Washington State Ferries

Seattle Multimodal Terminal at Colman Dock Project

NEPA Environmental Assessment

Volume I

Washington State Department of Transportation
Federal Highway Administration
Federal Transit Administration

April 2014

Washington State Department of Transportation

Washington State Ferries

Seattle Multimodal Terminal at Colman Dock Project

King County Washington
Environmental Assessment

Submitted pursuant to the National Environmental Policy Act, 42 U.S.C. 4321 *et. seq.* and 23 CFR Part 771

By the U.S. Department of Transportation, Federal Transit Administration and the Federal Highway Administration, Washington Division

4/2/2014
Date of Approval

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Abstract

This Environmental Assessment evaluates the impacts associated with replacing the aging, deteriorating and structurally deficient Seattle Ferry Terminal at Colman Dock, as proposed by the Washington State Department of Transportation (WSDOT) Ferries Division (WSF). The proposed action includes replacing the timber portion of the deck with a new and reconfigured steel and concrete deck, replacing the main terminal building, replacing the vehicle transfer span and overhead loading structures for Slip 3, providing improved pedestrian connections to transit, and replacing the passenger-only ferry facility.

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Copies of this document are available either in hard copy or on compact disk (CD). Copies may be purchased for $15, which does not exceed the cost of production. CDs will be provided free of charge.

The lead agencies have established a 30-day period for commenting on this document. You may submit comments in writing to Marsha Tolon at the address indicated above, online on the project website at www.wsdot.wa.gov/projects/ferries/colmanmultimodalterminal/, or by e-mail to ColmanDockEA@wsdot.wa.gov. You may also make comments orally at a public hearing that will be held at the Puget Sound Regional Council, 1011 Western Avenue, Suite 500, Seattle, WA from 4:00 to 6:30 PM on April 28, 2014. FTA, FHWA, and WSDOT will consider all comments received by May 12, 2014 and will include them in the administrative record.

Americans with Disabilities Act (ADA) Information

This material can be made available in an alternate format by emailing the WSDOT Diversity/ADA Affairs team at wsdotada@wsdot.wa.gov or by calling toll free, 855-362-4ADA(4232). Persons who are deaf or hard of hearing may make a request by calling the Washington State Relay at 711.

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Glossary and Acronyms

A

ADA	Americans with Disabilities Act
APE	Area of Potential Effects
AQI	Air Quality Index
AWV	Alaskan Way Viaduct
AWVRP	Alaskan Way Viaduct Replacement Project

B

BA	Biological Assessment
BMP	best management practices
BO	Biological Opinion
BTEX	benzene, toluene, ethylbenzene, xylenes

C

CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
CO	carbon monoxide
CO2	carbon dioxide
CSL	cleanup screening levels
CSO	combined sewer overflow
CWA	Clean Water Act
CZMA	Coastal Zone Management Act

D

DAHP	Washington State Department of Archaeology and Historic Preservation
dB	decibel
dBA	A-weighted decibels
DH1	Downtown Harborfront 1
DMC	Downtown Mixed Commercial
DMMP	Dredged Material Management Program
DNL	day-night average sound level
DNR	Washington State Department of Natural Resources
DOT	U.S. Department of Transportation
DPD	Seattle Department of Planning and Development
DR	discipline report

E

Ecology	Washington State Department of Ecology
EA	environmental assessment
EBSP	Elliott Bay Seawall Project
EFH	essential fish habitat
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act

F

FAQ	frequently asked questions
FHWA	Federal Highway Administration
FTA	Federal Transit Administration

G

GHG	greenhouse gas
GIS	geographic information system
GMA	Growth Management Act
GRSA	geographic resource study area

H

HOV	high-occupancy vehicle
HPA	Hydraulic Project Approval
Hz	Hertz

I

I-	Interstate
I&M	inspection and maintenance
IG1	Industrial General 1

J

K

KCFD	King County Ferry District

L

LCCM	life cycle cost model
LEP	limited-English proficiency
Leq	equivalent sound pressure level
Ldn	day – night sound level
Lmax	instantaneous maximum noise level
LOS	level of service
LPS	light-penetrating surface

M

MHHW	mean higher high water
MLLW	mean lower low water
MMPA	Marine Mammal Protection Act
MPPNV	Major Public Project Noise Variance
MSA	Magnuson Stevens Act
MTCA	Model Toxics Control Act

N

NAAQS	National Ambient Air Quality Standard
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NTU	nephelometric turbidity units

O

OFM	Washington Office of Financial Management
OHL	overhead loading
OWS	overwater structures

P

PAH	polycyclic aromatic hydrocarbon
PAR	photosynthetically active radiation
PCB	polychlorinated biphenyl
PCE	perchloroethylene
PHS	priority habitats and species
POF	passenger only ferry
PPV	peak particle velocity
PSRC	Puget Sound Regional Council

Q

R

RCW	Revised Code of Washington
RTP	regional transportation plan

S

SDOT	City of Seattle Department of Transportation
SEPA	State Environmental Policy Act
SIP	State Implementation Plan
SMC	Seattle Municipal Code
SMS	sediment management standards
SPCC	Spill Prevention and Countermeasures (Plan)
SQS	sediment quality standards
SR	State Route
SSDP	shoreline substantial development permit
SSMP	Seattle Shoreline Master Program
SVOC	semi-volatile organic compound

T

TCRP	Transit Cooperative Research Program
TESC	Temporary Erosion and Sediment Control (Plan)
TIP	Transportation Improvement Plan
TNM	traffic noise model

U

UH	Urban Harborfront
U.S.	United States
USC	United States Code
USFWS	U.S. Fish and Wildlife Service

V

VOC	volatile organic compound

W

WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife

WHR	Washington Heritage Register
WSDOT	Washington State Department of Transportation
WSF	Washington State Ferries
WSRC	Washington State Report Card
WTP	Washington Transportation Plan 2030

X

Y

Z

Chapter 1 Executive Summary

The Washington State Department of Transportation (WSDSOT) proposes to replace the aging and seismically vulnerable components of the Seattle Ferry Terminal at Colman Dock in order to maintain ferry service in the future (Exhibit 1-1). WSDOT Ferries Division (WSF) operates the Seattle Ferry Terminal. The Federal Transit Administration (FTA) and the Federal Highway Administration (FHWA) are the federal co-lead agencies responsible for reviewing the proposal for compliance with the National Environmental Policy Act (NEPA).

Colman Dock is located on Pier 52, along the central waterfront of downtown Seattle, Washington. The northern portion of Colman Dock is a timber structure that has deteriorated over time and is both seismically vulnerable and at the end of its service life. Initially constructed in 1938, the timber dock was rebuilt in 1964 and expanded in the northwest corner in 1971; it is still supported in large part by many of the original 1938 timber piles and structural components. The terminal building and the vehicle and passenger loading bridges of Slips 2 and 3 were built in 1964 on independent foundations. Due to their degraded conditions, these components require regular maintenance, which can cause lane closures and disrupt operations.

Key elements of the Seattle Ferry Terminal Project include:

- Replacing and re-configuring the timber trestle portion of the dock;
- Replacing the main terminal building;
- Reconfiguring the dock layout to provide safer and more efficient operations;
- Replacing the vehicle transfer span and the overhead loading structures of Slip 3;
- Maintaining a connection to the Marion Street pedestrian overpass;
- Replacing the King County-operated passenger-only ferry (POF) facility on the southern edge of Colman Dock.

Much of the northern trestle area would be left as open water after construction; the design replaces the northern holding lane capacity on the south side of the terminal. The reconfiguration increases nearshore habitat and narrows the facility’s frontage along Alaskan Way by 150 feet. The total overwater coverage for the reconfigured terminal, including the POF facility, would increase by about 5,200 square feet. Mitigation for the increased overwater coverage would include restoration of equivalent ecological functions in Elliott Bay or elsewhere in Puget Sound. Exhibit 1-2 shows key project elements.

1.1 What is the purpose of the project?

The purpose of the project is to preserve the Seattle Ferry Terminal as a regional multimodal transportation hub, providing safe, reliable, and effective service for transit, general and commercial purpose transportation, high occupancy vehicles (vanpools/carpools), pedestrians, and bicyclists.

