable needs of river users and landside and transit users.
Dear Mr. Krochalis:

The enclosed document contains a biological opinion (Opinion) prepared by the National Marine Fisheries Service (NMFS) pursuant to section 7(a)(2) of the Endangered Species Act (ESA) on the effects of the proposed Portland to Milwaukie Light Rail Project being partially financed by the Federal Transit Administration (FTA) through a New Starts Fund (49 U.S.C. 5309) grant to TriMet and Metro, the local agency applicants. In this Opinion, NMFS concludes that the action, as proposed, is not likely to jeopardize the continued existence of Lower Columbia River (LCR) Chinook salmon (*Oncorhynchus tshawytscha*), Upper Willamette River (UWR) spring-run Chinook salmon, LCR coho salmon (*O. kisutch*), LCR steelhead (*O. mykiss*), and UWR steelhead or result in the destruction or adverse modification of designated critical habitat for LCR Chinook salmon, UWR Chinook salmon, LCR steelhead, and UWR steelhead. Critical habitat has not been proposed or designated for LCR coho salmon. NMFS also concludes that the proposed action is not likely to adversely affect green sturgeon (*Acipenser medirostris*) and Columbia River (CR) chum (*O. keta*).

As required by section 7 of the ESA, NMFS is providing an incidental take statement with the Opinion. The incidental take statement describes reasonable and prudent measures NMFS considers necessary or appropriate to minimize the impact of incidental take associated with this action. The take statement sets forth nondiscretionary terms and conditions, including reporting requirements, that FTA must comply with to carry out the reasonable and prudent measures. Incidental take from actions that meet these terms and conditions will be exempt from the ESA’s prohibition against the take of listed species.
This document also includes the results of our analysis of the action’s likely effects on essential fish habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and includes two conservation recommendations to avoid, minimize, or otherwise offset potential adverse effects on EFH. The conservation recommendations are a subset of the ESA take statement’s terms and conditions. Section 305(b)(4)(B) of the MSA requires Federal agencies to provide a detailed written response to NMFS within 30 days after receiving these recommendations.

If the response is inconsistent with the EFH conservation recommendations, FTA must explain why the recommendations will not be followed, including the justification for any disagreements over the effects of the action and the recommendations. In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we request that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

If you have questions regarding this consultation, please contact Christy Fellas in the Willamette Basin Habitat Branch of the Oregon State Habitat Office at 503.231.2307.

Sincerely,

William W. Stelle, Jr.
Regional Administrator

cc: Bill Hall, Parametrix
Steve Saxton, FTA
Mark Turpel, Metro
Dave Unsworth, TriMet
Endangered Species Act
Biological Opinion

and

Magnuson-Stevens Fishery Conservation and Management Act
Essential Fish Habitat Conservation Recommendations

for the

Portland-Milwaukie Light Rail Project,
Multnomah and Clackamas Counties, Oregon
6th Field HUCs: 170900120302, 170900120103 and 170900120102

Lead Action Agency: Federal Transit Administration

Consultation Conducted By: National Marine Fisheries Service Northwest Region

Date Issued: June 23, 2010

Issued by: William W. Stelle, Jr.
Regional Administrator

NMFS No.: 2009/05649
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INTRODUCTION

This document contains a biological opinion (Opinion) that was prepared by National Marine Fisheries Service (NMFS) in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531, et seq.), and implementing regulations at 50 CFR 402.1 It also contains essential fish habitat (EFH) conservation recommendations prepared by NMFS in accordance with section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801, et seq.) and implementing regulations at 50 CFR 600. The Opinion and EFH conservation recommendations are both in compliance with section 515 of the Treasury and General Government Appropriations Act of 2001 (Data Quality Act) (44 U.S.C. 3504 (d)(1) and 3516), and underwent pre-dissemination review. The administrative record for this consultation is on file at the Oregon State Habitat Office in Portland, Oregon.

Background and Consultation History

The Federal Transit Administration (FTA) proposes to partially fund, through the New Starts Fund (49 U.S.C. 3509), the proposed Portland to Milwaukie Light Rail (PMLR) project, in coordination with local agency applicants Metro and TriMet, to connect the City of Portland, City of Milwaukie and north Clackamas County. In 2007, the project team began coordination with NMFS to refine the designs for the stream crossings and pier locations. In the fall of 2008, a draft Biological Assessment (BA) was prepared and shared with NMFS and several interagency meetings and site visits were subsequently held to refine designs, impacts and develop mitigation plans.

On October 15, 2009, FTA initiated formal consultation with NMFS and submitted the final BA. FTA determined that the proposed project is likely to adversely affect Lower Columbia River (LCR) Chinook salmon (Oncorhynchus tshawytscha), Upper Willamette River (UWR) spring-run Chinook salmon, LCR coho salmon (O. kisutch), LCR steelhead (O. mykiss), and UWR steelhead and their designated critical habitats. Critical habitat has not yet been designated for LCR coho salmon. FTA also determined that the proposed project is not likely to adversely affect green sturgeon (Acipenser medirostris) and Columbia River (CR) chum (O. keta). Critical habitat for CR chum does not extend in to the Willamette River, and at the time the BA was completed, critical habitat for green sturgeon was proposed.

On December 14, 2009, FTA, NMFS and the project team had a meeting to discuss sediment analysis, scour protection for the Willamette River bridge, mitigation options, pile driving and riparian plantings. On February 2, 2010, FTA submitted amendments to the BA to refine the items discussed at the December 14, 2009 meeting. On April 14, 2010, FTA submitted the finalized locations for pile removal mitigation. On May 25, 2010, FTA submitted additional mitigation plans to be included in the proposed project.

NMFS concurs with FTA’s determination that the proposed project is likely to adversely affect LCR Chinook salmon, UWR spring-run Chinook salmon, LCR coho salmon (O. kisutch), LCR

1 With respect to designated critical habitat, the following analysis relied only on the statutory provisions of the ESA, and not on the regulatory definition of “destruction or adverse modification” at 50 CFR 402.02.
steelhead (O. mykiss), and UWR steelhead and their designated critical habitats, except LCR coho which has not yet been proposed or designated. NMFS also concurs with FTA’s determination that the proposed action is not likely to adversely (NLAA) affect CR chum, as NMFS does not expect CR chum individuals to be in the action area. Any effects of the proposed project on CR chum are unlikely and therefore discountable due to lack of exposure of chum individuals. CR chum will not be discussed further in this Opinion.

Since the BA was completed in October 2009, critical habitat has been designated for green sturgeon. NMFS concurs that the proposed action is NLAA green sturgeon and also determined it will not affect the designated critical habitat, since no individuals are likely to be in the action area and the final critical habitat designation did not include the Willamette River. The nearest location of report green sturgeon is in the Columbia River, 12 miles downstream and any effects of the proposed action on green sturgeon are discountable. Green sturgeon will not be discussed further in this Opinion.

Description of the Proposed Action

Project Coordination. Since 2007, when FTA and the project team began coordinating with NMFS, they have also been coordinating with a proposed contaminant cleanup proposed at the ZRZ Realty/Zidell (ZRZ) property which overlaps with the proposed west bent of the new Willamette River bridge for the PMLR project. The most recent timelines propose that the bridge construction will begin and the contaminants will be cleaned up during the in-water work window of July 1 – October 31, 2011. NMFS attended several interagency meetings in late 2009 to discuss difficulties of completing two construction projects in the same location at the same time. Construction decisions for the PMLR bridge over the Willamette River, such as placement of rock for scour protection, could preclude cleanup options at the ZRZ property. As of the date of this Opinion, the ZRZ ESA section 7 consultation is still in process and the outcome is unknown.

Interrelated and Interdependent Actions. FTA identified several interrelated and interdependent actions\(^2\) in the BA for the PMLR project. For the purposes of consultation under the ESA, NMFS agrees that the following two actions are interrelated and interdependent to the PMLR:

- The Portland Streetcar Loop project published a NEPA Environmental Assessment (EA) in February 2008, and received a Finding of No Significant Impact (FONSI) from the FTA in July 2008. The project was awarded a federal grant for construction in 2009. As described in the EA, long-range plans for the streetcar system called for a southern crossing of the Willamette River. Although the Portland Streetcar Loop project to the east side of the Willamette River down to OMSI is now being completed and would connect to the Portland-Milwaukie Light Rail Project at the OMSI Station, completing the southern east-west connection for streetcar will add greater utility and efficiency within

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\(^2\) As defined in 50 CFR§402.02, Interdependent actions are actions having no independent utility apart from the proposed action and interrelated actions are actions that are part of a larger action and depend on the larger action for their justification.
the overall transit network. The South Waterfront Plan (adopted by the City of Portland under Resolution #36111 and Ordinance #177082, on November 13, 2002, and effective January 20, 2003) supports overall City of Portland and regional objectives to manage future population and employment growth by focusing it in already urbanized areas, served by a transportation system that reduces the need for the automobile. Several planned activities are under way within the South Waterfront area of the City of Portland, with a variety of parties involved. The locally preferred alternative for the Portland-Milwaukie Light Rail Project was developed in close cooperation with the City of Portland and other parties, but the South Waterfront Plan and the individual initiatives are not considered interdependent.

• ZRZ cleanup as described above in the project coordination section.

The PMLR alignment crosses seven streams: the Lower Willamette River, Crystal Springs Creek, Johnson Creek, Crystal Creek, Spring Creek, Kellogg Lake, and Courtney Springs Creek and proposes work near Fairview creek (Figure 1). Of those, the Lower Willamette River, Crystal Springs Creek, Johnson Creek, and Kellogg Lake support fish species listed as threatened under the federal ESA.

Project elements affect ESA-listed species include in-water work such as pile driving, fill placement, scour protection, fish salvage and habitat creation. The proposed action and each location will be discussed in detail below.

**Crystal Creek, Spring Creek, Courtney Springs Creek and Fairview Creek.** NMFS determined that the proposed project components occurring at Crystal Creek, Spring Creek, Courtney Springs Creek and Fairview Creek are NLAA ESA-listed salmon and steelhead. The proposed culverts to be repaired and extended at Crystal Creek, Courtney Springs Creek and Spring Creek are located above multiple fish barriers and the action areas have no documented presence of ESA-listed fish\(^3\) and are not designated as critical habitat.

Near Fairview Creek the Ruby Junction maintenance facility will be expanded but no construction will take place within 100 feet of the creek. Three parcels of land anticipated to be acquired for the expansion are located within the 100 year floodplain. The expansion would result in the same amount of pollutant-generating impervious surface as currently exists, and all stormwater will be infiltrated onsite.

Based on the above, NMFS determined that the Crystal Creek, Courtney Springs Creek and Spring Creek culvert repairs and upgrades and the Ruby Junction maintenance facility upgrade near Fairview Creek are NLAA ESA-listed salmon and steelhead or their critical habitats and will not be discussed further in this Opinion.

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\(^3\) Lack of fish presence documented by search of fish distribution maps at [www.streamnet.org](http://www.streamnet.org) and based on professional judgment of ODFW fish biologists present at the site visit.
Figure 1.  PMLR project proposed stream crossing and alignment from Portland to Milwaukie. Drawing provided in BA submitted by FTA.
The Willamette River bridge will be a cable-stayed structure with a width of between 66 and 83 feet, including the wind nose, and a total length of approximately 1,720 feet from abutment to abutment. This bridge design entails five spans with two abutments (Abutments 1 and 6), two towers located in the river (Towers 3 and 4), and two landside piers (Bents 2 and 5) above the ordinary high water line (OHW). Bent 2 is above the top of bank and Bent 5 is below the top of the bank (Figure 2). The bridge will provide a vertical clearance for marine navigation of between 75 and 85 feet.

Permanent components of the bridge design include:
- Two in-water piers (Towers 3 and 4), each consisting of a set of nine 10-foot diameter drilled shafts.
- One concrete pile cap for each pier (each pile cap will be approximately 100 feet in diameter and 14 feet deep; pile caps will be placed at the waterline, i.e., the bottom of the pile cap will be at an approximate elevation of -5 feet [COP datum]).
- Up to 18 ship-fendering piles and up to 18 navigation assistance piles.
- Scour protection to protect temporary work structures and prevent resuspension of contaminated sediments.

Temporary components include:
- Two 100-foot diameter cofferdams for construction of the in-water piers.
- Up to 126 piles (maximum 36-inch diameter) for two work bridges, one from each bank to the permanent pier locations, of which up to 114 piles will be located below OHW.

A work bridge will be constructed from each bank to the in-water pier locations. These temporary piles for the work bridge will include up to 126 total (with 114 in-water) steel pipe piles, each up to 36 inches in diameter and 20 to 100 feet long. The western work bridge will span approximately 125 feet from the riverbank across the proposed sediment cap to be placed by ZRZ. The remainder of the work bridges will have bents that are placed approximately 30 feet apart. All in-water work will occur during the Willamette River in-water work window of July 1 to October 31.

Contaminated in-water sediments associated with historical landside industrial activities are present in the project area. Sediments within the footprint of the work bridge on the west side within ZRZ’s sediment management area (SMA) will be covered by this project with a clean sand layer prior to pile installation. The purpose of the clean sand layer is to limit the extent to which contaminants will be resuspended in the water column and transported downriver during pile installation and removal.
Figure 2. Detailed drawing of the proposed crossing on the Willamette River as provided in the BA submitted by FTA.
Piles will be driven initially by vibratory methods into the cemented gravel layer, estimated to occur at 60 to 80 feet below the mudline of the river. Once the gravel layer is reached, piles may need to be struck with an impact hammer up to 100 times to reach their required load-bearing capacity. Use of hydroacoustic attenuation methods (e.g., bubble curtains, temporary noise attenuation piles) will be used during impact driving and a 10 decibel (dB) reduction in sound is assumed from the proposed attenuation. Work bridge piles will be installed simultaneously on both sides of the river. After piles for the western work bridge are driven, Type B rock will be placed around the work bridge piers to protect the structure from scour for up to a ten-year flow event.