FILE NAME:Ex01-1_ExistingProjectSite.ai / CREATED BY: JAC / DATE LAST UPDATED: 10/24/13

Washington State Ferries

Washington State Department of Transportation

N

NOT TO SCALE

SOURCE: WSDOT, 2011

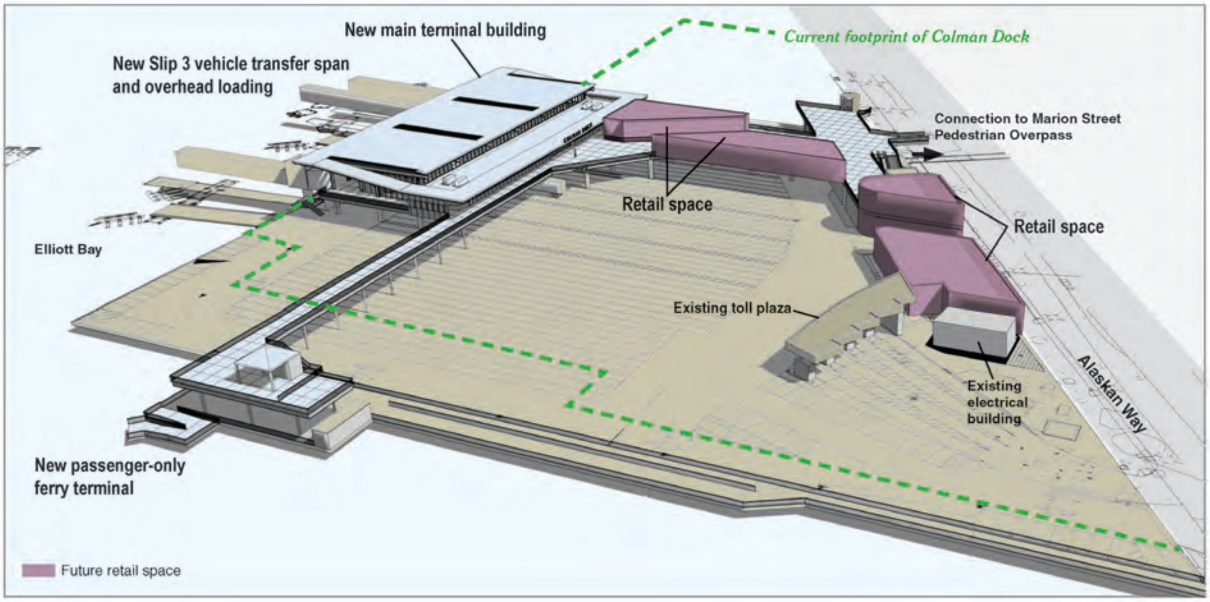
Exhibit 1-1

Existing Project Site

Seattle Terminal Project

Seattle, Washington

Exhibit 1-2 Completed Build Alternative



1.2 Have alternatives been considered?

Yes, alternatives have been considered. Because the project focuses narrowly on preserving existing functions and service levels, alternatives were considered only if they used trestle modifications to address seismic and structural safety, improve operational efficiency, and/or reduce pedestrian-vehicle conflicts. They were not considered if they added substantially to holding capacity, overwater coverage, or project costs, or if they added new uses.

WSDOT considered an alternative that eliminated the POF from the Seattle Ferry Terminal project, and proposed that option during the public scoping period. Based on feedback received during scoping, and additional legislative direction, WSDOT worked closely with the King County Ferry District to incorporate the POF in a revised project description. WSDOT also considered relocating the POF to the north side of the terminal; this alternative was eliminated based on potential navigation and safety conflicts with the WSF ferries and with the fire boats operating out of Fire Station No. 5, to the north of the site.

WSDOT also considered two design options: replacing the terminal in its existing configuration, or reconfiguring the terminal by removing vehicle holding area on the north side and replacing it on the south side. The advantages of reconfiguring the terminal's layout led to its selection as the Build Alternative. These advantages include reduced pedestrian-vehicle conflicts, improved operational efficiencies, and environmental benefits such as increased near shore open water area and a narrower facility profile along Alaskan Way.

As a result of the previous analysis of alternatives, only one Build Alternative is considered in this Environmental Assessment.

To provide a baseline for comparison, a No Build Alternative is included in the EA's discussion of the project's affected environment and impacts. The No Build Alternative includes continuation of WSDOT's rigorous program of inspection and maintenance activities, and would continue the current practice of replacing timber portions of the north trestle as needed.

1.3 What impacts are likely to be caused by the project?

The project's long-term effects would be minimal. It is designed to preserve existing ferry service levels. Beneficial effects would include safety improvements (seismic upgrades, ADA compliance, elimination of pedestrian-vehicle conflict points) and environmental improvements (removal of creosote-treated timber piles and decking, removal of contaminated sediment and fill, placement of a cap over remaining contamination, inclusion of water-quality treatment facilities). The project's adverse effects would arise primarily from construction, which, in order to maintain service and comply with environmental laws, would be phased over a six-year period (2015-21). In-water work would include demolition, pile removal and replacement, and construction of over-water decking. Much of it would be performed from barges. The project would add about 5,200 square feet of new overwater coverage, which would be mitigated by restoring equivalent ecological functions in Elliott Bay or elsewhere in Puget Sound.

The following sections summarize the effects of project construction. Chapter 4 includes a complete discussion of project impacts.

1.3.1 Ecosystems

During operation, the project's long-term effects on ecosystems would be positive. Construction of the project would occur in the near shore environment of Elliott Bay, and would cause short-term effects on ecosystems.

Construction noise and vibration, particularly related to demolition and pile removal and installation, may affect fish, marine mammals, seabirds, and other animals that are in the vicinity. In addition, pile removal and installation would stir up and suspend sediments that contain contaminants from the creosote-treated timber piles and from other sources. Overwater coverage would be increased by approximately 5,200 square feet as a result of an expanded walkway to provide public access from Alaskan Way to the King County POF, and from stairs and elevators providing access from the POF to the terminal's upper level. Beneficial effects would include removal of about 7,400 tons of creosote-contaminated timber piles from the marine environment, creation of new open water along the northern shoreline of the site, installation of a new stormwater treatment system at the facility, and placement of a clean sand sediment cap to contain contaminated sediment.

WSDOT would take specific measures to minimize and mitigate adverse effects. WSDOT would limit in-water work to resource agency-approved in-water work windows to protect fish and marine mammals. Water quality would be monitored and corrective measures taken to ensure that water quality standards are met. WSDOT would monitor for the presence of marine mammals and protected bird species, and assure that work would be halted when these animals approach within specified distances from the site. Bubble curtains would be used as appropriate to attenuate the in-water noise of impact pile-driving, reducing effects on fish and marine mammals. Mitigation for increased overwater coverage would include restoration of equivalent ecological functions in Elliott Bay or elsewhere in Puget Sound.

1.3.2 Noise and Vibration

All phases of construction would generate noise. Heavy equipment and pile driving would cause the most noise. While not continuous, noise would affect nearby properties over the entire construction period. The City limits construction noise based on the type of noise-generating activity, time of day, and property type(s) affected. Project noise would likely exceed City limits and so require a variance, which would require specified measures to reduce noise and limit hours of noisy construction. Vibration effects would also be caused by construction. Vibration impacts were carefully assessed at the historic Fire Station No. 5, located immediately north of the site, because of its proximity to the demolition of the north trestle. To avoid vibration levels that approach potential damage thresholds, WSDOT would cut piles off at the mudline within 35 feet of the fire station, and monitor actual vibration levels beyond 35 feet. If vibration levels approach the damage threshold beyond 35 feet, piles would be cut rather than vibrated out to the point that vibration is well below the threshold. There are no noise or vibration impacts anticipated with long-term operation of the Seattle Ferry Terminal Project.

1.3.3 Water Resources

Increased turbidity could occur during pile removal and installation. This turbidity is expected to spread no further than 25 feet from the pile being removed or driven, and to settle within one hour. WSDOT would monitor water quality during construction, and take additional measures as necessary to ensure that water quality standards are met.

The project would result in long-term beneficial effects to water quality for several reasons. New stormwater vaults below the deck would provide water quality treatment for all new and replaced areas of the terminal. The vaults would collect and hold runoff, allowing suspended solids to settle. WSDOT would periodically clean the vaults and remove the solids to maintain proper functioning. The existing terminal is not equipped with vaults, and provides only limited stormwater treatment. Creosote-treated timber piles, which can leach contamination into the adjacent sediment and water, would be removed during construction, resulting in improved water quality. Finally, a clean sediment cap would be placed during construction. This cap, a clean layer of sand and cobbles, would cover contaminated sediment, preventing sea life from direct exposure and preventing leaching of contaminants into the water.

1.3.4 Hazardous Materials

The project would remove 1,446 creosote-treated timber piles supporting the northern portion of the trestle and other structures. Pile removal and installation would disturb contaminated sediment, temporarily suspending it into the water column. During pile installation, approximately 3,500 cubic yards of contaminated sediments would be collected from inside the casings as the new piles are driven; this sediment would be removed from the site and disposed of at an approved site. The existing sediment cap would be expanded, covering any piles that break at or beneath the mudline during removal. Expanding the sediment cap would also protect benthic organisms from exposure to contaminated sediment. Approximately 7,700 cubic yards of contaminated fill now contained behind a retaining wall at the northeast corner of the site would be removed.

1.3.5 Historic, Cultural, and Archaeological Resources

Fire Station No. 5, a structure that is eligible for listing on the National Register of Historic Places (NRHP), is directly adjacent to the areas of proposed ground disturbance. Vibration effects during construction, primarily during pile removal and demolition of the north timber trestle, would be avoided by cutting rather than vibrating the piles within 35 feet of the fire station.

No adverse effects to other historic properties in the area, such as the Washington Street Boat Landing, are expected.