The total driving duration for each pile is estimated to be 1 to 4 hours, or between two and eight piles per day. These numbers will depend on the number of cranes, whether piles are pre-spliced, and whether cranes are located on the work bridge or a barge. Approximately four piles will typically be “proofed” per day (200 impact blows) and the maximum probable blows is for 20 piles, or 800 impact blows within any given 12-hour period.

Scour protection associated with Tower 3 on the west side of the river will be placed to limit resuspension of contaminated sediments within and outside of the identified SMA and to protect the proposed ZRZ sediment caps. The bridge towers are designed to withstand a 500-year flow without the need for scour protection. Permanent scour protection around Tower 3 will consist of 1 foot of sand overlain 4 feet of mixed Class 100 (100 pounds, less than 13” diameter) and Type B (rounded 8” diameter and smaller) rock. The total thickness of additional sand and rock armor will be 5 feet.

Permanent scour protection at Tower 4, to protect a City of Portland 36-inch diameter water supply pipe and to limit the resuspension and redeposition of contaminated sediments, entails a 1-foot layer of sand overlain by rock armor blanket along the water supply pipe that consists of 7-foot thick layer of mixed Class 200 (200 pounds, less than 16” diameter) and Type B rock. In addition, a rock armor blanket would be placed around the Tower 4 pile group and would be comprised of a 1 foot sand layer overlain by a 4 foot layer of mixed Class 200 rock and Type B rock. A foot of sand would be placed in the scour area prior to the placement of the permanent scour. The Project may adjust rock size based on further analysis of supplemental sediment samples from the scour areas around Towers 3 and 4. Sand and rock associated with scour protection will be placed either from the completed work bridges or from barges during the first in-water work window.

Cofferdams for the in-water piers will be constructed of steel sheet pile and placed in an approximately 100-foot diameter circular pattern within the in-water work window. Individual sheets will be installed using vibratory methods. Once the cofferdam is in place, the water level will be lowered by pumping. Pumped water will be disposed of in accordance with applicable permits and regulations. Fish screens meeting NMFS and Oregon Department of Fish and Wildlife (ODFW) criteria will be installed on all pumps prior to pumping. Fish removal and salvage will be performed using approved methods by the ODFW and NMFS. An approximately 1-foot layer of clean sand will be placed at the bottom of both cofferdams to isolate potentially contaminated material. Then Type B and E rock armor will be placed for scour protection and then sand, gravels, and cobbles will be placed into the cofferdam to the bottom of the pile cap.
The placement of riverbed and scour protection materials inside the cofferdams will occur outside of the in-water work window, but will be isolated from the river. Riverbed and scour protection materials will be obtained from a permitted source, and will meet Sediment Evaluation Framework standards for in-water placement.

The two permanent in-water piers will be constructed within fully contained sand, gravels, and cobble islands on 18 ten-foot diameter drilled shafts, each between 160 and 200 feet in length. It is anticipated that the equipment used to install the drilled shafts will be mounted on one or more barges or work bridges around the perimeter of the sand island, and drilling operations are expected to be performed outside of the summer (July 1 to October 31) in-water work window for the Willamette River inside the cofferdam.

Drilled shaft steel casings will be installed using oscillatory (non-vibratory) or vibratory methods approximately to the depth of the Troutdale Formation, which is approximately 100 feet below mudline. Drilled shafts will be installed to approximately 40 feet into the Troutdale Formation. Installation of each 10-foot diameter drilled shaft will require approximately one week to vibrate or oscillate the temporary steel casings to the depth required and to construct each of the concrete shaft foundations.

The anticipated permanent bridge and temporary work bridge foundations are depicted in Appendix A of the BA. The construction contractor will prepare and submit a Work Area Isolation Plan, Temporary Erosion and Sediment Control Plan (TESCP) with Best Management Practices (BMPs), and a Pollution Control Plan (PCP) for TriMet’s and NMFS’ approval before beginning work. These plans will ensure that spills or leaks of contaminating substances are contained and that turbidity and erosion effects on the river are reduced. These plans will be monitored by TriMet throughout construction. Turbidity curtains for drilling and pile driving may be used, if necessary, to limit turbid discharges to the waterway. Sound attenuation techniques will be used for all in-water pile-driving using impact methods.

Shafts will be drilled to the required depth with a rotator-oscillator machine, which will be mounted on a barge or on the sand island cofferdam. Temporary casing pipe will be vibrated or rotated simultaneously with the excavation to prevent soil from entering the hole. Drilling slurry may also be pumped into the hole to facilitate auguring. Excavated soil will be captured, contained, and disposed of at an approved off-site facility. At Abutment 1, Bent 2, and Tower 3, excavated material in the upper 40 feet will be separated, stored, and characterized for hazardous contaminants. Based on its characterization, the waste material will be disposed of at an approved hazardous material facility.

In-water pipe and sheet piles will be driven using a crane- or barge-mounted vibratory hammer to either their required depth or the level where vibratory methods are no longer effective. Piles are anticipated to require splicing via field welding in order to extend down to the bearing layer. To reach the required capacity, piles will be “proofed” with an impact hammer. Sheet piles will not require proofing. Within the limits of the proposed ZRZ sediment cap, if implemented, a turbidity curtain will be installed around the pile, if deemed necessary, prior to pile driving and/or “proofing.” A sound attenuation measure will also be used while an impact hammer is in use for in-water pile driving, in accordance with an approved monitoring plan. Piles installed
above OHW or out of the water column are proposed to be installed with an impact hammer only. No sounds attenuation is proposed for piles above OHW or out of the water. The City of Portland water line and other underwater utility lines adjacent to the east work bridge and east cofferdam will be protected by a scour protection blanket.

The construction contractor may use barge-mounted equipment to accelerate the work. In-water piles will be installed using vibratory methods. When the pile can no longer be driven using vibratory methods, a diesel impact hammer will be used to proof each pile to the design capacity (30 to 50 blows). A noise attenuation method will be used to reduce hydroacoustic impacts. In addition, pile driving noise will be monitored per a Hydroacoustic Monitoring Plan. This plan may require a small amount of un-attenuated pile driving as a baseline for sound measurements before attenuation methods are used.

Temporary piles and sheet piles will typically be removed using only vibratory methods. After completion of drilled shafts and pile cap for each tower, the cofferdam will be allowed to fill with water, and then will be removed with vibratory methods. Cofferdam removal will occur during the approved in-water work period. The preferred removal approach will be with vibratory methods, but certain segments under the newly constructed bridge superstructure may be difficult to access, hazardous materials may be present, or areas may be adjacent to utilities. Therefore, it may become necessary to cut off some or all of the sheet piles at the ground line using underwater cutting torches. Pile caps for the in-water towers will be cast-in-place. Removal activities would occur during the in-water work window of July 1 through October 31.

If deemed necessary to deflect ships, up to eighteen 24-inch diameter (100-feet deep) steel pipe piles will be arranged in two “V” patterns upstream and downstream of the bridge piers. In addition, up to eighteen 24-inch diameter (100-feet deep) steel pipe piles may be needed near Tower 4 to assist *Portland Spirit* operations in maneuvering to and from its existing dock.

Riparian areas impacted by the projected on the east and west banks with be stabilized and re-planted with native riparian vegetation.

**Crystal Springs Creek.** The anticipated new bridge for crossing Crystal Springs Creek will be a 68-foot-long single-span structure supported on cast-in-place abutments with a driven pile foundation. The bridge will completely span Crystal Springs Creek; no element of the structure will be within the 20-foot active waterway channel, and no in-water work is anticipated. However, all piles and some retained fill will be within the 100-year floodplain and portions of a jurisdictional wetland. The structure will use an approximately 34-foot-wide bridge section, with an anticipated additional 10 feet of temporary construction easement on either side of the bridge.

There will be approximately 30 steel HP14 piles driven for this bridge, 15 for each abutment. The piles will be driven into an anticipated substrate profile of fills over alluvium over sand/gravel mix over cemented gravels; the expected pile depth is approximately 100 feet. Piles will be driven using a diesel impact hammer mounted on a crane using fixed leads. Each pile will take approximately 12 continuous hours to complete, and all pile installations are anticipated to be complete within 30 days. Pile driving of piles within 30 feet of Crystal Springs Creek will occur during the approved in-water work window (July 15 - August 31) since
hydroacoustic impacts may be similar to in-water pile driving. Driving of piles that are further than 30 feet from Crystal Springs Creek may occur at any time of the day and at any time of the year, unless in-water work becomes necessary. No in-water work is anticipated at Crystal Springs Creek. If work is scheduled to occur at night, mobile light plants would be required, but lights will be directed away from the water.

After completion of the pile installation, piles will be cut off to the required elevation and pile cap reinforcement will be installed. Formwork will be installed around the reinforcement and concrete placed. Pile cap construction will use typical cast-in-place concrete construction practices.

Construction of the balance of the abutment is a continuation of the pile cap construction. The abutments may include the construction of wingwalls and backwalls to retain trackway approach material. Construction will use typical cast-in-place concrete practices, with reinforcement and formwork placed to line and elevation. Concrete will be delivered to the formwork using methods that best target proper placement. After completion of concrete curing, the formwork will be stripped and removed from the structure.

Anticipated primary superstructure elements will be fabricated offsite and delivered to the construction site using trucks. Fabrication offsite eliminates the potential for materials used in fabrication (such as wet concrete) to fall into the waterway. After delivery to the job site, the superstructure elements will be picked and placed onto the newly constructed bridge abutments using cranes and connected together using transverse tie rods. BMPs associated with this type of operation will be used to reduce opportunities for items to fall into the stream. For example, netting, diapers or other techniques will be used where appropriate to capture any construction material that may fall from the bridge.

Primary access is currently planned to be within the trackway, and will potentially extend from the railroad access road to the west of the proposed trackway between SE Harold Street to the north and SE Tacoma Street to the south. Staging areas will be located either on the trackway or to the east of the trackway in the vicinity of Crystal Springs Creek. As with all staging areas, appropriate containment and pollution control measures will be put in place before and during staging activities.

Approximately 1.1 acres of wetland in the vicinity of Crystal Springs Creek will be impacted by the light rail transit (LRT) crossing. In addition, approximately 3,080 cubic yards (cy) of 100-year floodplain would be filled, but an equal amount of removal would occur south of the SE Bybee Boulevard bridge. No Federal Emergency Management Agency (FEMA)-identified floodway is present at this stream. The new bridge at Crystal Springs Creek will permanently shade 680 square feet of the creek.

**Johnson Creek.** The anticipated new bridge over Johnson Creek will be 108 feet long center of bent to center of bent and will span the 35-foot active creek channel. The structure will be a single-span steel through girder structure with PCPS transverse structural elements (floorbeams) on cast-in-place abutments founded on driven piles. The bridge will completely span Johnson Creek, and no in-water work will occur. No element of the structure will be within
the active waterway channel or FEMA-identified floodway, or below the OHW. However, all piles will be within the 100-year floodplain. The structure will use an approximately 43-foot out-to-out bridge section, with an anticipated additional 10 feet of temporary construction easement on either side of the structure. The bridge abutments are anticipated to be skewed to better match the existing stream alignment and reduce impacts to the stream. Primary access is currently planned to be within the track alignment from the north and from the south.

There will be 30 steel HP 14 piles driven for this bridge, 15 for each abutment. The piles will be driven into an anticipated substrate profile of typical fills over alluvium over sand/gravel mix over cemented gravels; the expected pile depth is approximately 100 feet. Each pile will take approximately 12 continuous hours to complete, and all pile installations are anticipated to be complete within 30 days. Pile driving of piles within 30 feet of Johnson Creek will occur during the approved in-water work window (July 15 – August 31) since hydroacoustic impacts may be similar to in-water pile driving. Driving of piles that are further than 30 feet from Johnson Creek may occur at any time of the day and at any time of the year. Although night construction is not anticipated at Johnson Creek, if it does occur, mobile light plants will be required and will be directed away from the water to the extent practicable.

Construction of the balance of the abutment will be a continuation of the pile cap construction. The abutments may include the construction of wingwalls and backwalls to retain trackway approach material. Construction will use typical cast-in-place concrete practices, with reinforcement and formwork placed to line and elevation. Concrete will be delivered to the formwork using methods that best target proper placement. After completion of concrete curing, the formwork will be stripped and removed from the structure.

Anticipated primary superstructure elements (steel girders and PCPS structural elements) will be fabricated offsite and delivered to the construction site using trucks. Fabrication offsite eliminates the potential for materials used in fabrication (such as wet concrete) to fall into the waterway. After delivery to the job site, the superstructure elements will be picked and placed onto the newly constructed bridge abutments using cranes. Temporary bracing will be used as required to maintain the girder alignment. BMPs associated with this type of operation will be used to reduce opportunities for items to fall into the stream. For example, diapers, netting or other techniques will be used where appropriate to capture construction material that may fall from the bridge.

Access to the north bridge abutment is proposed to be from the existing access driveway into the site and set back 25 feet from the top of bank. Access to the south bridge abutment is proposed to be from the Tacoma park-and-ride site. Staging will be located outside of the area designated as a conservation zone under the City of Portland Environmental Zone.

Research of past geotechnical data generally indicates non-liquefiable conditions at the LRT crossing at Johnson Creek. However, there is one historical data point south of Johnson Creek in the project vicinity that suggests a limited zone of liquefiable material. Though there is a low probability of the presence of liquefiable soils adjacent to Johnson Creek, mitigation of this condition may be necessary and would consist of subsurface ground improvements in the
surrounding area of the pile foundations. The ground improvement treatment area will total approximately 360 square yards. All proposed treatment areas are above OHW.

In addition to the new bridge structure for the LRT over Johnson Creek, there is also an existing 106-foot-long bridge that will be used for access to the new Tacoma park-and-ride structure. The existing bridge will be modified slightly to accommodate pedestrian use. The modifications will include either a 10-foot sidewalk on one side of the bridge or two 8-foot sidewalks on either side of the bridge. Updates to stormwater drainage of the existing structure will be included in the modifications as well.