1.3.6 Transportation

Project construction would take place over water, and most deliveries of construction equipment and material would arrive by barge. The primary construction effects on the transportation system would be associated with changes to vehicle holding capacity for ferry loading on the trestle during the four phases of construction. During the final phase of construction, when holding capacity is reduced compared to current conditions, additional queuing backups on Alaskan Way are likely.

The transportation analysis indicates that the first three phases of construction maintain sufficient holding capacity to avoid queuing impacts on Alaskan Way. During Phase 4 of construction, the holding capacity is reduced from the current 596 vehicles to 498 vehicles, and queues would increase, particularly at the left turn to enter the terminal from Alaskan Way at Yesler Way.

To address this impact, mitigation to increase the site's vehicle holding capacity would include active lane management; on-site attendants would direct vehicles to park closer together, minimizing wasted space. This approach would increase vehicle holding capacity to 584 vehicles during Phase 4, bringing queuing conditions essentially back to existing levels.

Following construction, the terminal would maintain ferry service at existing levels, and no long-term operational effects on the nearby roads would occur.

1.3.7 Navigable Waters

The project's in-water construction and occasional barge traffic over a period of up to 72 months could affect vessel traffic on Elliott Bay. To avoid or minimize this impact, the project would restrict construction barge mooring to WSDOT right-of-way, and would develop communications protocols and coordinate closely with the U.S. Coast Guard, Port of Seattle, City of Seattle, King County Marine Division, the Suquamish Tribe, and the Muckleshoot Indian Tribe.

1.4 Summary of Other Effects

The EA's analysis shows even less likelihood of significant impacts in other areas of the environment, as the following chart summarizes.

Resource	Build Alternative
Geology and Soils	**Construction:** None. **Long-Term:** No adverse effects. Overall risk of damage or catastrophic failure due to an earthquake is substantially reduced relative to the No Build Alternative.
Land Use	**Construction:** Temporary effects on adjacent land uses and the local street system from noise, dust, vibration, glare, traffic detours, traffic delays, and visual disturbance. **Long-Term:** None. No change in principal use of site.
Visual Quality	**Construction:** Barriers and other equipment would be visible during construction. **Long-Term:** The terminal's orientation would be changed, to run parallel to the waterfront. The proposed design would create an increased massing along the elevated walkway to the Marion Street Overpass for retail spaces.
Air Quality	**Construction:** Dust, pollutants, odors, and exhaust would be generated during construction. Construction emissions would be mitigated by implementing BMPs. **Long-Term:** None.
Navigable Waterways	**Construction:** Construction barges would be brought to the site and moored in WSDOT's right-of-way. **Long-Term:** None.
Socioeconomics and Environmental Justice	**Construction:** None. **Long-Term:** None.

1.5 How much would the project cost and how would it be paid for?

The project budget is $268 million and includes a risk reserve. Project funding relies on a combination of federal and state funding sources, with approximately $13 million in local funding from King County required for the replacement POF facility. Although the King County funding has not yet been secured, the County is committed to providing it.

The project design includes retail space to replace existing retail services at the terminal. Funding for new retail space has not been authorized for the project's budget. WSDOT will pursue, but has not identified, funding to allow it to build out this retail space. However, the NEPA analysis does consider impacts of the full project, including retail spaces.

1.6 How have the public, government agencies, and tribes been involved?

The public, other government agencies, and interested tribes have been involved during the development of the project. Public scoping as part of the NEPA EA process occurred in February and March 2012, and included a public scoping meeting on February 16, 2012, onboard outreach on both the Seattle-Bainbridge and Seattle-Bremerton evening peak period sailings in February 2012, and an on-line narrated presentation available throughout the scoping period. In addition to the public scoping activities, coordination efforts have included regular updates to the project website (http://www.wsdot.wa.gov/projects/ferries/colmanmultimodalterminal), email updates to interested stakeholders, project fact sheets and Frequently Asked Questions documents, informational graphics and illustrations, and presentations to groups and organizations. The project team has presented briefings to organizations that include the League of Women Voters, the Waterfront Business Owners, the Downtown Seattle Association, and the Alliance for Pioneer Square.

Federal, state, and local government agencies, as well as tribal representatives, participated in an agency and tribal scoping meeting February 7, 2012. Coordination with two agencies in particular, the City of Seattle and King County, has been extensive. Frequent meetings have been held with the Seattle Department of Transportation (SDOT), including the teams from both the Waterfront Seattle Project and the Elliott Bay Seawall Project; with the Seattle Department of Planning and Development (DPD) staff; and with the Seattle Fire Department. King County Ferry District and King County Metro have been consulted frequently as well.

Project staff have also provided briefings to the United States Fish and Wildlife Service (USFWS); the National Marine Fisheries Service (NMFS); Washington Departments of Ecology (Ecology), Archaeology and Historic Preservation (DAHP), Natural Resources (DNR), and Fish and Wildlife (WDFW); the Washington Office of Financial Management (OFM); and the Joint Transportation Committee.

Elliott Bay is designated as Salmon Management Area 10A by the Washington State Department of Fish and Wildlife and is co-managed by the Suquamish and Muckleshoot Indian Tribes. The Tribes have federally adjudicated treaty rights to fish, hunt, and gather in Elliott Bay. The harvest of salmon and shellfish in these waters is a part of these rights. FTA, FHWA, and WSDOT are engaged in government-to-government consultation with both tribes to resolve the project's potential interference with their treaty rights.

Consistent with the National Historic Preservation Act (NHPA) and several other state and federal authorities, FTA, FHWA, and WSDOT initiated government-to-government consultation with federally recognized tribes that may have interest in the project's impacts: the Muckleshoot Indian Tribe, the Suquamish Indian Tribe, the Snoqualmie Tribe, the Tulalip Tribes, and the Confederated Tribes and Bands of the Yakama Nation. The Confederated Tribes and Bands of the Yakama Nation have deferred oversight of the project to local tribes on cultural concerns. To comply with Section 106 of the NHPA, FTA, FHWA, and WSDOT have also consulted with the historic preservation programs at King County and the City of Seattle, the Washington Trust for Historic Preservation, Historic Seattle, the Alliance for Pioneer Square, and the non-federally recognized Duwamish Tribe.

1.7 How can I get more information about the project?

Additional information on the project can be found online at www.wsdot.wa.gov/projects/ferries/colmanmultimodalterminal.

Hard copies of the Environmental Assessment can be reviewed at several locations, including libraries in Seattle, White Center, Bremerton, and Winslow. Library locations are:

Seattle Central Library
1000 Fourth Avenue
Seattle WA 98104
206-386-4636

Kitsap Regional Library
1270 Madison Avenue North
Bainbridge Island WA 98110
206-842-4162

Kitsap Regional Library
612 Fourth Street
Bremerton WA 98337
360-377-3955

White Center Library
King County Library System
11220 16th Avenue SW
Seattle WA 98146
206-243-0233

Hard copies may also be viewed at the Washington State Ferries offices (2901 Third Avenue, Suite 500, Seattle WA 98121).

Personal copies of this document are available either in hard copy or on compact disk (CD). Copies may be purchased for $15.00, which does not exceed the cost of production. CDs will be provided free of charge.

This material can be made available in an alternate format by emailing the WSDOT Diversity/ADA Affairs team at wsdotada@wsdot.wa.gov, or by calling toll free, 855-362-4232. Persons who are deaf or hard of hearing may make a request by calling the Washington State Relay at 711.

For additional information about this project, please contact:

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1.8 How can I comment on the project and this EA?

There are several ways to provide comments on the project and the EA:

- **Attend a public hearing on the EA.** WSF will hold a public hearing on the EA. It will include information on the project, team members will be available to answer questions, and attendees will have the opportunity to comment in writing, on a computer, or by talking to a court reporter.
- **Comment online.** WSDOT has provided an online comment feature at the project website: www.wsdot.wa.gov/projects/ferries/colmanmultimodalterminal/
- **Comment by e-mail.** Submit comments by e-mail to ColmanDockEA@wsdot.wa.gov.

Public Hearing

When: April 28, 2014
from 4:00 to 6:30 PM

Where: Puget Sound
Regional Council,
1011 Western Avenue,
Suite 500
Seattle, WA 98104

- **Comment by mail.** You can write comments and mail them (postmarked by May 12, 2014) to:

  Marsha Tolon
  Environmental Lead
  Seattle Ferry Terminal Project
  MS TB-83
  2901 3rd Avenue, Suite 500
  Seattle, WA 98121

The comment period ends at midnight on May 12, 2014. FTA, FHWA, and WSDOT will consider all comments received prior to making a decision on this project. After the comment period has closed, WSF will continue to keep the public informed about the project and opportunities for input. If you provide your name and address when you comment, we will add you to the project mailing list.