Approximately 115 cy of fill within the 100-year floodplain is anticipated to occur as part of the Johnson Creek crossing. An equal amount of removal will occur within the 100-year floodplain. The removal will likely occur adjacent to the project alignment and will be designed to provide for flood relief while minimizing the potential for fish stranding after waters recede. No in-water work will occur at this crossing. Approximately 5,000 square feet of riparian vegetation may be removed or shaded at this crossing due to the bridge structure and alignment. The new bridge will permanently shade 1,500 square feet of Johnson Creek’s channel.

**Kellogg Lake.** The anticipated Kellogg Lake LRT bridge crossing Kellogg Lake will be a box girder structure with multiple spans. The box girders, pier foundations, and abutments will be cast-in-place and founded on drilled shafts and driven piles. Additionally, structural provision for a future pedestrian path under the LRT bridge will be included. It is anticipated that the truss for this path will be installed by the City of Milwaukie.

One H-pier consisting of two 6-foot diameter columns will be constructed in the Kellogg Lake bed, with the remainder of the piers above OHW. Two temporary 8-foot diameter steel casings (up to 120 feet in length) will be driven into the creek bed with a crane-mounted vibratory hammer or oscillator. The H-pier will be in shallow-water habitat approximately 12 feet deep. The drilled shafts for the H-pier will be excavated to the scheduled elevation. Then, reinforcing cages will be placed into the excavation and the shaft will be filled with concrete (by tremie methods, if groundwater is present). After completion of the shafts above the water surface, the temporary steel casings will be removed using a crane-mounted vibratory hammer or if it is not possible to remove entire casings, they will be cut off at the lowest elevation possible.

The drilled shafts for the in-water H-pier may require the use of polymer drilling fluids to stabilize the sides of the excavation prior to placement of concrete. If polymer drilling fluids are required, they will be recirculated through on-site Baker tanks or by a similar method to separate suspended drill tailings and to control the drilling fluid. Use of the Baker tanks and active isolation of the work area will prevent spills of the drilling fluid. Drill tailings removed from shafts by cleanout buckets will be separated from drilling fluid by settling in controlled areas.

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4 Note: As of October 1, 2009, the Kellogg Lake Dam located downstream of the project site has been targeted for removal to restore salmonid usage in the ecosystem. The funding of this action through a National Oceanic and Atmospheric Administration (NOAA) restoration grant was not approved in mid-2009. Another funding source has not yet been discovered. The description of this project element assumes that the current condition still exists at the time of the construction and operation of the Portland-Milwaukie Light Rail project. If the dam is removed and the channel is restored, efforts will be made to place the one permanent pier outside the active channel and to decrease the number of temporary piles below the new OHW.
and all drill tailings will be monitored for contamination and will be separated from drilling fluid prior to proper disposal. Drilling fluid will be processed into Baker tanks as the concrete is being placed in the shaft.

Additional in-water work includes installation of approximately 60 steel pipe pilings for support of a temporary work bridge extending from each bank. These temporary work bridges will provide access to the in-water H-pier and all bridge construction operations. Each temporary steel pipe piling will be up to 24 inches in diameter and 100 feet in length and will be installed in shallow-water habitat (0 to 20 feet deep) using a vibratory hammer, with the potential for proofing of the pile with an impact hammer. When the pile can no longer be driven using vibratory methods, a diesel hammer will be used to proof each pile to its design capacity (30 to 50 blows). The total driving duration for each pile is estimated to be one to four hours, or between two and eight piles per day. Approximately four piles will typically be “proofed” per day (200 impact blows), and the maximum probable is 8 piles, or 400 impact blows, within any given 12-hour period.

The temporary piles will be extracted using a vibratory hammer when the bridge is complete. All temporary piles will be plain, untreated steel, and the anticipated substrate consists of fill, alluvium, gravel, and cemented gravel. Because the sediment within the lake has been reported to be contaminated with pesticides and polychlorinated biphenyls (PCBs) (City of Milwaukie 2002), care will be taken to reduce resuspension and transport of existing sediments.

Landside bridge supports include twelve 8-foot diameter drilled shafts and two H-piers consisting of two 6-foot diameter drilled shafts for the landside piers and abutments. For the piers, some amount of excavation may be required. The shafts will be drilled to the scheduled depth and temporary 8-foot diameter steel casings (up to 120 feet in length) will be driven with a crane-mounted vibratory hammer or oscillator. Then, reinforcing cages will be placed into the excavation and the shaft will be filled with concrete (by tremie methods, if ground water is present). After completion of the shafts above the water surface, the temporary steel casings will be removed using a crane-mounted vibratory hammer, if possible or will be cut below finished grade and the upper section removed if it is not possible to extract the entire length.

All landside piers and the cross beam associated with the in-water H-pier will be located above OHW. The H-pier shafts and cross beams will be formed, reinforced, and filled with concrete. The shafts for all other piers will be formed, reinforcement installed, and concrete placed. Concrete will be pumped into the formwork, allowing the concrete placement to be controlled and avoiding any spills. Once concrete placement is complete and the concrete begins curing, the formwork for the pier crossbeams will begin. The H-pier cross beam forms will be installed on temporary scaffolding, followed by reinforcement and concrete. After curing is complete, the formwork will be stripped from the pier and crossbeams. After the crossbeam forms are removed, the piers will be ready for the superstructure.

For both landside abutments, the first step will be to excavate for the footing of the abutment. It is anticipated that end-bearing steel H-piling will be driven to the required capacity/depth, then the footing will be formed, reinforcement installed, and the footing concrete poured. The pile driver for the steel H-piling for the landside abutments will be a crane-mounted, diesel-powered
impact hammer, and will have a maximum noise level of 120 dBA. The maximum size for the permanent piling at the abutments is anticipated to be HP 14 by 89 with no taper, approximately 100 feet in length. Next, the abutment walls and bearing seats will be formed, reinforcement installed, and the concrete for the abutment walls and bearing seat placed. The forms will be stripped, the bearings placed, and the abutment will be ready for installation of the superstructure.

All concrete bridge support structures are anticipated to be constructed using reusable formwork. Once the drilled shafts are complete, reinforcement will be installed and the formwork will be put around the reinforcement cages. Concrete will be pumped into the formwork, allowing the concrete placement to be controlled and avoiding any spills. Once concrete placement is complete and the concrete begins curing, the formwork for the pier cross beams will begin. The crossbeams will be constructed using temporary scaffolding. The formwork will be installed, reinforcement placed, and the concrete placed into the formwork. After curing is complete, the formwork will be stripped from the pier and cross beams.

Construction of the temporary pipe piles for the access bridges and steel casing for the in-water pier is anticipated to take three months; H-pile installation at the abutments is anticipated to take 18 working days. On average, one H-pile at the abutments, one to eight temporary steel pipe piles, and one-half of an in-water steel casing in Kellogg Creek can be installed per day. Work could be scheduled to occur at any time of the day during the in-water work window for Kellogg Creek (July 15 to September 30). If night work is scheduled, mobile light plants would be used as required, but lights would be directed away from the water surface to the extent practicable.

Once the abutments and piers are constructed, prefabricated structural members will be picked and placed on to the pier caps and abutments with the use of cranes. The prefabricated structural members will be constructed offsite and delivered to the construction site using trucks. Scaffolding and formwork will be used to construct the superstructure of the bridge. During concrete placement activities, the formwork for the superstructure will be diapered to prevent dropping fresh concrete into the water or onto the roadway below. The temporary formwork and scaffolding will be removed once the superstructure is complete.

In addition to the LRT bridge, a pedestrian bridge, which would also accommodate bicycles, is proposed to be built over Kellogg Lake. When constructed by the City of Milwaukie, it will be attached underneath the LRT bridge superstructure. Construction of the approximately 240-foot pedestrian structure would include the installation of Americans with Disabilities Act (ADA)-compliant approach ramps on both the north and south banks attached to concrete substructure supports that would support the main pedestrian superstructure. The anticipated superstructure could consist of a prefabricated 14-foot-wide steel truss with a concrete walking surface attached to the lower chord. The truss would be fabricated offsite and delivered to the construction site using trucks. Fabrication offsite eliminates the potential for materials used in fabrication to fall into the waterway.

Total in-water work construction time entails approximately 12 weeks for both the installation of the temporary piles for the work bridges and the permanent in-water pier. Fill from the permanent piles below existing OHW will cover approximately 60 square feet of the lake.
bottom. The temporary piles for work bridges below existing OHW will cover approximately 200 square feet.

Permanent shading of the river from the bridge would total approximately 3,600 square feet. Temporary shading from the work bridges would total approximately 800 square feet. At Kellogg Lake, encroachments into the riparian areas will include temporary access roads above OHW, temporary access bridges, material staging areas, landside piers, and approach structures. Areas of riparian encroachments from access roads, bridges, or material staging areas will be revegetated per City of Milwaukie requirements.

**Minimization, Conservation Measures, Mitigation and Monitoring.**

To reduce effects at all construction sites, erosion and sediment control measures will be put in place, all disturbed areas will be restored during post-construction site restoration, and staging areas will be located at least 150 feet from any waterbody. The following conservation measures, as outlined in the section 6.2 of the BA, are relevant to the effects on ESA-listed species:

- Erosion, Sediment and Pollution Control Plan
- In-water work period
- Piling installation, removal and hydroacoustic monitoring
- Fish capture and removal and work area isolation
- Site preparation and staging areas
- Resuspension of contaminated sediments and scour protection

Additional conservation measures are outlined in the BA. All monitoring reports will be submitted to NMFS.

Mitigation has been proposed as part of the PMLR project to offset adverse effects to ESA-listed species and their habitat. Table 1 summarizes the proposed mitigation for each project component. See Figure 3 for proposed shallow-water habitat mitigation area.

Hydroacoustic monitoring of impact pile installation will occur according to a protocol approved by NMFS. A Hydroacoustic Monitoring Plan will be developed from an approved template. Hydroacoustic monitoring will be implemented by a contractor with proven expertise in the field of underwater acoustics and data collection. If threshold sound levels are exceeded during monitoring, pile driving will cease, NMFS will be notified, and corrective actions will be taken and clearly documented before work continues.

To limit hydroacoustic impacts to listed species, unattenuated impact pile driving to obtain baseline sound measurements will be conducted in the time period of July 1 through October 31 for the Willamette River and July 15 to September 30 for Kellogg Lake, or as defined in the Hydroacoustic Monitoring Plan. Unattenuated impact pile driving for obtaining baseline sound measurements will be limited to the number of piles necessary to obtain an adequate sample size for the project, as defined in the final Hydroacoustic Monitoring Plan.
Within 60 days of completing the hydroacoustic monitoring, a report shall be submitted to NMFS. Content of the report shall be determined during approval of the Hydroacoustic Monitoring Plan.

NMFS relied on the foregoing description of the proposed action, including all features identified to reduce adverse effects (BMPs and mitigation), to complete this consultation. To ensure that this biological opinion remains valid, NMFS requests that the action agency or applicant keep NMFS informed of any changes to the proposed action.

**Table 1.** Summary of impacts and proposed mitigation for PMLR crossings.

<table>
<thead>
<tr>
<th>Location</th>
<th>Impact</th>
<th>Proposed mitigation activity</th>
<th>Location of proposed mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Willamette River crossing</td>
<td>44,000 ft² of permanent scour protection at tower 3</td>
<td>Removal of 20,000 square feet of derelict piles and creation of 25,500 square feet of shallow-water habitat</td>
<td>Lower Willamette River</td>
</tr>
<tr>
<td></td>
<td>21,500 ft² placed in shallow water (&lt; 20 feet)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Willamette River crossing</td>
<td>47,000 ft² of permanent scour protection placed in deep water (&gt; 20 feet) at tower 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Willamette River crossing</td>
<td>Temporary impacts (during 3-4 years of construction) from 126 work bridge pilings and 1,415 ft² permanent impacts from drilled shafts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Willamette River crossing</td>
<td>13,500 ft² of permanent impacts from scour protection at temporary work bridges</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11,500 ft² in shallow water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crystal Springs and Johnson Creek</td>
<td>1.1 acres wetland fill</td>
<td>Partial funding of Westmoreland Park Restoration Project or purchase of credits at Foster Creek mitigation bank</td>
<td>Crystal Springs at Westmoreland Park or Foster Creek</td>
</tr>
<tr>
<td>Kellogg Lake crossing</td>
<td>60 ft² of permanent impact to critical habitat and EFH</td>
<td>Native species planting for 100-300 linear feet and removal of 12 derelict piles and associated bracing</td>
<td>Kellogg Lake</td>
</tr>
</tbody>
</table>
Figure 3. Proposed shallow-water mitigation area in South Waterfront District of Portland, OR, approximately river mile 13.5. Shaded blue area is the proposed shallow-water habitat to be created.
**Action Area**

Action area means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). For this consultation, the action area is described below for each waterbody. See Figure 1 for exact locations of each crossing. The action area is defined by the linear extent of noise from driving the steel piles based on an analysis using a spreadsheet developed by NMFS\(^5\) (pile driving analysis) to model levels of underwater sound received by fish exposed to pile driving (Table 2 and Appendix A).

**Table 2.** Extent of action area as defined by pile driving analysis within a line of sight radius that originates from each pile.

<table>
<thead>
<tr>
<th>Project Component</th>
<th>Maximum number of pile strikes per day with impact hammer</th>
<th>Extent of action area based on pile driving analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Willamette River Bridge</td>
<td>800</td>
<td>17,775 ft (5412 m)(^*)</td>
</tr>
<tr>
<td>Kellogg Lake Bridge</td>
<td>400</td>
<td>2814 ft (858 m)(^*)</td>
</tr>
</tbody>
</table>

\(^*\)This theoretical distance is based on calculations of sound generated from pile driving and the assumption that sound travels unobstructed; when the action occurs on the landscape, the distance is reduced due to dampening of sound by geological features such as islands, river banks and bends in the river.

For the Crystal Springs Creek and Johnson Creek bridges (Figure 1), there is no in-water pile driving and thus the action area is determined by the construction area and associated staging. The action area extends 500 feet upstream and downstream from the stream crossing at these two sites.