Chapter 2 Project Background

Washington State Department of Transportation (WSDOT), Ferries Division (WSF), proposes to replace the aging and seismically vulnerable components of the Seattle Ferry Terminal at Colman Dock in order to maintain ferry service in the future. This Environmental Assessment (EA) has been prepared to assist the Federal Transit Administration (FTA) and the Federal Highway Administration (FHWA) in evaluating the potential environmental effects of this proposed project. FTA and FHWA are providing funding for design and environmental review, and are co-leads for the project's compliance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code (USC) 4321 et seq.). An EA is a NEPA document used by federal agencies to assess the significance of proposed projects that receive federal funds, need federal approvals before they can be built, or otherwise require a federal decision or action. Additionally, a NEPA EA can be adopted or otherwise used by WSDOT to help meet its separate responsibilities for environmental review under the Washington State Environmental Policy Act (SEPA).

The Seattle Ferry Terminal is the largest of WSF's 20 terminals. It serves general and commercial purpose traffic, high occupancy vehicles, transit, cyclists and pedestrians. In 2012, the Seattle/Bremerton and Seattle/Bainbridge routes accounted for 8.5 million riders (38 percent of WSF's total) and 4.2 million foot passengers (68 percent of WSF's total).The Seattle/Bainbridge route is the system's busiest route overall and busiest walk-on route. Also, King County Ferry District (KCFD) provides passenger-only ferry (POF) service from the site to West Seattle and Vashon Island, with annual ridership estimated by King County at 445,000 foot passengers and bicycles in 2013.

2.1 The Seattle Ferry Terminal

2.1.1 Project Location

The Seattle Ferry Terminal Project is located at Colman Dock along the central waterfront of downtown Seattle, Washington. The site is owned by WSDOT, and is part of the state highway system. The terminal is the western terminus of State Route (SR) 519, and the eastern terminus of SR 305. The Elliott Bay Seawall and Alaskan Way border the site on the east. Immediately north of the site is the Seattle Fire Station No. 5 at Pier 53, while 200 feet south of the site are the Washington Street Boat Landing and the WSDOT-owned Pier 48. The project site includes Piers 50 and 52. The site and vicinity are shown in Exhibit 2-1.

N

Washington State Ferries

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SOURCE: Google Earth, 2011; WSDOT, 2011

Exhibit 2-1

Project Vicinity Map

Seattle Terminal Project

Seattle, Washington

FILE NAME:Ex02-1_ VicinityMap.ai / CREATED BY: JAC/ DATE LAST UPDATED: 10/31/13

2.1.2 Existing Terminal Features and Operations

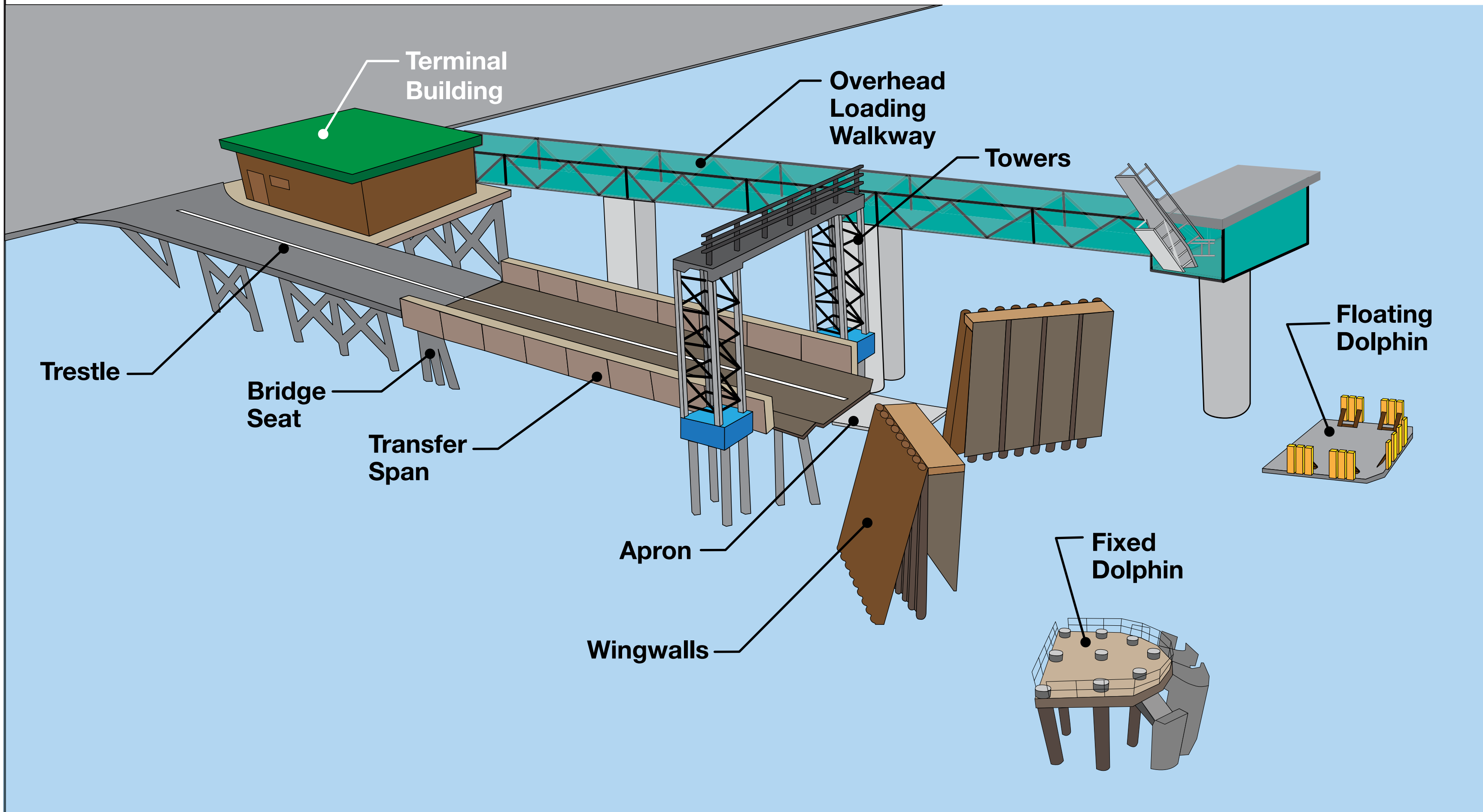
Exhibit 2-2 shows the key parts of a typical ferry terminal. The Seattle Ferry Terminal consists of three ferry slips connected to a trestle and associated terminal buildings (Exhibit 2-3). The existing timber trestle is an overwater structure covering an approximately 140,000 square-foot area. The trestle includes the timber piles, the deck and the deck's structural supports. It extends from the south edge of the existing terminal building to the north edge of the facility, adjacent to the fire station. Originally constructed in 1936 and rebuilt in 1964, the trestle uses many of the original timber piles. As part of the 1964 pier reconstruction, WSF also constructed the main terminal building. In 1971, the north trestle was expanded near the northwest corner of the terminal building, also using creosote-treated timber piles. WSF added the southern portion of the dock in 1990. This section of dock, which extends south from the timber trestle, uses concrete and steel piles and structural supports.

The main level of the existing terminal building includes 36,000 square feet of enclosed space. It accommodates passenger waiting and processing areas, as well as staff and vendor spaces. WSF-leased vendor spaces provide food, drink, and convenience items to ferry users and others visiting the waterfront area. The King County Ferry District (KCFD) currently operates POF service from Pier 50, under a lease with WSF. KCFD operates the Seattle/Vashon Island and Seattle/West Seattle water taxis.

2.2 Project Background

More than ten years ago, WSDOT began planning to replace the aging and deteriorating facilities at Colman Dock with an expanded terminal that would enhance operational capacity, increase the vehicle holding area, and expand the potential for commercial and retail development at the site. FTA and FHWA issued a Notice of Intent (NOI) to prepare an Environmental Impact Statement in March 2006 and began a scoping process. WSDOT held two public open houses in April 2006, as well as agency and tribal scoping meetings. Additional public and agency outreach continued into 2007.

In 2007, in light of growing concern about funding constraints, the Washington State Legislature directed WSDOT to pursue adaptive management practices for the Ferries Division to keep costs as low as possible while continuously improving the quality and timeliness of service (Engrossed Substitute House Bill 2358). Adaptive management is a process for continually improving management policies and practices by learning from the outcomes of operational programs and adapting them to improve customer service. This legislation informed the new Ferries Division Long-Range Plan (LRP) (*Washington State Department of Transportation Ferries Division Final Long-Range Plan, 2009-2030* (June 2009), adopted by the Washington State Transportation Commission as part of the *Washington Transportation Plan 2030* (WTP) (December 2010)). The 2006 Colman Dock expansion plans were inconsistent with the new LRP. The NOI was formally rescinded on February 10, 2011.