**ENDANGERED SPECIES ACT BIOLOGICAL OPINION**

Section 7(a)(2) of the ESA requires Federal agencies to consult with NMFS to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. The Opinion that follows records the results of the interagency consultation for this proposed action. The ITS provided after the Opinion specifies (1) the impact of any taking of threatened or endangered species that will be incidental to the proposed action; (2) reasonable and prudent measures that NMFS considers necessary and appropriate to minimize such impact, and (3) nondiscretionary terms and conditions (including, but not limited to, reporting requirements) that must be complied with by the Federal agency, applicant (if any), or both, to carry out the reasonable and prudent measures.

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To complete the jeopardy analysis presented in this Opinion, NMFS reviewed the status of each listed species\(^6\) considered in this consultation, the environmental baseline in the action area, the effects of the action, and cumulative effects (50 CFR 402.14(g)). From this analysis, NMFS determined whether effects of the action were likely, in view of existing risks, to appreciably reduce the likelihood of both the survival and recovery of the affected listed species.

For the critical habitat adverse modification analysis, NMFS considered the status of the entire designated area of the critical habitat considered in this consultation, the environmental baseline in the action area, the likely effects of the action on the function and conservation role of the affected critical habitat, and cumulative effects. NMFS used this assessment to determine whether, with implementation of the proposed action, critical habitat would remain functional, or retain the current ability for the primary constituent elements (PCEs) to become functionally established, to serve the intended conservation role for the species.\(^7\)

If the action under consultation is likely to jeopardize the continued existence of an ESA-listed species, or destroy or adversely modify critical habitat, NMFS must identify any reasonable and prudent alternatives for the action that avoid jeopardy or destruction or adverse modification of critical habitat and meet other regulatory requirements (50 CFR 402.02).

**Status of the Species and Critical Habitat**

The summaries that follow describe the status of the ESA-listed species, and their designated critical habitats, that occur within the geographic area of this proposed action and are considered in this Opinion. More detailed information on the status and trends of these listed resources, and their biology and ecology, can be found in the listing regulations and critical habitat designations published in the Federal Register (Table 3).

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\(^6\) An “evolutionarily significant unit” (ESU) of Pacific salmon (Waples 1991) and a “distinct population segment” (DPS) (Policy Regarding the Recognition of District Vertebrate Population; 61 FR 4721, Feb 7, 1996) are both “species” as defined in section 3 of the ESA.

\(^7\) Memorandum from William T. Hogarth to Regional Administrators, Office of Protected Resources, NMFS (November 7, 2005) (Application of the “Destruction or Adverse Modification” Standard Under Section 7(a)(2) of the Endangered Species Act).
Table 3. Federal Register notices for final rules that list threatened and endangered species, designate critical habitats, or apply protective regulations to listed species considered in this consultation. Listing status: ‘T’ means listed as threatened under the ESA.

<table>
<thead>
<tr>
<th>Species</th>
<th>Listing Status</th>
<th>Critical Habitat</th>
<th>Protective Regulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinook salmon (Oncorhynchus tshawytscha)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower Columbia River</td>
<td>T 6/28/05; 70 FR 37160</td>
<td>9/02/05; 70 FR 52630</td>
<td>6/28/05; 70 FR 37160</td>
</tr>
<tr>
<td>Upper Willamette River</td>
<td>T 6/28/05; 70 FR 37160</td>
<td>9/02/05; 70 FR 52630</td>
<td>6/28/05; 70 FR 37160</td>
</tr>
<tr>
<td>Coho salmon (O. kisutch)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower Columbia River</td>
<td>T 6/28/05; 70 FR 37160</td>
<td>Not applicable</td>
<td>6/28/05; 70 FR 37160</td>
</tr>
<tr>
<td>Steelhead (O. mykiss)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower Columbia River</td>
<td>T 1/05/06; 71 FR 834</td>
<td>9/02/05; 70 FR 52630</td>
<td>6/28/05; 70 FR 37160</td>
</tr>
<tr>
<td>Upper Willamette River</td>
<td>T 1/05/06; 71 FR 834</td>
<td>9/02/05; 70 FR 52630</td>
<td>6/28/05; 70 FR 37160</td>
</tr>
</tbody>
</table>

It is also likely that climate change will play an increasingly important role in determining the abundance of ESA-listed species, and the conservation value of designated critical habitats, in the Pacific Northwest. During the last century, average regional air temperatures increased by 1.5°F, and increased up to 4°F in some areas (USGCRP 2009). Warming is likely to continue during the next century as average temperatures increase another 3 to 10°F (USGCRP 2009). Overall, about one-third of the current cold-water fish habitat in the Pacific Northwest is likely to exceed key water temperature thresholds by the end of this century (USGCRP 2009).

Precipitation trends during the next century are less certain than for temperature but more precipitation is likely to occur during October through March and less during the summer, and more of the winter precipitation is likely to fall as rain rather than snow (ISAB 2007, USGCRP 2009). Where snow occurs, a warmer climate will cause earlier runoff so stream flows in late spring, summer, and fall will be lower and water temperatures will be warmer (ISAB 2007, USGCRP 2009).

Higher winter stream flows increase the risk that winter floods in sensitive watersheds will damage spawning redds and wash away incubating eggs (USGCRP 2009). Earlier peak stream flows will also flush some young salmon and steelhead from rivers to estuaries before they are physically mature, increasing stress and the risk of predation (USGCRP 2009). Lower stream flows and warmer water temperatures during summer will degrade summer rearing conditions, in part by increasing the prevalence and virulence of fish diseases and parasites (USGCRP 2009). Other adverse effects are likely to include altered migration patterns, accelerated embryo development, premature emergence of fry, and increased competition and predation risk from warm-water, non-native species (ISAB 2007).

The earth’s oceans are also warming, with considerable interannual and inter-decadal variability superimposed on the longer-term trend (Bindoff et al. 2007). Historically, warm periods in the coastal Pacific Ocean have coincided with relatively low abundances of salmon and steelhead, while cooler ocean periods have coincided with relatively high abundances (Scheuerell and
Williams 2005, Zabel et al. 2006, USGCRP 2009). Ocean conditions adverse to salmon and steelhead may be more likely under a warming climate (Zabel et al. 2006).

**Status of the Species.** Over the past few decades, the sizes and distributions of the populations considered in this Opinion generally have declined due to natural phenomena and human activity, including the operation of hydropower systems, over-harvest, hatcheries, and habitat degradation. Enlarged populations of terns, seals, sea lions, and other aquatic predators in the Pacific Northwest have been identified as factors that may be limiting the productivity of some Pacific salmon and steelhead populations (Bottom et al. 2005, Fresh et al. 2005).

**LCR Chinook salmon.** The range of this species includes all naturally-spawned populations of Chinook salmon from the Columbia River and its tributaries from its mouth at the Pacific Ocean upstream to a transitional point between Washington and Oregon, east of the Hood River and the White Salmon River, and includes the Willamette River to Willamette Falls, Oregon, exclusive of spring-run Chinook salmon in the Clackamas River. Historical records of Chinook salmon abundance are sparse, but cannery records suggest a peak run of 4.6 million fish in 1883. Although fall-run Chinook salmon are still present throughout much of their historical range, they are still subject to large-scale hatchery production, relatively high harvest, and extensive habitat degradation. The spring-run populations are largely extirpated as a result of dams that block access to their higher-elevation habitat. Abundances largely declined during 1998-2000 and trend indicators for most populations are negative, especially if hatchery fish are assumed to have a reproductive success equivalent to that of natural-origin fish. However, 2001 and 2002 abundance estimates increased for most LCR Chinook salmon populations over the previous few years (Good et al. 2005).

Factors limiting recovery for LCR Chinook salmon are reduced access to spawning/rearing habitat in tributaries, hatchery impacts, loss of habitat diversity and channel stability in tributaries, excessive sediment in spawning gravel, elevated water temperature in tributaries, and harvest impacts on fall Chinook (NMFS 2005, NMFS 2006). The NMFS (2007) identified degraded estuarine and nearshore habitat; floodplain connectivity, and function; channel structure and complexity; riparian areas and large wood; stream substrate, streamflow; fish passage; and harvest and hatchery impacts as the major factors limiting the recovery of this species.

LCR Chinook salmon in the action area are part of the Clackamas fall-run population. Based on a recent viability status report (McElhany et al. 2007), there are no reliable abundance data for this population, but estimates put the population in the “extirpated or nearly so” persistence category based on the minimum abundance threshold. There is no abundance or productivity evidence supporting the existence of a viable, natural-origin population in the Clackamas. This population is at significant risk based on the criteria for diversity, spatial structure, and abundance and productivity. From the perspective of all viability criteria, LCR Chinook in

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8 McElhany et al. 2007 (Table 1) defines population risk as the following percentage probability of extinction in 100 years: “extinct or very high risk” has a 60-100% probability; “high risk” has a 25-60% probability; “moderate risk” has a 5-25% probability; “low or negligible risk” has a 1-5% probability; and “very low risk” has a >1% probability. At the ESU level, risk is described more generally from the perspective of all populations and viability criteria.
Oregon are at high risk (McElhany et al. 2007). Habitat degradation in the basin has reduced the spatial distribution of suitable habitats for fall Chinook.

**UWR spring-run Chinook salmon.** The UWR spring-run Chinook salmon includes seven populations of native spring-run populations above Willamette Falls and in the Clackamas River. All the populations are in a single stratum since they share a similar life history pattern (spring run) and a single ecozone (McElhany et al. 2003, Myers et al. 2006). All populations are present in the action area during some portion of the year.

Numbers of spring Chinook salmon in the Willamette River basin are extremely depressed (McElhany et al. 2007). Historically, the spring run of Chinook may have exceeded 300,000 fish (Myers et al. 2003). The current abundance of wild fish is less than 10,000 fish, and only two populations (McKenzie and Clackamas) have significant natural production. The UWR Chinook have been adversely affected by the degradation and loss of spawning and rearing habitat (loss of 30 to 40%) associated with hydropower development, and interaction with a large number of natural-spawning hatchery fish. Other limiting factors include altered water quality and temperature, lost and degraded floodplain connectivity and lowland stream habitat, and altered streamflow in the tributaries (NMFS 2005, NMFS 2006). The NMFS (2007) identified degraded floodplain connectivity and function, channel structure and complexity, riparian areas and large wood recruitment, water quality, fish passage, and hatchery impacts as the major factors limiting recovery of this species.

McElhany et al. (2007) analyzed the population criteria (diversity, spatial structure, and abundance and productivity) for UWR Chinook salmon and found that the risk of extinction is high. The Clackamas population exhibited the lowest extinction risk. However, five of the seven populations were clearly in the high risk category, and thus the ESU can be characterized as having a high risk of extinction.

Chinook salmon generally spawn and rear in mainstem reaches of large rivers such as the Willamette River and the Clackamas River. Juvenile Chinook salmon that have emerged from spawning sites in the Upper Willamette River watershed use the lower mainstem Willamette River and Columbia Slough through Portland for temporary rearing as they migrate to the ocean.

**LCR coho salmon.** This ESU includes 25 populations that historically existed in the Columbia River basin from the Hood River downstream (McElhany et al. 2007). The boundaries do not extend into the upper Willamette portion of the basin because Willamette Falls is a natural barrier to fall-migrating salmon and steelhead. In general, wild coho in the Columbia River basin have been in decline for the last 75 years. The number of wild coho returning historically was at least 600,000 fish (Chapman 1986). As recently as 1996, the total return of wild fish may have been as few as 400 fish (Chilcote 1999). Of the 25 historical populations, only the Clackamas and Sandy populations show direct evidence that coho production is not reproductively dependent on the spawning of stray hatchery fish (McElhany et al. 2007). However, in the last 5 years there has been an increase in the abundance of wild coho in the Clackamas and Sandy rivers, plus a reappearance of moderate numbers of wild coho in the Scappoose and Clatskanie rivers after a 10-year period in the 1990s when they were largely absent (McElhany et al. 2007).
The NMFS (2007) identified floodplain connectivity and function, degraded channel structure and complexity, degraded riparian areas and large wood recruitment, degraded stream substrate, degraded streamflows, degraded water quality, and harvest and hatchery impacts as the major factors limiting recovery of LCR coho salmon.

The Clackamas population would be the most likely population found in the action area. Based on a recent analysis, this population is most likely in the low risk category for abundance and productivity, although all the other populations are in the high or very high risk category (McElhany et al. 2007). Spatial structure scores are reduced because of significant habitat degradation in lower basin tributaries such as Johnson and Kellogg creeks, and other urbanized portions of the Lower Willamette River, Multnomah Channel, and Sauvie Island. This habitat loss has reduced the population’s diversity score. Despite this, the Clackamas population is the only population in Oregon’s portion of the species that is most likely in the viable category, and the risk of extinction for LCR coho in Oregon remains high (McElhany et al. 2007).

**LCR steelhead.** This species includes all naturally spawning populations of steelhead in streams and tributaries of the Columbia River between, and including, the Cowlitz and Wind rivers in Washington, along with, and including, the Willamette River and Hood River in Oregon. Excluded are steelhead from the Upper Willamette River basin above Willamette Falls and steelhead from the Little and Big White Salmon rivers in Washington (NMFS 2004).

Five populations of winter steelhead and one population of summer steelhead exist in Oregon (McElhany et al. 2007). The population most likely to be present in the action area is the Clackamas River population, which is part of the Cascade winter stratum.

In general, wild steelhead numbers are depressed from historical levels but probably exist in most of their historical range, and all historical populations are believed to be extant. However, up until recent years, the presence of naturally spawning hatchery fish in most populations has been high (McElhany et al. 2007).

The Clackamas population is at low risk for abundance and productivity, although the future impacts of human population growth and climate change add a degree of uncertainty (McElhany et al. 2007). The Upper Clackamas River basin contains most of the historically-productive habitat, and most of that habitat is of high quality today. For the species, the overall risk classification for Oregon LCR steelhead is moderate, with the Clackamas population at the lowest risk.