Washington State Ferries

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

NOT TO SCALE

Washington State Department of Transportation

SOURCE: WSDOT, 2011

Exhibit 2-2

Key Parts of a Typical Ferry Terminal

Seattle Terminal Project

Seattle, Washington

FILE NAME:Ex02-2_KeyPartsTypTerminal.ai / CREATED BY: JAC / DATE LAST UPDATED: 11/01/13

Washington State Ferries

Washington State Department of Transportation

N

NOT TO SCALE

SOURCE: WSDOT, 2011

Exhibit 2-3

Existing Project Site

Seattle Terminal Project

Seattle, Washington

FILE NAME:Ex02-3_ExistingProjectSite.ai / CREATED BY: JAC / DATE LAST UPDATED: 10/30/13

The Long-Range Plan focuses on preserving existing assets and service levels. It provides a service and capital improvement strategy for the Ferry System that maintains service levels, maximizes existing assets, and improves cost effectiveness. It documents that limited vehicle capacity exists during the peak periods and shows that while ridership has decreased since 1999, it is expected to return to historically high levels by 2030. It expresses WSF's commitment to manage that increasing demand through four strategies: a vehicle reservation system, transit enhancements, pricing strategies, and marketing. It recognizes a shortfall in the revenue required for major capital improvements and therefore explicitly rejects a strategy of trying to maintain service levels by adding capacity (i.e., vehicle storage area, larger vessels, more slips). Its preservation program for terminals therefore focuses on identifying the needs for operating at current service levels and maintaining, preserving, and replacing existing capital assets. The LRP identifies the trestle/terminal replacement at Colman Dock as an appropriate preservation project.

> By law, the WTP, which incorporates the Ferries LRP, must be consistent with state's growth management goals, reflect the priorities of government, and address regional needs, including multimodal transportation planning. The 2030 WTP is based on six transportation policy goals established by the Legislature:
>
> - Economic Vitality – To promote and develop transportation systems that stimulate, support, and enhance the movement of people and goods to ensure a prosperous economy;
> - Preservation – To maintain, preserve, and extend the life and utility of prior investments in transportation systems and services;
> - Safety – To provide for and improve the safety and security of transportation customers and the transportation system;
> - Mobility – To improve the predictable movement of goods and people throughout Washington state;
> - Environment – To enhance Washington's quality of life through transportation investments that promote energy conservation, enhance healthy communities, and protect the environment; and
> - Stewardship – To continuously improve the quality, effectiveness, and efficiency of the transportation system.

WSF developed the LRP with substantial public, agency and tribal input. Additional information on this process can be found at http://www.wsdot.wa.gov/Ferries/Planning/. The WTP was similarly shaped with comments and advice from a variety of public and private stakeholders. For more detail on the plans and the processes that drove the WTP, see http://www.wstc.wa.gov/wtp/.

With direction in the LRP that replacing the deteriorated timber trestle at Colman Dock is an essential preservation element, WSF reassessed options for accommodating retail uses at the terminal. Balancing broader system needs and limited available funding with the narrow preservation scope of the project, it developed a design that retains flexibility to incorporate future retail uses if funding becomes available. Buildout of the retail spaces is not funded with the current project, but could occur if funding becomes available in the future.

These planning efforts led to the development of the project's statement of purpose and need.

2.3 Project Purpose

The purpose of the project is to preserve the Seattle Ferry Terminal as a regional multimodal transportation hub, providing safe, reliable, and effective service for transit, general and commercial purpose transportation, high occupancy vehicles (vanpools/carpools), pedestrians, and bicyclists.

WSDOT intends to achieve this by accomplishing the following objectives:

- Maintaining the terminal's existing role as a safe regional transportation hub by designing the project to current codes and regulations, including the Americans with Disabilities Act (ADA);
- Addressing deficiencies in the existing creosote-treated timber dock structures and their associated buildings, and in Slip 3 vehicle and pedestrian bridges and their supporting structures;
- Enhancing the terminal's safety and operational efficiency through measures that include: minimizing pedestrian and vehicle conflicts; optimizing movement of pedestrians and vehicles through the facility; and improving pedestrian connections with transit services adjacent to the terminal;
- Designing and developing the project in a manner that does not preclude a possible future open space feature that would be developed by the City of Seattle under a separate process;
- Designing and developing the project to accommodate in-kind replacement of the existing two-slip passenger-only ferry (POF) facility, in a manner that does not preclude future growth of POF service in the vicinity of Colman Dock; and
- Designing and developing the project in a manner that is both sensitive to the natural environment and fiscally responsible.

2.4 Need for the Project

WSDOT's preservation program for ferry terminals seeks to maintain operations at current service levels and to maintain, preserve, and replace existing capital assets. A terminal's preservation needs are developed using a Life Cycle Cost Model (LCCM) that takes into account the facilities' condition. Current LCCM reports (2012) rate the condition of many of the Seattle Ferry Terminal's assets as poor or substandard. The structures proposed for replacement are deteriorating, seismically vulnerable, and at the end of their service life. In addition, the Slip 3 OHL does not meet the requirements of the Americans with Disabilities Act (ADA).

Facility inefficiencies complicate the operation of the terminal and hamper the connections between modes of travel. Because incoming traffic bound for the holding area north of Marion Street conflicts with traffic leaving the site, terminal crews often cannot off-load the vessels fast enough to meet the sailing schedule. Short holding lanes in this area worsen the inefficiencies (see also Exhibits 4-19 and 4-20).

The northeastern stairs leaving the terminal are too narrow for the demand. There is no ADA access north of the Marion Street exit lanes from the building level, and the existing ramp from the second level of the main building to Alaskan Way does not meet ADA standards. Due to these inadequacies, all northbound passengers with disabilities, luggage, and baby strollers use the elevators or interior building ramp to leave the terminal. They must then wait at the Marion Street crosswalks until vehicle traffic clears.

Existing passenger corridors, doorways, and ramps through the facility restrict pedestrian flow. Corridors vary in width, doorways are too narrow, and ramps are too steep. The Seattle/Bainbridge run is already the system's busiest passenger route, and the WSF Long-Range Plan forecasts walk-on ridership to grow by 31 percent on the Bainbridge route and by 20 percent on the Bremerton route by 2030. The facility will become even less efficient over time as the pedestrian ridership grows. Finally, the WSF Long-Range Plan identifies transit enhancements as an environmentally and fiscally responsible way to accommodate growth in ridership, optimize vessel capacity, and reduce environmental effects. Providing sufficient transit-supportive facilities will help accommodate the anticipated growth in walk-on ridership and encourage a shift in travel modes from vehicles to walk-ons.

The reconfigured facility will preserve the level of vehicle holding available today while enhancing safety. In addition to the safety benefits of ADA compliance, the new structures will be designed to meet current seismic code requirements. The project will also improve safety by reducing conflicts between vehicles and pedestrian/bicycle traffic.

The proposed design retains those elements of the site that are in good condition. The southern portion of the dock, for example, was constructed in 1990 using concrete and steel piles and structural supports, and will be retained. The overhead pedestrian bridge on Alaskan Way that crosses the Marion Street entrance is planned to be replaced by the City of Seattle after demolition of the viaduct.

During its current planning for a revitalized Central Waterfront, the City of Seattle has considered a future public open space feature at the project site. Potential plans include open spaces at Colman Dock, additional structures along the Alaskan Way frontage, and possible use of the WSDOT property south of Colman Dock at Pier 48 for gathering or entertainment areas. These plans are preliminary and conceptual. If pursued, they would be proposed by the City of Seattle, which would prepare site plans, environmental review, and permit applications in a separate process independent from that of the Seattle Ferry Terminal Project. Although the potential open space feature would not be sponsored by WSDOT, the Seattle Ferry Terminal project is being designed so that it would not be precluded. However, WSDOT's ability to financially support non-transportation-related projects is limited by its legislative authorization (RCW 47.01), and project work will remain consistent with those constraints.

2.5 Outreach and Coordination

WSDOT has conducted a formal scoping process for the Seattle Ferry Terminal project. In addition, it has developed outreach plans for involving the general public, government agencies, and tribes. Outreach and communication efforts will continue through project approvals, final design, and construction. The different elements of the outreach program are described below.

2.5.1 EA Scoping

A formal scoping comment period ran from February 8 through March 15, 2012. During public, agency, and tribal scoping meetings, FTA and FHWA identified thirteen elements of the environment for study in the Environmental Assessment. These elements were as follows:

- Ecosystems
- Noise and Vibration
- Water Resources
- Hazardous Materials
- Geology and Soils
- Historic and Cultural Resources
- Transportation
- Land Use
- Visual Quality
- Air Quality
- Navigation
- Social Elements and Environmental Justice
- Energy and Greenhouse Gas

Approximately 200 people participated in the public scoping activities, and 196 comments were received from agencies and the public. FTA and FHWA carefully reviewed the comments received during the scoping period, and revised the planned NEPA analysis in several ways. In addition, revisions to the project were made in response to agency and tribal coordination, as well as to scoping comments received.

Many commenters objected to the removal of the POF operation, as initially proposed. Following this input, WSDOT modified the project description and coordinated with King County and other potential POF operators to assure that a two-slip POF terminal will continue to be accommodated on the south side of the Colman Dock facility.

WSDOT has also coordinated with the City of Seattle in response to the City's scoping comments. In addition to comments about the need for the POF at the Seattle Ferry Terminal, Seattle noted that the project presents an opportunity to add to the pedestrian environment with an "active urban edge" along Alaskan Way. While design details have not yet been developed, WSDOT has agreed in principle to a design that will accommodate future street-level retail activities along Alaskan Way, should funding become available.