Factors limiting recovery for LCR steelhead are degraded floodplain and stream channel structure and function, reduced access to spawning/rearing habitat, altered streamflow in tributaries, excessive sediment and elevated water temperatures in tributaries, and hatchery impacts (NMFS 2005, NMFS 2006). The NMFS (2007) identified degraded floodplain connectivity and function, channel structure and complexity, riparian areas and large wood recruitment, stream substrate, streamflow, water quality, fish passage and predation/competition as the major factors limiting recovery of this species.
**UWR steelhead.** This species consists of four populations: the Molalla, North Santiam, South Santiam, and Calapooia. All populations of UWR steelhead migrate through and rear in the action area. These populations are depressed from historical levels, with adverse impacts from the alteration and loss of spawning and rearing habitat associated with hydropower development. Based on recent analyses of the population criteria, McElhany et al. (2007) concluded that the species risk of extinction is moderate, with the highest risk category being genetic diversity.

Habitat loss, hatchery steelhead introgression, and harvest are the major contributors to the decline of this species. Willamette Falls (RM 26.5) is a known migration barrier. Winter-run steelhead and spring-run Chinook salmon historically occurred above the falls, whereas summer-run steelhead, fall-run Chinook, and coho salmon did not. Detroit and Big Cliff dams have cut off access to 335 miles of spawning and rearing habitat in the North Santiam River. In general, habitat in this species has become substantially simplified since the 1800s by removal of large wood to increase the river’s navigability.

The NMFS (2007) identified degraded floodplain connectivity and function, channel structure and complexity, riparian areas and large wood recruitment, streamflow, fish passage, and predation/competition and disease as the major factors limiting recovery of this species.

**Status of Critical Habitat.** Climate change, as described in the introduction above, is likely to adversely affect the conservation value of designated critical habitats in the Pacific Northwest. These effects are likely to include, but are not limited to, depletion of cold water habitat and other variations in quality and quantity of tributary spawning, rearing and migration habitats and estuarine areas.

The action area is within designated critical habitat for the affected salmonid species, except LCR coho salmon, for which critical habitat has not been proposed or designated. The PCEs found at the project site are freshwater rearing and freshwater migration (Table 4).

The NMFS designated critical habitat for all species considered in this Opinion, except LCR coho salmon, for which critical habitat has not been designated. To assist in the designation of salmonid critical habitat in 2005, NMFS convened a critical habitat review teams (CHARTs), organized by major geographic areas that roughly correspond to salmon recovery planning domain (NOAA Fisheries 2005). Each CHART consisted of Federal biologists and habitat specialists from NMFS, the Fish and Wildlife Service, the Forest Service, and the Bureau of Land Management, with demonstrated expertise regarding salmon and steelhead habitat and related protective efforts within that domain.

In designating these critical habitats, NMFS organized information at scale of the watershed or 5th field hydrologic unit code (HUC5) because that scale largely corresponds to the spatial distribution and site fidelity of Pacific salmon and steelhead populations (WDF et al. 1992, McElhany et al. 2000). The NMFS reviews the status of designated critical habitat affected by the proposed action by examining the condition and trends of PCEs throughout the designated area. The action area was rated medium and high (Table 5). PCEs consist of the physical and
biological features identified as essential to the conservation of the listed species in the documents that designate critical habitat (Table 4).

The value of critical habitat for the species is limited by poor water quality, altered hydrology, lack of floodplain connectivity and shallow-water habitat, and lack of complex habitat to provide forage and cover.

Table 4. PCEs of critical habitats designated for ESA-listed salmon and steelhead species considered in the Opinion (except Snake River spring/summer run Chinook salmon, Snake River fall-run Chinook salmon, Snake River sockeye salmon, and Southern Oregon/Northern California Coasts coho salmon), and corresponding species life history events.

<table>
<thead>
<tr>
<th>Primary Constituent Elements</th>
<th>Species Life History Event</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Site Type</strong></td>
<td><strong>Site Attribute</strong></td>
</tr>
<tr>
<td>Freshwater rearing</td>
<td>Floodplain connectivity</td>
</tr>
<tr>
<td></td>
<td>Forage</td>
</tr>
<tr>
<td></td>
<td>Natural cover</td>
</tr>
<tr>
<td></td>
<td>Water quality</td>
</tr>
<tr>
<td></td>
<td>Water quantity</td>
</tr>
<tr>
<td>Freshwater migration</td>
<td>Free of artificial obstruction</td>
</tr>
<tr>
<td></td>
<td>Natural cover</td>
</tr>
<tr>
<td></td>
<td>Water quality</td>
</tr>
<tr>
<td></td>
<td>Water quantity</td>
</tr>
</tbody>
</table>
Table 5. Summary of CHART ratings for conservation values of critical habitat in action area. N/A indicates that the waterbody was not part of the ESU evaluated. The mainstem Willamette was rated as important corridor that all species must use when migrating to the ocean.

<table>
<thead>
<tr>
<th></th>
<th>LCR steelhead</th>
<th>LCR Chinook</th>
<th>UWR Chinook</th>
<th>UWR steelhead</th>
</tr>
</thead>
<tbody>
<tr>
<td>Willamette River</td>
<td>High</td>
<td>High</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Johnson Creek</td>
<td>High</td>
<td>Medium</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Crystal Springs</td>
<td>High</td>
<td>Medium</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Kellogg Creek</td>
<td>High</td>
<td>Medium</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

All waterbodies affected in the proposed action are rated medium or high conservation value for critical habitat. All action areas are located in urban areas where the habitat has been degraded due to past land use practices including stormwater runoff and urban development.

Environmental Baseline

The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process (50 CFR 402.02). For more details about the environmental baseline in the action area refer to Section 3 of the BA.

Since 1850, both primary channel and side channels have been lost in the Lower Willamette (Gregory 2002). Much of the off-channel and beach type habitat has been lost over the years due to development and channelization. With development comes clearing of riparian vegetation and direction of stormwater to the river. Gravel continues to be extracted from the river and floodplain and much of the sediment trying to move downstream in the Willamette River is blocked by dams. These river changes contribute to the limiting factors identified for ESA-listed species using the action area.

The Willamette River is approximately 1,400 feet wide and approximately 45 feet deep in the action area. The banks in the action area are comprised of numerous commercial and industrial facilities separated from the river by a public, multi-use pathway in some locations. Remnant riparian vegetation communities on both banks are highly disturbed and dominated by invasive species. The portion of the Willamette River located in the project area currently is on Oregon’s 303(d) list because it does not meet water quality standards for multiple contaminants, biological criteria and bacteria (DEQ 2009).

Crystal Springs Creek is not on the state’s 303(d) list for any parameters (DEQ 2009), nor have there been any Total Maximum Daily Load standards developed for it. Its water quality is
assumed to be consistent with the other urban streams encountered along the project corridor, though it is worth noting that it originates from springs east of Reed Lake and is considered to be the purest water source in the Johnson Creek watershed. Also, Crystal Springs Creek is one of a handful of historic waterways in the City of Portland that has not been paved, rerouted, or drained

At the location where the project is proposed to cross Crystal Springs Creek, the creek channel is 1 to 2 feet deep and 15 to 20 feet wide. About 37% of the Crystal Springs Creek watershed is covered by impervious surface, and the majority of the channel flows through developed areas from its origin at Crystal Springs Lake at Reed College.

The lower portion of Johnson Creek flows primarily through urbanized land with industrial, commercial, and residential areas. This is in contrast to the eastern portion of the creek, which flows through undeveloped open space, rural residential areas, and agricultural land. Overall, 54% of the watershed is residential, 33% is rural, 8% is commercial/industrial, and 5% is parks and open space (JCWC 2009). About 39% of the lower portion of Johnson Creek is covered by impervious surface, which is associated with road-building and development.

At the proposed LRT crossing, Johnson Creek’s floodplain is restricted by the high-density commercial and transportation facilities located adjacent to the site. The active channel width is approximately 35 feet, with bank slopes less than 30% and average channel depth of approximately 8 feet.

Within the project area, Kellogg Creek exists as an artificially impounded reservoir; therefore, its substrate is likely dominated by fines and its habitat is a fairly uniformly shaped pool. Very little instream habitat diversity exists in this location, limiting refugia and spawning opportunities that might otherwise be present at the site. Some woody debris has accumulated on the upstream side of the UPRR trestle pilings during flood events, but little or no large wood that meets the 60-centimeter-diameter/50-foot-length standard was present. The existing habitat elements at this site indicate that the creek is not properly functioning in terms of meeting salmonid biological requirements.

Within the project area, Kellogg Creek provides rearing and migration habitat for fall-run LCR Chinook salmon, LCR coho salmon, and winter-run LCR steelhead. Kellogg Dam, at the confluence of Kellogg Creek and the Willamette River, is the only fish barrier downstream of the project area. The box culvert and fish ladder under SE McLoughlin Boulevard is a partial fish barrier.

**Species within the Action Area**

The action area in the Willamette is located downstream of the Clackamas River and Johnson Creek watersheds. The Clackamas River is the natal stream for populations of UWR Chinook, LCR Chinook, LCR steelhead and LCR coho and Johnson Creek is the natal stream for LCR Chinook and coho. NMFS expects that many ESA-listed fish found in the action area are likely to have been produced in the Lower Willamette River tributaries.
Additionally, those fish produced in the upper river, above Willamette Falls, migrate through the action area. According to the 2005 Friesen study, Chinook in the action area are subyearlings from lower basin tributaries, such as the Clackamas River, and larger yearlings are from the upper basin tributaries, such as the Santiam River. Since the Willamette River is a migratory corridor, both adult and juvenile life history stages are expected to be in the action area. During the proposed in-water work window, it is likely that juveniles of all species will be present and Chinook adults will be migrating upstream.

In Johnson, Crystal Springs and Kellogg creeks only juvenile life history stages will be present during construction of the proposed project. No adults will be present.

Individuals in the action area are exposed to reduced water quality, lack of suitable habitat and restricted movement due to developed urban areas and land use practices. These stressors already exist and are in addition to any additional adverse effects produced by the proposed action.

**Critical Habitat within the Action Area**

All action areas of the proposed project are located in developed urban areas. Species in the action area are exposed to reduced water quality, a multitude of fish barriers, insufficient riparian areas and lack of floodplain.

The proposed Willamette River bridge would be located adjacent to a shallow area. As discovered in a recent Lower Willamette River study, beach areas provide important habitat for ESA-listed fish and seem to be the preferred nearshore habitat type for juvenile coho (Friesen 2005). A primary recommendation of this multi-year study is to protect existing beach habitat (Friesen 2005). Additional development in beach and shallow water areas may prevent access to these areas by ESA-listed fish for rearing and migration.

In Johnson, Crystal Springs and Kellogg creeks the action area is surrounded by dense development and experiences seasonal flooding due to reduce channel capacity and limited access to the adjacent floodplain. Crystal Springs and Kellogg creeks have multiple fish passage barriers that prevent free passage for some life stages and during some flow conditions.

**Effects of the Action**

Effects of the action refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

The effects of the proposed PMLR project include those associated with construction activities (contaminants and suspended sediments, reduction and disturbance of aquatic habitat,
hydroacoustics) and post-construction (shading and stormwater) and handling of fish during fish salvage.

**Suspended Sediments.** Of the four crossings, only two are likely to result in increased suspended sediments – Willamette River and Kellogg Lake. Contaminants that are likely to be present in the sediments on the west side of the Willamette River include antimony, cadmium, copper, lead, mercury, nickel, zinc, PAHs, and TBT. Contaminants on the east side may include PCBs, mercury, cadmium, DDT, DDE, dichlorodiphenyldichloroethane (DDD), chlordane, PAHs, TBT, and dioxin/furans. Sediments in Kellogg Lake have been shown to be contaminated with PCBs and pesticides.

Toxicological effects of these pollutants are dependent on their concentration, composition and environmental condition. Of these pollutants, PCBs appear to have the most ecological risk to benthic organisms, fish, and other aquatic life. PCBs have been identified as a carcinogen, bioaccumulate through the food chain, and are linked to liver, stomach and thyroid damage, and immune disorders in fish (Meador *et al.* 2001).

At Kellogg Lake, temporary piles and steel casing will be driven and may result in suspended sediment increases. Any suspended sediment is not likely to travel far due to the project proximity to Kellogg Dam downstream and low water levels during the summer in-water work window. In addition, a clean layer of sand may be placed to prevent suspending contaminated sediments. Due to low numbers of fish present and the proximity to the dam, adverse effects from suspended sediment are not expected.

At the Willamette River bridge, clean sand and rock will be placed to prevent contaminants from being suspended and adversely affecting salmon and steelhead in the project area. These measures, along with working during the summer when the fewest ESA-listed species are present will reduce exposure of these fishes to contaminants. However, placing rock in the Willamette River for permanent scour protection is likely to result in an adverse affect on the designated critical habitat in the project area as discussed below.

**Aquatic Habitat Modification.** Permanent placement of pilings at the Kellogg and Willamette crossings and placement of permanent scour protection in the Willamette will adversely affect ESA-listed species and their habitat. The shallow-water areas affected are important for rearing and migration of ESA-listed species, especially juveniles (Friesen 2007). Although the number of predators in the Lower Willamette is thought to be low (Friesen 2005), the conversion of shallow-water habitat from small grained sediment to the proposed riprap is likely to provide additional desirable habitat for predators such as smallmouth bass. It is unknown whether additional predators would use this new habitat in significant numbers.

**Creation of Shallow-Water Habitat for Mitigation.** Beaches and shallow-water habitat have been lost in the Willamette River basin over time and as a result this type of habitat has become more limited. Loss of habitat is a limiting factor for ESA-listed species in the Willamette River basin and most populations in the basin must pass through the Lower Willamette River on both upstream and downstream migration.
To offset the adverse impacts of permanently modifying habitat, a shallow-water beach area will be created in the Lower Willamette River and derelict pilings will be removed (Table 1). The creation of shallow-water habitat will provide an area for ESA-listed species to feed, rest and seek refuge in the Lower Willamette River. In addition, the removal of piling in the Lower Willamette River and Kellogg Lake will increase the contiguous shallow water available to juvenile salmon and steelhead. ESA-listed species in Crystal Springs Creek will also benefit from the proposed riparian and wetland restoration at Westmoreland Park. The proposed project will improve fish passage by removing barriers and improve water quality by improving riparian vegetation. Both of these mitigation projects will undergo separate consultation under section 7 of the ESA at a later date once the designs and details are finalized.