Several comments suggested other revisions to the project description. These included suggestions to open a nearshore passage for salmon migration, to reduce the project footprint by adding a second deck to the vehicle loading platform, and to remove Pier 48 as part of the project. FTA and FHWA, in consultation with WSDOT, have determined that these suggestions are not consistent with the limited "preservation" focus of the project scope, and will not be incorporated into the project description.

In response to comments received from the Seattle Historic Preservation Office and the Pioneer Square Historic District, the Area of Potential Effects related to cultural and historic resources was expanded to include consideration of the Washington Street Boat Landing (to the south of Colman Dock) and Seattle Fire Station No. 5 (to the north).

The Final Scoping Report is included as Appendix A to this EA. The project website contains more information about the project's scoping.

2.5.2 Outreach to the General Public

WSDOT developed a Public Involvement Plan at the beginning of the project, both to provide information about the project and to encourage input. Scoping occurred in February and March 2012, and included a public scoping meeting on February 16, 2012, onboard outreach on both the Seattle/Bainbridge and Seattle/Bremerton evening peak period sailings in February 2012, and an on-line narrated presentation available throughout the scoping period.

Other outreach efforts have included dissemination of project information through flyers, website content and email updates; community and stakeholder briefings; meetings with nearby businesses; briefings of elected officials; public events; and site tours. Tools have included:

- advertisements, fliers, and postcards
- on-line comments/contact database/mailing list
- fact sheets and frequently asked questions (FAQ) responses
- information displays
- presentations
- briefing packets
- media outreach

Coordination efforts have included regular updates to the project website (http://www.wsdot.wa.gov/projects/ferries/colmanmultimodalterminal). Individual project briefings have been made to the League of Women Voters, the Waterfront Business Owners, the Downtown Seattle Association, and the Alliance for Pioneer Square.

2.5.3 Outreach to Government Agencies

WSF developed an Agency Coordination Plan that anticipated federal, state, and local government agency participation in scoping, in permit review, and in direct communication on project design and construction issues.

A scoping meeting for agencies and tribes was held on February 7, 2012. Individual meetings or briefings have also been held with the United States Fish and Wildlife Service (USFWS); the National Marine Fisheries Service (NMFS); the United States Coast Guard (USCG); Washington Departments of Ecology (Ecology), Archaeology and Historic Preservation (DAHP), and Fish and Wildlife (WDFW); the Washington Office of Financial Management (OFM); and the Joint Transportation Committee.

Coordination with two local agencies, the City of Seattle and King County, has been particularly extensive. The project will be built adjacent to the Elliott Bay Seawall Project, and construction of the two projects will partially overlap both physically and temporally. Also, the City will reconstruct Alaskan Way following demolition of the Alaskan Way Viaduct, and changes along the central waterfront will occur as part of the longer-term Waterfront Seattle Project. Frequent meetings and discussions with the Elliott Bay Seawall team, led by Seattle Department of Transportation (SDOT), have addressed both individual project elements and overall construction coordination. The project team has met with Waterfront Seattle and Seattle's Department of Planning and Development (DPD) to discuss open space planning, public access requirements, and opportunities at the Seattle Ferry Terminal. The project team has also coordinated with the Seattle Fire Department concerning both barge movements and construction adjacent to Fire Station No. 5.

King County Ferry District (KCFD) operates the POF service from Pier 50, under a lease from WSDOT. The project as initially envisioned and described during the scoping process would have eliminated POF service at the Seattle Ferry Terminal. Responding to concerns expressed during the scoping process, the State Legislature directed WSDOT to assure that POF operations at the site would not be precluded by the project (RCW 47.60.662). In response to this and to the feedback received during scoping, WSDOT worked closely with KCFD and other potential operators (for instance, Kitsap Transit, which has operated at Pier 50 in the past) to revise the project so that project objectives would be met while continuing to accommodate POF operations from Pier 50.

2.6 Tribal Coordination

FTA, FHWA, and WSDOT are committed to government-to-government consultation with Native American tribes on projects that may affect tribal rights and resources. In accordance with Section 106 of the National Historic Preservation Act and other authorities, FTA and FHWA initiated formal consultation with federally-recognized tribes that may have an interest in the project or areas potentially affected by the project: the Muckleshoot Indian Tribe, the Suquamish Indian Tribe, the Snoqualmie Tribe, the Tulalip Tribes, and the Confederated Tribes and Bands of the Yakama Nation. Per NHPA and NEPA guidance, WSDOT also provided information on project activities to the non-federally-recognized Duwamish Tribe.

FTA, FHWA, and WSDOT developed a Tribal Coordination Plan for the project that emphasizes engagement with interested tribes at both the elected official and technical staff levels. The plan encourages direct communication with the tribes, through the two federal co-lead agencies and through the designated WSF tribal liaison. The plan also includes a process to follow in the event that unanticipated cultural resources are encountered during project construction.

FTA, FHWA, and WSDOT have consulted with affected tribes, and will continue to do so through final design and construction. The laws and policies described below provide the basis for this ongoing coordination.

- NEPA calls for federal agencies to invite any affected federally-recognized Native American tribe to participate in the environmental review process.

- Section 106 of the National Historic Preservation Act requires that federal agencies consult with federally-recognized tribes regarding potential impacts and mitigation for historic properties prior to making decisions that could affect those properties.
- Federal policy requires that federal agencies observe a government-to-government relationship with federally-recognized tribal governments, as articulated in a 2004 Presidential Memorandum and Executive Order 13175 (2000).
- WSDOT's Centennial Accord Plan requires each state agency to develop a procedure for effective government-to-government relations. The Centennial Accord Plan includes the WSDOT Secretary's Executive Order on Tribal Consultation (E1025.01), a Dispute Resolution Policy, and detailed descriptions of the programs, services, and funding available to tribes from key WSDOT divisions and offices.
- WSDOT Executive Order E1025.01 directs WSDOT employees to enter into consultation with tribes on all decisions that may affect tribal rights and interests. It defines consultation as respectful, effective communication in a cooperative process that works toward a consensus, before a decision is made or an action is taken. Consultation with tribal governments occurs independently of the public participation process. Representatives of tribal governments and tribal members have equal access to the public participation process.

2.7 Project Funding and Schedule

The project budget is $268 million and includes a risk reserve. Project funding relies on a combination of federal and state funding sources, with approximately $13 million in local funding from King County required for the replacement of the POF.

The existing terminal contains about 14,300 square feet of retail space. The project design includes only a small retail area inside the terminal building. Additional retail space would be located along the upper level walkway to the Marion Street Overpass and along Alaskan Way. WSDOT will pursue but has not identified funding that would allow it to build out this retail space. However, the NEPA analysis does consider impacts of the full project, including retail spaces.

The project schedule anticipates a construction period of 69-72 continuous months, from 2015 through 2021.

2.8 Environmental Permits and Approvals Required for the Project

The environmental permits, approvals, and other authorizations required from federal, state and local agencies prior to construction of the proposed project are listed below.

2.8.1 Federal

- U.S. Army Corps of Engineers
  - Rivers and Harbors Act, Section 10 Permit
  - Clean Water Act, Individual Section 404 Permit
- U.S. Fish and Wildlife Service
  - Endangered Species Act (ESA) Consultation
- National Marine Fisheries Service

- Endangered Species Act (ESA) Consultation
- Marine Mammal Protection Act (MMPA) Authorization
- Magnuson-Stevens Act, Essential Fish Habitat Determination

2.8.2 State

- Washington Department of Archaeology and Historic Preservation
  - Section 106 of the National Historic Preservation Act Consultation
- Washington Department of Ecology
  - Clean Water Act Section 401 Water Quality Certification
  - Coastal Zone Management Act (CZMA), Consistency Determination
  - National Pollution Discharge Elimination System (NPDES) Construction Stormwater General Permit
  - Model Toxics Control Act compliance for sediment remediation
- Washington Department of Fish and Wildlife
  - Washington Hydraulic Code, Hydraulic Project Approval (HPA)
- Washington Department of Natural Resources
  - Aquatic Lands Act, Aquatic Land Use Authorization
- Washington State Department of Transportation
  - State Environmental Policy Act (SEPA rules WAC 197-11-610 Use of NEPA documents)

2.8.3 Local Government

- City of Seattle
  - Shoreline Master Program, Master Use Permit for Shoreline Substantial Development Permit (SSDP)
  - Noise Variance
  - Construction permits (building, electrical, elevator and escalator, etc.)

Chapter 3 Description of Alternatives

This chapter describes the two alternatives carried forward for analysis in this EA: the No Build Alternative and the Build Alternative.

3.1 No Build Alternative

The No Build Alternative (Exhibit 3-1) establishes the baseline conditions against which the Build Alternative is evaluated in this EA.

Under the No Build Alternative, the older parts of the facility built in 1964 would not be replaced and the terminal, including King County's POF facility at Pier 50, would continue operating in its current configuration. WSDOT would continue its rigorous program of inspections and maintenance.

The No Build Alternative would not address the seismic vulnerability of the structures built in 1964. These structures would continue to age and deteriorate, particularly the pilings which are subject to a harsh marine environment. Over time, safety concerns about deteriorating conditions would likely cause restrictions in service, closures of parts of the facility, and reduced ferry service from Colman Dock.

The No Build Alternative would not address other safety conflicts and operational inefficiencies at the terminal. These were described in Chapter 2, and include pedestrian-vehicle conflicts at the Marion Street exit; conflicts between entering and exiting vehicles at the driveways; inadequate capacity and lack of ADA compliance for the passenger corridors, doorways, ramps, and stairways of the terminal building; and ADA non-compliance at Slip 3.

3.2 Build Alternative

The Build Alternative includes four main elements:

- Replace and reconfigure the timber trestle portion of the dock;
- Replace the main terminal building and its foundations;
- Replace the Slip 3 transfer span and OHL; and
- Replace the King County POF facility.

More detail about the project elements is provided below. The completed Build Alternative is shown in Exhibit 3-2.

N

NOT TO SCALE

SOURCE: WSDOT, 2011

Washington State Department of Transportation

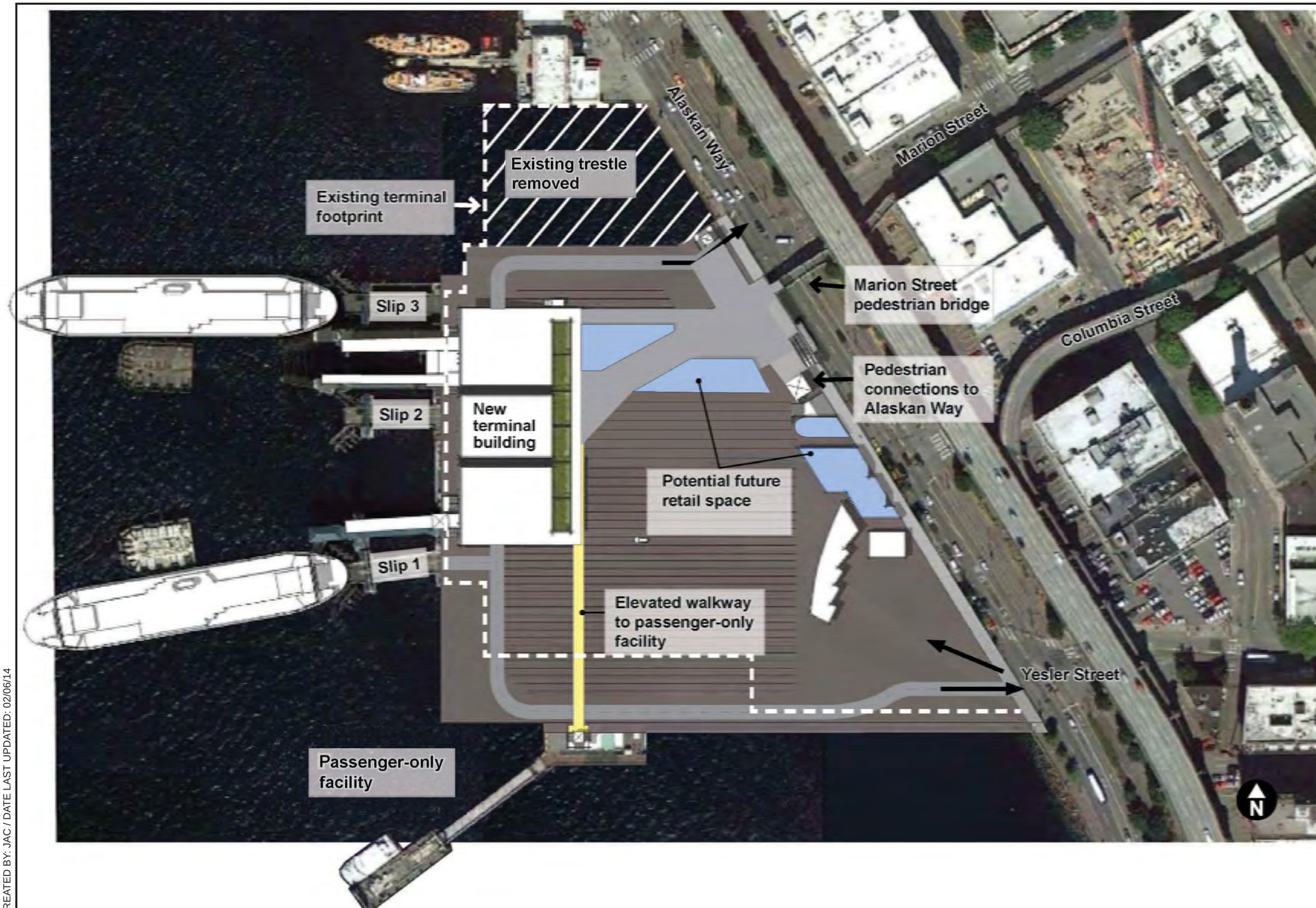
Exhibit 3-1

Existing Project Site

Seattle Terminal Project

Seattle, Washington

FILE NAME:Ex03-1_ExistingProjectSite.ai / CREATED BY: JAC / DATE LAST UPDATED: 10/24/13



Washington State Ferries

Washington State Department of Transportation

N

NOT TO SCALE

SOURCE: Google Earth, 2011; WSDOT, 2011

Exhibit 3-2

Completed Build Alternative

Seattle Terminal Project

Seattle, Washington

FILE NAME:Ex03-2_BuildingAltComp.ai / CREATED BY: JAC / DATE LAST UPDATED: 02/06/14

3.2.1 Trestles

The trestle is the support structure beneath the deck, or surface, of Colman Dock. The trestle is constructed of both timber and concrete piles. The proposed project would remove the northern timber trestle built in 1964. WSDOT would construct a new steel and concrete trestle from Columbia Street northward to Marion Street. A section of fill contained behind a bulkhead underneath the northeast section of the dock would also be removed. The area from Marion Street to the north edge of the property would not be rebuilt and would become, after demolition, a new area of open water. The dock would be reconfigured by constructing a new concrete trestle area on the south edge of the facility. See also Exhibit 2-2 for a diagram showing major terminal components.

This new dock configuration, with exit lanes running along the edges of the facility, would enhance safety by eliminating vehicle conflicts with pedestrians and bicycles at the Marion Street exit. Longer holding lanes on the south would allow for faster loading of the vessel. The reconfigured dock would have a smaller width along the shoreline: 180 linear feet of waterfront and nearshore habitat would be opened at the north end of the site, and 30 feet of new trestle would be constructed along the south shoreline, for a net reduction of 150 feet in width along the Alaskan Way shoreline.

Total overwater coverage would increase by about 5,200 square feet (about 1.7% more than existing overwater coverage), due to the new walkway from the King County POF to Alaskan Way and new stairways and elevators from the POF to the upper level of the terminal. WSDOT would mitigate for the impacts of this additional overwater cover by restoring an area of equivalent ecological function, in Elliott Bay or elsewhere in Puget Sound. Options include removal of some overwater cover at Pier 48, which is owned by WSDOT, or participation in King County's In Lieu Fee Mitigation Program, certified under 2008 federal rules and overseen by federal and state resource agencies.

The overall project would maintain existing vehicle service levels through anticipated 2030 conditions, as projected in WSF's Long-Range Plan. Vehicle holding capacity would remain very similar to today's capacity (611 vehicle holding capacity for the Build Alternative; existing capacity of 596). Additional vehicle holding area is not needed to maintain existing service levels because the maximum number of sailings in any one hour for 2030 will remain the same as today, at three (two vessels to Bainbridge and one to Bremerton), and these boats are full at peak hours now. Peak hour volumes will remain at 550 vehicles-per-hour.

Although the terminal's vehicle holding area does not need to be expanded to maintain current service levels, a growth in walk-on passenger volumes is predicted, and new terminal features are included to accommodate these increased pedestrian volumes. In particular, the passenger overhead loading at Slip 3 will be widened to handle increased walk-on traffic.

3.2.2 Terminal Building and Entrance

The Build Alternative includes demolition of the existing terminal building and construction of a new terminal building. The new terminal building would be located along the west edge of the dock, spanning all three slips to handle passenger traffic more efficiently, and would be connected to the Marion Street Overpass by an elevated deck. It would be smaller than the current terminal building, at

22,000 square feet of enclosed space, compared to 36,000 square feet provided today. WSDOT sized the new building and entryways to accommodate projected 2030 passenger volumes while maintaining today's operational level of service. Passenger volumes for 2030 were estimated based on ridership projections published in the 2009 WSF Long-Range Plan. Areas for waiting, queuing, processing, and support were sized according to industry standards, including WSF Terminal Design Standards.

Retail services would not be included in the new terminal building. The design anticipates about 14,000 square feet of retail space, located both along the walkway between the building and the Marion Street Overpass and along the Alaskan Way street frontage. Construction of the retail spaces would be phased based on funding availability.

Along Alaskan Way, the entrance to the new terminal building would include a new stairway, an escalator, and elevators flanked by retail spaces on each side fronting the street edge.