**Hydroacoustics.** Biological effects to ESA-listed Pacific salmon are likely to result from the high sound pressures produced if piles are driven with an impact hammer. To reduce sound impacts on fishes, vibratory hammers can be used instead of impact hammers, size of piles can be reduced and sound attenuation devices can be employed during pile driving. Vibratory hammers do not reach levels of concern even when piles are many times larger than proposed for this project are driven (up to 72 inches in diameter; CALTRANS 2007). For the proposed project, the maximum impact (24-inch piles) using an impact hammer to drive piles was analyzed.

Fishes with swimbladders (including salmonids) are sensitive to underwater impulsive sounds, *i.e.*, sounds with a sharp sound pressure peak occurring in a short interval of time, (Caltrans 2001). As the pressure wave passes through a fish, the swimbladder is rapidly squeezed due to the high pressure, and then rapidly expanded as the under pressure component of the wave passes through the fish. The pneumatic pounding may rupture capillaries in the internal organs as indicated by observed blood in the abdominal cavity, and maceration of the kidney tissues (Caltrans 2001). The injuries caused by such pressure waves are known as barotraumas, and include hemorrhage and rupture of internal organs, as described above, and damage to the auditory system. Death can be instantaneous, can occur within minutes after exposure, or can occur several days later. A multi-agency work group determined that to protect listed species, sound pressure waves should be within a single strike threshold of 206 dB, and for cumulative strikes 187 dB sound exposure level (SEL) where fish are larger than 2 grams (NMFS 2008). Based on the pile driving analysis in Appendix A, the proposed pile driving is likely to meet the 187 dB threshold at 521 feet from each pile in the Willamette River and 154 feet from each pile in Kellogg Creek.

NMFS assumes a 10 dB attenuation with the use of a confined bubble curtain when the bubble curtain is set up and operated properly. However, a bubble curtain is not likely to bring the sound pressure levels below injury thresholds, and some death or injuries of ESA listed salmonids are likely to occur. To reduce the potential risk to juvenile ESA-listed Pacific salmon, a bubble curtain will be used whenever an impact hammer is in operation.

**Shading.** The proposed crossings of the Willamette River and Kellogg Lake are elevated structures and shading impacts are expected to be minimal due to height of the structure and the angle of light throughout the day. The proposed crossings at Johnson and Kellogg creeks are
located in right of ways next to existing roads and bridges. These new crossings are not likely to increase shading significantly over current conditions.

**Stormwater.** Stormwater runoff from developed areas, including roads, culverts, and bridges, discharges a variety of pollutants to waterways. These pollutants include but are not limited to: nutrients, PCBs, metals (e.g., arsenic, copper, chromium, lead, mercury, nickel), PAHs, sediment, and pesticides (LCREP 2007). Exposure to these contaminants has the potential to affect the survival and productivity of salmonids, and of juveniles in particular. Short-term exposure to contaminants such as pesticides and dissolved metals may disrupt olfactory function and interfere with associated behaviors such as foraging, antipredator responses, reproduction, imprinting (odor memories), and homing (the upstream migration to their natal stream). Exposure to bioaccumulative toxicants such as PCBs and DDTs has been shown to cause immunotoxic effects, immunosuppression, reduced disease resistance, disrupted smoltification, and reduced growth rates in juvenile salmon (Fresh *et al.* 2005; LCREP 2007).

Improvements to stormwater treatment along the proposed PMLR alignment are expected to provide a long-term net improvement to water quality and hydrology for aquatic habitat and fish species in the Lower Willamette River basin due to decreases in pollutant concentrations in project waterways and increased infiltration opportunities for stormwater runoff. Various levels of stormwater treatment currently exist within the project footprint, and all new and replaced impervious surfaces will undergo enhanced treatment.

Stormwater will be collected on-site and treated using a variety of methods (swales, stormfilters, tanks) and using on-site infiltration where possible on the 15.6 acres of impervious surface created by the proposed action. Additionally, 9.4 acres of existing impervious surface will not require treatment because it will be converted to open pervious space and pervious track ballast will be used on the light rail alignment. The construction of the light rail line is also expected to reduce pollutants in stormwater by reducing vehicle miles and hours traveled in the project area.

**Fish Salvage.** Fish salvage will be necessary at any dewatered work sites (e.g., cofferdams on the Willamette River) that have been shown as supporting ESA-listed fish species, and will include seining, electrofishing, trapping and other necessary fish capture techniques. Although in-water work area isolation is a conservation measure intended to reduce potential effects to water quality and fish from construction, fish present in the work isolation area will be captured, handled, and released. Immediate or delayed death or injury of juvenile salmonids from capture and relocation stress are likely to occur during fish capture by electrofishing, which can cause injury or death, removal and relocation within the in-water work isolation area.
Table 6. Summary of effects of the proposed action categorized by location and type of effect.

<table>
<thead>
<tr>
<th></th>
<th>Willamette River</th>
<th>Johnson Creek</th>
<th>Crystal Springs Creek</th>
<th>Kellogg Creek</th>
<th>Proposed mitigation sites</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contaminants and Suspended Sediments</strong></td>
<td>Resuspension of contaminants during in-water work</td>
<td>No in-water work proposed</td>
<td>No in-water work proposed</td>
<td>Resuspension of contaminants during in-water work limited area due to downstream dam</td>
<td>Resuspension of contaminants during in-water work (limited duration)</td>
</tr>
<tr>
<td><strong>Reduction and Disturbance of Aquatic Habitat</strong></td>
<td>Permanent placement of riprap and bridge bents will reduce rearing habitat available and convert shallow beach type habitat to rock</td>
<td>No in-water work proposed</td>
<td>No in-water work proposed</td>
<td>Permanent placement of piles will reduce rearing habitat available</td>
<td>Increase in rearing habitat from piling removal and creation of shallow-water habitat</td>
</tr>
<tr>
<td><strong>Hydroacoustics and Pile Driving</strong></td>
<td>Behavioral disturbance and/or injury from impact hammer striking in-water piles</td>
<td>Behavioral disturbance and/or injury from impact hammer striking piles within 30 feet of water</td>
<td>Behavioral disturbance and/or injury from impact hammer striking piles within 30 feet of water</td>
<td>Behavioral disturbance and/or injury from impact hammer striking in-water piles</td>
<td>No effect</td>
</tr>
<tr>
<td><strong>Shading</strong></td>
<td>Shading from bridge decks is not likely to have an adverse effects due to the elevation of the structures above the water</td>
<td>No significant increase in shading</td>
<td>No significant increase in shading</td>
<td>Shading from bridge decks is not likely to have an adverse effects due to the elevation of the structures above the water</td>
<td>No effect</td>
</tr>
<tr>
<td><strong>Predation</strong></td>
<td>No significant increase in predation</td>
<td>No in-water work proposed</td>
<td>No in-water work proposed</td>
<td>No significant increase in predation</td>
<td>No effect</td>
</tr>
<tr>
<td><strong>Stormwater</strong></td>
<td>Stormwater will be treated to maintain/improve water quality</td>
<td>No effect</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fish Salvage</strong></td>
<td>Direct effects from salvaging fish from cofferdams</td>
<td>No fish salvage proposed</td>
<td>No fish salvage proposed</td>
<td>No fish salvage proposed</td>
<td>No effect</td>
</tr>
</tbody>
</table>

Species Within the Action Area

Rearing and migrating juveniles are likely to be in the action area year round. In the Willamette River, upstream migrating Chinook adults are likely to present in July and upstream migrating coho adults are likely to be present in October. Any ESA-listed species in the action area during pile driving are likely to be affected by sound waves created by the pile driving hammer. As mentioned above, sounds waves created by pile driving may result in behavioral changes, injury or death of fish. All pile driving and in-water work will take place during the work window and the effects to species within in the action area have been evaluated based on the presence of ESA-listed species during the relevant work window identified below.
**Willamette River (July 1 to October 31 work window)**

1. **Embryos and alevins**
   a. Incubation – no incubation occurs in the action area.
   b. Emergence – no emergence occurs in the action area.

2. **Juveniles**
   a. Rearing – rearing juveniles in the action area are likely to be subject to hemorrhage and rupture of internal organs, and damage to the auditory system due to pile driving and stress, external hemorrhages (bruising) and internal spinal damage and muscle hemorrhage during fish salvage activities. Loss of rearing is likely to occur as a result of riprap being placed in shallow water and these adverse affects will be offset by the creation of shallow water habitat at the mitigation site.
   b. Migration – migrating juveniles in the action area are likely to be injured or killed by pile driving and stress, external hemorrhages, and internal spinal damage and muscle hemorrhage during fish salvage activities.
   c. Smoltification – no smoltification occurs in the action area.

3. **Adults**
   a. Sub-adult growth and development – this life stage is not present in the action area.
   b. Upstream migration and holding – Chinook adults migrate upstream in July and coho adults migrate upstream in October and are likely to subject to hemorrhage and rupture of internal organs, and damage to the auditory system due to pile driving in the action area.
   c. Spawning – no spawning occurs in the action area.
   d. Seaward migration (steelhead) – steelhead adults will not be migrating through the action area.

**Johnson and Crystal Springs Creeks (July 15 to August 31 work window)**

4. **Embryos and alevins**
   a. Incubation – no incubation occurs in the action area.
   b. Emergence – no emergence occurs in the action area.

5. **Juveniles**
   a. Rearing – rearing juveniles in the action area are likely to be affected by pile driving.
   b. Migration – migrating juveniles in the action area are likely to be affected by pile driving.
   c. Smoltification – no smoltification occurs in the action area.

6. **Adults**
   a. Sub-adult growth and development – this life stage is not present in the action area.
   b. Upstream migration and holding – adults will not be migrating or holding in the action area.
   c. Spawning – no spawning occurs in the action area.
   d. Seaward migration (steelhead) – steelhead adults will not be migrating through the action area.

**Kellogg Creek (July 15 to September 30 work window)**

7. **Embryos and alevins**
   a. Incubation – no incubation occurs in the action area.
   b. Emergence – no emergence occurs in the action area.
8. **Juveniles**
   a. **Rearing** – rearing juveniles in the action area are likely to be affected by pile driving.
   b. **Migration** – migrating juveniles in the action area are likely to be affected by pile driving.
   c. **Smoltification** – no smoltification occurs in the action area.

9. **Adults**
   a. **Sub-adult growth and development** – this life stage is not present in the action area.
   b. **Upstream migration and holding** – adults will not be migrating or holding in the action area.
   c. **Spawning** – no spawning occurs in the action area.
   d. **Seaward migration (steelhead)** – steelhead adults will not be migrating through the action area.

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**Critical Habitat Within the Action Area**

Designated critical habitat within the action area for the ESA-listed salmon and steelhead considered in this Opinion consists of a freshwater rearing site and freshwater migration corridor and their essential physical and biological features (PCEs) as listed below. The effects of the proposed action on these features are summarized below as a subset of the habitat-related effects of the action that were discussed more fully above. The noise and water quality effects described will be short-term (i.e., weeks) during and immediately following in-water work (pile driving).

None of action areas are located in a freshwater spawning area, nearshore marine area or offshore marine area. Therefore, freshwater rearing and migration PCEs will be discussed for each creek.

**Willamette River**

1. **Freshwater rearing**
   a. **Floodplain connectivity** – maintain the current limited connection to floodplains due to riprap being placed in shallow water.
   b. **Forage** – reduced forage from placement of rock in fine substrate, shallow-water habitat and increase in available predator habitat; increased shallow-water habitat will be created at the mitigation sites.
   c. **Natural cover** – no effect.
   d. **Water quality** – short-term effects will occur from pile driving and in-water work.
   e. **Water quantity** – no effect.

2. **Freshwater migration**
   a. **Free of artificial obstruction** – no effect.
   b. **Natural cover** – no effect.
   c. **Water quality** – short-term effects, such as hemorrhage and rupture of organs and hearing damage, will occur from pile driving and in-water work.
   d. **Water quantity** – no effect.

Based on the most recent study of the Lower Willamette River (Friesen 2005), shallow-water, beach-type habitat was preferentially selected by juvenile salmon. The proposed project would affect this type of habitat by placing rock armor over 33,000 ft² of shallow-water habitat. These
impacts will be offset by the creation of 25,500 ft² shallow-water habitat and the removal of 20,000 ft² of derelict piles from shallow-water habitat.

**Johnson and Crystal Springs Creeks**

3. Freshwater rearing
   a. Floodplain connectivity – maintain the current limited connection to floodplains.
   b. Forage – no effect.
   c. Natural cover – no effect.
   d. Water quality – short-term effects, such as hemorrhage and rupture of organs and hearing damage, will occur from pile driving and in-water work.
   e. Water quantity – no effect.

4. Freshwater migration
   a. Free of artificial obstruction – the proposed project will have no effect.
   b. Natural cover – the proposed project will have no effect.
   c. Water quality – short-term effects, such as hemorrhage and rupture of organs and hearing damage, will occur from pile driving and in-water work. Water quantity – the proposed project will have no effect.

**Kellogg Creek**

5. Freshwater rearing
   a. Floodplain connectivity – maintain the current limited connection to floodplains.
   b. Forage– no effect.
   c. Natural cover – no effect.
   d. Water quality – short-term effects, such as hemorrhage and rupture of organs and hearing damage, will occur from pile driving and in-water work.
   e. Water quantity – no effect.

6. Freshwater migration
   b. Natural cover – no effect.
   c. Water quality – short-term effects, such as hemorrhage and rupture of organs and hearing damage, will occur from pile driving and in-water work.
   d. Water quantity – no effect.

**Cumulative Effects**

Cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02). NMFS expects development to continue as the population in the action area continues to grow.

The BA identified future land use consistent with the South Waterfront Plan as a category of actions that are reasonably certain to occur within the action area. In addition, NMFS is aware that the property adjacent to the Willamette River action area on the west side is planned for development of large residences, office buildings, road expansions and waterfront trails and
recreation areas. These developments are likely to result in additional stormwater runoff, floodplain fill and reduced riparian vegetation due to trails and infrastructure.

**Synthesis and Integration of Effects**

**Species at the Population Scale**

The applicant has proposed to complete all in-water work during the preferred summer in-water work windows, and to provide off-site mitigation, which will reduce adverse effects to adult and juvenile ESA-listed salmonids that migrate and rear in the action area by scheduling work when salmon presence is low. The in-water work window is designed to avoid peak migrations periods of adults and allow work when the fewest number of juveniles are present. Individuals in the Willamette River action area represent all populations of UWR Chinook and UWR steelhead since all individuals must migrate through the action area to the upper Willamette basin. For LCR Chinook, LCR steelhead and LCR coho individuals in the action area are likely to be from the Clackamas River populations. Floodplain fill, pile driving and fish salvage are likely to result in stress, injury or death of individuals in the action areas.

**Willamette River.** The proposed project is likely to adversely affect individual fish as a result of fish salvage and pile driving and floodplain fill. Both juvenile and adult fish are likely to be present during the summer work window proposed for in-water work. Most of the fish will incur short-term stress due to loud sounds during construction. Any non-lethal stress experienced by individual fish is likely to be brief (weeks). A few fish may be injured or killed by pile driving or by the culmination of joint causes, such as a previous wound acquired from exposure to the environmental baseline and genetic weakness.

Any Chinook adults present in July and coho adults present in October are important to the population because they represent genetic diversity resulting in migration timing outside the peak timing for the species. Since the Willamette River is a migration corridor for LCR Chinook salmon, UWR Chinook salmon, LCR steelhead, UWR steelhead, and LCR coho salmon, the proposed in-water work will affect individuals in many species and populations. For UWR species, all individuals of the species must pass the action area during upstream and downstream migration. Few adults and juveniles are likely to be injured or killed but too few to affect the abundance or productivity of any affected population or to appreciably reduce the likelihood of survival and recovery of any listed species.

Floodplain fill from the scour protection and bridge towers will reduce the floodplain connectivity and the ability for individuals to access shallow water habitat. Availability of shallow water habitat will be increased by the proposed creation of shallow water habitat in the Lower Willamette.

**Kellogg Creek.** The proposed project is likely to adversely affect individual LCR steelhead, LCR Chinook and LCR coho juveniles as a result of pile driving. Due to run timing, adult fish are not likely to be present in Kellogg Creek during the summer work window proposed for in-water work. NMFS does expect a small number of fish to be present during construction. Most of the fish will incur short-term stress due to loud sounds during construction.
Any non-lethal stress experienced by individual fish is likely to be brief (days). A few fish may be injured or killed by pile driving or by the culmination of joint causes, such as a previous wound inflicted by the environmental baseline and genetic weakness.

Considering the low abundance of ESA-listed juvenile salmonids in the action area, it is likely that the net effect of the proposed action will be a very small and temporary reduction in the number of juvenile fish, far too few to significantly reduce adult returns, and thus too few to affect the abundance or productivity of any affected population or to appreciably reduce the likelihood of survival and recovery of any listed species.

**Johnson and Crystal Springs Creeks.** The proposed project is likely to adversely affect individual LCR steelhead, LCR Chinook and LCR coho juveniles as a result of pile driving. Due to run timing, adult fish are not likely to be present in Johnson or Crystal Springs Creeks during the summer work window proposed for in-water work. NMFS does expect a small number of fish to be present during construction. Most of the fish will incur short-term stress due to loud sounds during construction. Any non-lethal stress experienced by individual fish is likely to be brief (days). A few fish may be injured or killed by pile driving or by the culmination of joint causes, such as a previous wound inflicted by the environmental baseline and genetic weakness.

Considering the low abundance of ESA-listed juvenile salmonids in the action area, it is likely that the net effect of the proposed action will be a very small and temporary reduction in the number of juvenile fish, far too few to significantly reduce adult returns, and thus too few to affect the abundance or productivity of any affected population or to appreciably reduce the likelihood of survival and recovery of any listed species.

**Critical Habitat at the Watershed Scale**

The same effects of the proposed action that will have an adverse affect on listed salmon and steelhead will also have an adverse affect on critical habitat PCEs for salmon and steelhead. The proposed action is likely to result in reduced conservation value of critical habitat in the construction area and some beneficial effects from the proposed mitigation.

**Willamette River.** The effects of the temporary bridge in the Willamette River will last several years, and the bridge piers and scour protection will be permanent. A total of 105,000 ft² (2.43 acres) will be permanently impacted, of which 33,000 ft² (0.75 acre) is located in shallow water. The permanent modification of shallow-water habitat will have an adverse effect on the conservation value at the watershed scale. The baseline and trends indicate that the Willamette River will continue to be developed and shallow-water habitat will continue to be lost.

To offset the impacts of scour protection at the Willamette River bridge, 25,500 ft² of shallow-water habitat will be created in the Lower Willamette River, approximately 0.5 mile upstream in the South Waterfront district, between Whitaker and Pennoyer streets. This new habitat will provide important rearing and migration habitat for ESA-listed species in the Lower Willamette River. In addition, 20,000 ft² of derelict piles will be removed from shallow-water habitat in the Lower Willamette River to benefit migrating and rearing ESA-listed species.
**Kellogg Creek.** These effects will last for the same a period of time during bridge construction, *i.e.*, re-suspension of sediments while installing piles and the noise of pile driving during pile installation, and longer as a result of establishing the new bridge. Together, these effects are likely to cause a minor reduction in the conservation value of critical habitat PCEs for the rearing and migration corridor within the action area, but are too small and brief to affect the conservation value of the Willamette River, or critical habitat as a whole. Therefore, critical habitat will remain functional and retain the current ability for PCEs to become functionally established, to serve the intended conservation role for the species.

**Johnson and Crystal Springs Creeks.** These effects will last for the same a period of time during bridge construction, *i.e.*, the noise of pile driving during pile installation, and longer as a result of establishing the bridge. Together, these effects are likely to cause a minor reduction in the conservation value of critical habitat PCEs for the rearing and migration corridor within the action area, but are too small and brief to affect the conservation value of the Johnson Creek, or critical habitat as a whole. Therefore, critical habitat will remain functional and retain the current ability for PCEs to become functionally established, to serve the intended conservation role for the species.

**Conclusion**

After reviewing the status of LCR Chinook salmon, UWR Chinook salmon, LCR steelhead, UWR steelhead, and LCR coho salmon and designated critical habitats, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects, NMFS concludes that the proposed action is not likely to jeopardize the continued existence of LCR Chinook salmon, UWR Chinook salmon, LCR steelhead, UWR steelhead and LCR coho salmon and does not result in destruction or adverse modification of designated critical habitat for LCR Chinook salmon, UWR Chinook salmon, LCR steelhead and UWR steelhead.

**Incidental Take Statement**

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by NMFS as significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by Fish and Wildlife Service as an intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not prohibited under the ESA, provided that such taking is in compliance with the terms and conditions of an incidental take statement.
Amount or Extent of Take

Actions necessary to construct the proposed PMLR project will occur during the summer in-water work window when juvenile LCR Chinook salmon, UWR Chinook salmon, LCR coho salmon, and UWR steelhead and adult Chinook and coho are likely to be present. These species use the action area in the Willamette River as a migratory and rearing corridor.

Take caused by the habitat-related effects of this action cannot be accurately quantified as a number of fish. This is because the precise distribution and abundance of juvenile fish within the action area, at the time of the action and for many years to follow, are not a simple function of the quantity, quality, or availability of predictable habitat resources within that area. Rather, the distribution and abundance of fish within this action area also show wide, random variations due to biological and environmental processes operating at much larger demographic and regional scales. In such circumstances, NMFS uses the causal link established between the activity and a change in habitat conditions affecting the listed species to describe the extent of take as a numerical level of habitat disturbance.

The best available indicators for the extent of incidental take are 33,000 ft² of permanent scour protection in shallow water habitat and observed sound pressure levels that meet or exceed 187 dB (dB re: 1µPa), the threshold of the onset of physical injury. These variables are directly proportional with an important cause of incidental take attributable to this action, i.e., the amount of noise that will be generated during pile driving with an impact hammer. The proposed action is likely to cause harm, injury or death of salmon and steelhead of the species considered in this Opinion as a result of noise generated during pile installation, fish salvage and habitat alteration. Take due to pile driving noise will occur within a radius extending approximately 521 feet (in the Willamette River) and 154 feet (in Kellogg Creek) around each pile that is driven using an impact hammer. In the accompanying Opinion, NMFS determined that this level of incidental take is not likely to result in jeopardy to the listed species.

In the Willamette River, sound pressure levels that meet or exceed 187 dB (dB re: 1µPa) at a distance of 521 feet from each pile driven by an impact hammer will exceed the level of permissible incidental take and trigger the reinitiation provisions of this Incidental Take Statement. In Kellogg Creek, sound pressure levels that meet or exceed 187 dB (dB re: 1µPa) at a distance of 610 feet from each pile driven by an impact hammer will exceed the level of permissible incidental take and trigger the reinitiation provisions of this Incidental Take Statement.

For Johnson and Crystal Springs Creeks, sound pressure levels in the water that exceed 187 dB (dB re: 1µPa) during pile driving will exceed the level of permissible incidental take and trigger the reinitiation provisions of this Incidental Take Statement.

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9 See Appendix A for detailed calculation of pile driving analysis.
Reasonable and Prudent Measures

The following measures are necessary and appropriate to minimize the impact of incidental take of listed species due to the proposed action:

The FTA shall:

1. Minimize incidental take by from construction and in-water work by avoiding and minimizing adverse effects to water quality, habitat and the ecology of aquatic systems.

2. Ensure completion of a monitoring and reporting program to confirm that the take exemption for the proposed action is not exceeded, and that the terms and conditions in this incidental take statement are effective in minimizing incidental take.

Terms and Conditions

The measures described below are non-discretionary, and must be undertaken by the FTA or, if an applicant is involved, must become binding conditions of any permit or grant issued to the applicant, for the exemption in section 7(o)(2) to apply. The FTA has a continuing duty to regulate the activity covered by this incidental take statement. If the FTA (1) fails to assume and implement the terms and conditions or (2) fails to require an applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the FTA or applicant must report the progress of the action and its impact on the species to NMFS as specified in the incidental take statement.

1. To implement reasonable and prudent measure #1 (construction and in-water work), the FTA shall ensure that:
   a. In-water Work Window. To minimize effects of in-water work, work shall occur during the in-water work windows proposed for each stream.
   b. Pile Driving Work Window. To minimize effects of pile driving to adult Chinook and coho salmon, pile driving with an impact hammer in the Willamette River shall occur between July 10 and October 15.
   c. Conservation Measures. All conservation measures and best management practices proposed in the BA shall be followed for construction activities.
   d. Pile Driving. Piling driving shall occur only during daylight hours with the sun above the horizon. This is to ensure that pile driving does not occur at dawn or dusk, which can be peak movement time for juvenile and adult salmonids.
      i. When possible, use a vibratory hammer for piling installation.
      ii. When using an impact hammer to drive or proof steel piles, one of the following sound attenuation devices must be used to reduce sound pressure levels by a minimum of 10 dB:
         (1) Completely isolate the pile from flowing water by dewatering the pile.
If water velocity is 1.6 feet per second or less, surround the piling being driven by an unconfined bubble curtain that will distribute small air bubbles around 100% of the piling perimeter for the full depth of the water column.

If water velocity is greater than 1.6 feet per second, surround the piling being driven by a confined bubble curtain (e.g., a bubble ring surrounded by fabric or metal sleeve) that will distribute air bubbles around 100% of the piling perimeter for the full depth of the water column.

iii. For each pile to be driven in the water, install and operate a bubble curtain with the following specifications:

1. General - A confined bubble curtain is composed of an air compressor(s), supply lines to deliver the air, distribution manifolds or headers, perforated aeration pipe(s), and a means of confining the bubbles.

2. The confinement shall extend from the substrate to a sufficient elevation above the maximum water level expected during pile installation such that when the air delivery system is adjusted properly, the bubble curtain does not act as a water pump (i.e., little or no water should be pumped out of the top of the confinement system).

3. The confinement shall contain resilient pile guides that prevent the pile and the confinement from coming into contact with each other and do not transmit vibrations to the confinement sleeve and into the water column (e.g. rubber spacers, air filled cushions).

4. In water less than 15 meters deep, the system shall have a single aeration ring at the substrate level. In waters greater than 15 m deep, the system shall have at least two rings, one at the substrate level and the other at mid-depth.

5. The lowest layer of perforated aeration pipe shall be designed to ensure contact with the substrate without sinking into the substrate and shall accommodate for sloped conditions.

6. Air holes shall be 1.6 mm (1/16-inch) in diameter and shall be spaced approximately 20 mm (3/4 inch) apart. Air holes with this size and spacing shall be placed in four adjacent rows along the pipe to provide uniform bubble flux.

7. The system shall provide a bubble flux of 2.0 cubic meters per minute per linear meter of pipe in each layer (21.53 cubic feet per minute per linear foot of pipe in each layer). The total volume of air per layer is the product of the bubble flux and the circumference of the ring:

\[ V_t = 2.0 \text{ m}^3/\text{min}/\text{m} \times \text{Circ of the aeration ring in m} \]

or
\[ V_t = 21.53 \text{ ft}^3/\text{min}/\text{ft} \times \text{Circ of the aeration ring in feet} \]
iv. Flow meters shall be provided as follows:
   (1) Pressure meters shall be installed at all inlets to aeration pipelines and at points of lowest pressure in each branch of the aeration pipeline.
   (2) Flow meters shall be installed in the main line at each compressor and at each branch of the aeration pipelines at each inlet. In applications where the feed line from the compressor is continuous from the compressor to the aeration pipe inlet the flow meter at the compressor can be eliminated.
   (3) Flow meters shall be installed according to the manufacturer’s recommendation based on either laminar flow or non-laminar flow.

e. Isolation of In-water Work Area. The work area will be well isolated from the active flowing stream using inflatable bags, sandbags, sheet pilings or similar materials.
   i. After completion of the project, the existing isolation area should be rewatered in a way that will not degrade water quality or cause fish stranding.
   ii. An experience biologist shall be on site to monitor for fish stranding during this process.
   iii. The existing flow downstream from the action area will be maintained throughout the construction.

f. Capture and Release. Fish will be captured and released from the isolated area using trapping, seining, electrofishing or other methods as are prudent to minimize risk of injury.
   i. A fishery biologist experienced with work area isolation and competent to ensure the safe handling of all ESA-listed fish must conduct or supervise the entire capture and release operation.
   ii. If electrofishing equipment is used to capture fish, the capture team must comply with NMFS’ electrofishing guidelines.
   iii. The capture team must handle ESA-listed fish with extreme care, keeping fish in water to the maximum extent possible during seining and transfer procedures to prevent the added stress of out-of-water handling.
   iv. Captured fish must be released as near as possible to capture sites.
   v. ESA-listed fish may not be transferred to anyone except NMFS personnel, unless otherwise approved in writing by NMFS.
   vi. Other Federal, state, and local permits necessary to conduct the capture and release activity must be obtained.
   vii. The NMFS or its designated representative must be allowed to accompany the capture team during the capture and release activity, and must be allowed to inspect the team’s capture and release records and facilities.

g. Best Management Practices and Conservation Measures. All BMPs and conservation measures outlined in the BA shall be carried out as described, including any monitoring reports generated shall be sent to NMFS.
2. To implement reasonable and prudent measure #2 (monitoring), the FTA shall ensure that:
   a. **Pile Driving Monitoring Plan.** The FTA shall prepare a pile driving monitoring plan, as described in WSDOT (2009), at least 60 days before pile driving commences, and submit the plan to NMFS for approval. Pile driving shall be monitored at a minimum of two locations, approximately 30 feet and 521 feet (Willamette) and 154 feet (Kellogg) from the piles. At Johnson and Crystal Springs Creek pile driving will be monitored in water, in line with the crossing.
   b. **Pile Driving Monitoring.** During construction, if an impact hammer is used and hammer strikes are exceed, contact NMFS immediately at 503-231-2307 or Christina.fellas@noaa.gov.
   c. **Reporting.** Within 90 days following the completion of the proposed construction project, the applicant shall report all monitoring items to include, at a minimum, the following:
      i. **Pollution control.** Give a summary of pollution control practices, including a description of any contaminant release, and efforts to correct such incidences.
      ii. **Pilings.** Number, size and type of piles installed.
      iii. **Piling installation.** Report the number of strikes per day, number of hours of impact pile driving and per pile and type of hammer used.
      iv. **Pile Driving Monitoring.** Submit results from pile driving monitoring plan.
   d. The applicant submits monitoring reports to:
      
      National Marine Fisheries Service  
      Oregon State Habitat Office  
      Attn: 2009/05649  
      1201 NE Lloyd Boulevard, Suite 1100  
      Portland, OR 97232-2778
   e. The applicant posts the following notice prominently at the work site: **NOTICE:** If a sick, injured or dead specimen of a threatened or endangered species is found in the project area, the finder must notify NMFS through the contact person identified in the transmittal letter for this Opinion, or through the NMFS Office of Law Enforcement at 1-800-853-1964, and follow any instructions. If the proposed action may worsen the fish’s condition before NMFS can be contacted, the finder should attempt to move the fish to a suitable location near the capture site while keeping the fish in the water and reducing its stress as much as possible. Do not disturb the fish after it has been moved. If the fish is dead, or dies while being captured or moved, report the following information: (1) NMFS consultation number; (2) the date, time, and location of discovery; (3) a brief description of circumstances and any information that may show the cause of death; and (4) photographs of the fish and where it was found. The NMFS also suggests that the finder coordinate with local biologists to recover any tags or other relevant research information. If the specimen is not needed by local biologists for tag
recovery or by NMFS for analysis, the specimen should be returned to the water in which it was found, or otherwise discarded.

Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species.

1. Provide additional riparian plantings at stream crossings and approaches to provide water quality benefits and sources of wood for streams that support ESA-listed species.
2. Reduce or remove floodplain fill to provide access for ESA-listed species to additional habitat.

Please notify NMFS if FTA carries out this recommendation so that we will be kept informed of actions that minimize or avoid adverse effects and those that benefit the listed species or their designated critical habitats.

Reinitiation of Consultation

Reinitiation of formal consultation is required and shall be requested by the Federal agency or by NMFS where discretionary Federal involvement or control over the action has been retained or is authorized by law and: (a) If the amount or extent of taking specified in the incidental take statement is exceeded; (b) if new information reveals effects of the action that may affect listed species or designated critical habitat in a manner or to an extent not previously considered; (c) if the identified action is subsequently modified in a manner that has an effect to the listed species or designated critical habitat that was not considered in the biological opinion; or (d) if a new species is listed or critical habitat is designated that may be affected by the identified action (50 CFR 402.16).

If FTA does not complete the mitigation components proposed as part of the action, NOAA Fisheries may consider this to be a modification of the action that causes an effect on listed species not previously considered, potentially resulting in the need to reinitiate consultation.

To reinitiate consultation, contact the Oregon State Habitat Office of NMFS, and refer to the NMFS Number assigned to this consultation (2009/05649).

MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

The consultation requirement of section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions, or proposed actions that may adversely affect EFH. Adverse effects include the direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitats, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse
effects on EFH may result from actions occurring within EFH or outside EFH, and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) also requires NMFS to recommend measures that may be taken by the action agency to conserve EFH.

The Pacific Fishery Management Council (PFMC) described and identified EFH for groundfish (PFMC 2005), coastal pelagic species (PFMC 1998), and Chinook salmon, coho salmon, and Puget Sound pink salmon (PFMC 1999). The proposed action and action area for this consultation are described in the Introduction to this document. The action area includes areas designated as EFH for various life-history stages of Chinook and coho. Based on information provided by the action agency and the analysis of effects presented in the ESA portion of this document, NMFS concludes that proposed action will have the following adverse effects on EFH designated for Pacific Coast salmon:

- Degradation of floodplain connectivity, forage and water quality required for rearing and migration in the Lower Willamette River as described in the Opinion above.

**Essential Fish Habitat Conservation Recommendations**

The following two conservation measures are necessary to avoid, mitigate, or offset the impact of the proposed action on EFH. These conservation recommendations are a subset of the ESA terms and conditions.

1. NMFS recommends that FTA follow Term and Condition 1b, related to the pile driving work window.

2. NMFS recommends that FTA follow Term and Condition 2a, b and c related to pile driving monitoring and reporting.

**Supplemental Consultation**

The Corps must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS’ EFH conservation recommendations [50 CFR 600.920(k)].

**DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW**

Section 515 of the Treasury and General Government Appropriations Act of 2001 (Public Law 106-554) (Data Quality Act) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section addresses these Data Quality Act (DQA) components, documents compliance with the DQA, and certifies that this Opinion has undergone pre-dissemination review.
Utility: Utility principally refers to ensuring that the information contained in this document is helpful, serviceable, and beneficial to the intended users.

The Opinion in this document concludes that the proposed PMLR project will not jeopardize the affected listed species. Therefore, the FTA can fund this action in accordance with its authority. The intended users are the FTA and local project partners. Individual copies were provided to the FTA and the local project partners. This consultation will be posted on the NMFS Northwest Region website (http://www.nwr.noaa.gov). The format and naming adheres to conventional standards for style.

Integrity: This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, ‘Security of Automated Information Resources,’ Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

Objectivity:

Information Product Category: Natural Resource Plan.

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the ESA Consultation Handbook, ESA regulations (50 CFR 402.01, et seq.) and the MSA implementing regulations regarding EFH [50 CFR 600.920(j)].

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the Literature Cited section. The analyses in this Opinion/EFH consultation contain more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA and MSA implementation, and reviewed in accordance with Northwest Region ESA quality control and assurance processes.
LITERATURE CITED


NMFS (National Marine Fisheries Service). 2005a. Draft interim regional recovery plan for portions of three evolutionarily significant units (ESUs) of salmon and steelhead—Lower Columbia River Chinook (Oncorhynchus tshawytscha), Columbia River chum (Oncorhynchus keta), and Lower Columbia River steelhead (Oncorhynchus mykiss)—within the Washington Lower Columbia Management Unit (April 15, 2005). National Marine Fisheries Service (NMFS). 598 p.

### Project Title
PMLR, Willamette Bridge

### Pile information (size, type, number, pile strikes, etc.)
126 36-inch diameter steel piles, (114 in water)

Fill in green cells: estimated sound levels and distances at which they were measured, estimated number of pile strikes per day, and transmission loss constant.

<table>
<thead>
<tr>
<th>Acoustic Metric</th>
<th>Peak</th>
<th>SEL</th>
<th>RMS</th>
<th>Effective Quiet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured single strike level (dB)*</td>
<td>214</td>
<td>186</td>
<td>201</td>
<td>150</td>
</tr>
<tr>
<td>Distance (m)</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

Estimated number of strikes: 800

Cumulative SEL at measured distance:

<table>
<thead>
<tr>
<th>Distance (m) to threshold*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset of Physical Injury</td>
</tr>
<tr>
<td>Peak dB</td>
</tr>
<tr>
<td>Fish ≥ 2 g</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transmission loss constant (15 if unknown)</th>
<th>206</th>
<th>187</th>
<th>183</th>
<th>150</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish &lt; 2 g not likely in mainstem Willamette during work window</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** This calculation assumes that single strike SELs < 150 dB do not accumulate to cause injury (Effective Quiet)

Notes (source for estimates, etc.)
(This model was last updated January 26, 2009)
### Project Title
PMLR, Willamette Bridge

### Pile information (size, type, number, pile strikes, etc.)
126 36-inch diameter steel piles, (114 in water) -- WITH ATTENUATION FROM BUBBLE CURTAIN

Fill in green cells: estimated sound levels and distances at which they were measured, estimated number of pile strikes per day, and transmission loss constant.

<table>
<thead>
<tr>
<th>Acoustic Metric</th>
<th>Peak</th>
<th>SEL</th>
<th>RMS</th>
<th>Effective Quiet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured single strike level (dB)*</td>
<td>204</td>
<td>176</td>
<td>191</td>
<td>150</td>
</tr>
<tr>
<td>Distance (m)</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

Estimated number of strikes: 800

Cumulative SEL at measured distance: 205

<table>
<thead>
<tr>
<th>Distance (m) to threshold*</th>
<th>Onset of Physical Injury</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak</td>
<td>Cumulative SEL dB**</td>
<td>RMS</td>
</tr>
<tr>
<td></td>
<td>Fish ≥ 2 g</td>
<td>Fish &lt; 2 g</td>
</tr>
<tr>
<td>Transmission loss constant (15 if unknown)</td>
<td>206</td>
<td>187</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>159</td>
</tr>
</tbody>
</table>

Fish < 2 g not likely in mainstem Willamette during work window

** This calculation assumes that single strike SELs < 150 dB do not accumulate to cause injury (Effective Quiet)

Notes (source for estimates, etc.):
(This model was last updated January 26, 2009)

*If bubble curtain is deployed, Peak/SEL/RMS are all reduced by 10 db
<table>
<thead>
<tr>
<th>Project Title</th>
<th>PMLR, Kellogg Bridge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pile information (size, type, number, pile strikes, etc.)</td>
<td>60 24-inch diameter steel piles for temporary bridge</td>
</tr>
</tbody>
</table>

Fill in green cells: estimated sound levels and distances at which they were measured, estimated number of pile strikes per day, and transmission loss constant.

<table>
<thead>
<tr>
<th>Acoustic Metric</th>
<th>Peak</th>
<th>SEL</th>
<th>RMS</th>
<th>Effective Quiet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured single strike level (dB)*</td>
<td>212</td>
<td>181</td>
<td>189</td>
<td>150</td>
</tr>
<tr>
<td>Distance (m)</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

Estimated number of strikes 400

Cumulative SEL at measured distance 207

<table>
<thead>
<tr>
<th>Distance (m) to threshold*</th>
<th>Onset of Physical Injury</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fish &lt; 2 g dB</strong></td>
<td>Peak dB</td>
<td>Cumulative SEL dB**</td>
</tr>
<tr>
<td></td>
<td>206</td>
<td>187</td>
</tr>
<tr>
<td>Transmission loss constant (15 if unknown)</td>
<td>15</td>
<td>25</td>
</tr>
</tbody>
</table>

Fish < 2 g not likely in mainstem Willamette during work window

** This calculation assumes that single strike SELs < 150 dB do not accumulate to cause injury (Effective Quiet)

Notes (source for estimates, etc.)
(This model was last updated January 26, 2009)
### Project Title
PMLR, Kellogg Bridge

### Pile information (size, type, number, pile strikes, etc.)
60 24-inch diameter steel piles for temporary bridge - WITH ATTENUATION FROM BUBBLE CURTAIN

Fill in green cells: estimated sound levels and distances at which they were measured, estimated number of pile strikes per day, and transmission loss constant.

<table>
<thead>
<tr>
<th>Acoustic Metric</th>
<th>Peak</th>
<th>SEL</th>
<th>RMS</th>
<th>Effective Quiet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured single strike level (dB)*</td>
<td>202</td>
<td>171</td>
<td>179</td>
<td>150</td>
</tr>
<tr>
<td>Distance (m)</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

**Estimated number of strikes**: 400

**Cumulative SEL at measured distance**: 197

<table>
<thead>
<tr>
<th>Distance (m) to threshold*</th>
<th>Onset of Physical Injury</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Peak dB</td>
<td>Cumulative SEL dB**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 2 g</td>
</tr>
<tr>
<td>Transmission loss constant (15 if unknown)</td>
<td>206</td>
<td>187</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>5</td>
</tr>
</tbody>
</table>

Fish < 2 g not likely in mainstem Willamette during work window

**This calculation assumes that single strike SELs < 150 dB do not accumulate to cause injury (Effective Quiet)**

### Notes (source for estimates, etc.)
(This model was last updated January 26, 2009)

*If bubble curtain is deployed, Peak/SEL/RMS are all reduced by 10 db*