3.2.3 Slip 3

The project includes reconstruction of the vehicle transfer span and the passenger overhead loading (OHL) structures of Slip 3 (see Exhibit 3-2). The design would meet current design codes and standards, including WSF Terminal Design Standards. New hydraulic systems would improve safety, reliability, and operational efficiency, and in the case of the transfer span, reduce maintenance costs compared to the current span. The new OHL would be wider than the existing OHL, to accommodate the increased walk-on passenger volumes projected for the year 2030 by the Long-Range Plan. It would also be designed to meet Americans with Disabilities Act (ADA) standards.

Replacement of two timber berthing structures at Slips 2 and 3 with steel dolphins is also proposed as part of the Build Alternative. Berthing structures, including dolphins, help to guide the boats into the slip and keep them in place while docked (see also Exhibit 2-2).

3.2.4 Passenger-Only Ferry Facility

Following scoping in spring 2012, the Washington State Legislature directed WSDOT to ensure that any future modifications at the terminal would not preclude access for passenger-only ferries. WSDOT worked closely with King County and other potential POF operators to develop the plan for POF service at Colman Dock, both during project construction and after its completion, and to avoid precluding potential future expansion. King County Ferry District's water taxi service to West Seattle and Vashon Island is the only POF service currently using Pier 50. However, Kitsap Transit and other transit agencies have either operated POF service to Seattle in the past or have actively considered doing so. The project team coordinated with five such agencies, although King County played the largest role.

The Build Alternative design replaces the current POF functions and addresses the safety concerns related to pedestrian/vehicle conflicts at Yesler Street. It would include a new covered pier, sized to accommodate passenger waiting and connected by a new overhead pedestrian bridge to the terminal building and the Marion Street Overpass. Elevators and stairs would connect the pier to the new pedestrian bridge. The POF pier would connect to Alaskan Way via a walkway along the south side of the trestle that would also be used for POF passenger queuing (see also Exhibit 3-2).

Passengers using the POF now enter and exit the ferry from a floating barge. A walkway called a gangway connects the barge to the south side of Colman Dock. During the first phase of construction, the POF barge and gangway would be temporarily relocated east of their current location, and then moved to their final location. The existing barge and gangway would be reused for both the temporary and final locations of the POF.

3.2.5 Other Features of the Build Alternative

In addition to the four main elements of the Build Alternative described above, the proposed action also includes improved access, egress, and dock operations; new pedestrian and bicycle features; a sediment cap; and improved stormwater treatment. These other features are described below.

3.2.5.1 Access and Egress

The layout on Colman Dock would be reconfigured to provide safer and more efficient operations. Pedestrian connections would include new elevators north of Marion, a new escalator, and north and south stairways. Also, a new bicycle exit lane would be added at Marion Street. New separate bicycle lanes at Yesler Way would be striped or painted for higher visibility. The Bainbridge-bound bicycle lane would be located parallel to and outside (east and north of) the vehicle entry lanes, to a new covered holding area. The Bremerton-bound bicycle lane would also be outside the vehicle entry lanes, located left of the entering cars. This design would avoid the weaving and mixing of bicycles and vehicles that occurs now, and provide a safer travel path to vessel loading.

Consistent with the requirements of the Seattle Shoreline Master Program, public access would be provided at the elevated terminal level, both outdoors and inside the terminal building.

3.2.5.2 Sediment Cap

Sediment beneath the terminal has been contaminated by the creosote-treated piles and other chemicals discharged to the environment over the years. A sediment cap was installed to cover contaminated sediment on the south half of the site prior to trestle expansion in 1990. WSDOT proposes to place a new sediment cap during construction of the project to contain existing contamination. WSDOT would work with the Washington Department of Ecology on final design of the sediment cap. Areas of the existing sediment cap disturbed during construction of the south portion of the project would be repaired.

3.2.5.3 Stormwater Treatment

WSDOT would install stormwater vaults below the deck to provide water quality treatment for all new and replaced areas of the terminal. The vaults would collect and hold runoff, allowing suspended solids to settle. WSDOT would periodically clean the vaults to remove the solids. The existing terminal is not equipped with vaults, and provides only limited stormwater treatment. Simple oil-water separators collect runoff on the southern (concrete) portion of the dock, while stormwater is not treated on the north (timber) trestle before it enters Elliott Bay.

As it collects and drains off road pavement, stormwater typically picks up pollutants that cars and trucks deposit. These pollutants include copper, zinc, and other suspended solids. Allowing the solids to settle in vaults before the stormwater is released removes much of the pollution. More discussion of this issue can be found in the Ecosystems and Water Resources sections of Chapter 4.

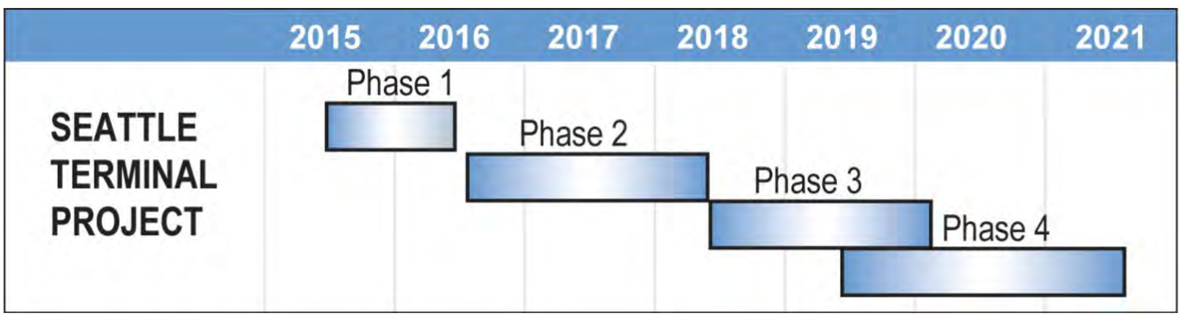
3.2.5.4 Multimodal Connections

WSF would integrate its efforts with the City of Seattle and King County Metro to assure that ferry passenger connections to local transit service are maintained or enhanced as local transit routes or service are revised. One example is Metro's potential new Columbia Station along Alaskan Way, a well-located intermodal connection for WSF and POF passengers.

3.3 Construction Activities and Phasing

Construction phasing has been developed to maintain ferry operations during construction while limiting in-water work to the approved work windows. The construction would take approximately six years (69-72 months), with four seasons of in-water work. In-water work would only occur during the Washington Department of Fish and Wildlife's approved in-water work window for Elliott Bay, which is anticipated to be August 1 – February 15. Exhibit 3-3 shows the anticipated construction schedule.

Exhibit 3-3 Construction Schedule



The timber trestle, fill area, Slip 3, and the main terminal building would be demolished using equipment mounted on barges moored at the site, or from the terminal deck. Piles would be removed using vibratory methods wherever possible, or else by direct pull, but would be cut at or below the mudline when necessary. The deteriorating condition of some of the piles may require capping or other partial removal methods.

Major construction activities include off-site shop fabrication of steel and concrete piles, pile driving (vibratory and impact), drilled shaft installation, building construction, site utility work, and transport of workers, equipment, materials, and debris.

In general, construction would start at the south end of the facility and move by section to the north. At least two slips would be kept operational at all times in order to maintain existing levels of ferry service and schedules. Pedestrian movements would be kept on the upper level of the main terminal building, on Yesler Street, and on Marion Street at all times in order to avoid pedestrian/vehicle conflicts.

Additional detail on the four construction phases is provided below (see Exhibit 2-2 for a diagram showing major terminal components).

3.3.1 Phase 1

Phase 1 (Exhibit 3-4) includes construction of a temporary platform for the King County POF slip on the south side of the trestle. The existing POF pier and walkway, including supporting piles, would be removed and the barge and gangway temporarily relocated east on the existing trestle. Steel piles would be used to support the platform walkway, barge, and gangway.

This phase also includes the reconstruction of Slip 3. A new standard hydraulic transfer span and a new bridge seat would replace the old transfer span, and the OHL structures would be replaced with a new super-column type of OHL. Drilled shafts would support the new transfer span and overhead loading structure. Steel casings for the drilled shafts would be vibrated into place. Steel piles would be used for the bridge seat.

On the south side of the terminal, construction would include an extension of the deck, supported by concrete piles. These concrete piles would be driven with an impact hammer.

The new POF slip would be constructed during this phase as part of the south trestle using concrete piles. A light-penetrating surface, such as glass blocks, is being considered for the POF at-grade walkway to Alaskan Way.

The two timber dogleg-shaped dolphins between Slips 2 and 3 would be replaced by two new steel pile dolphins. A temporary dolphin would be built to allow vessels to dock at Slip 2. Steel piles would be used for the dolphins. These dolphins (Exhibit 2-2) make the docking process safer.

Work would occur from the existing trestle as well as from one or two barges on the south side of the trestle. Barges would be anchored to the sea floor. A clean sediment cap would be placed underneath the new section of trestle once the old trestle sections and piles are removed; final details on the sediment cap would be established in coordination with Ecology.

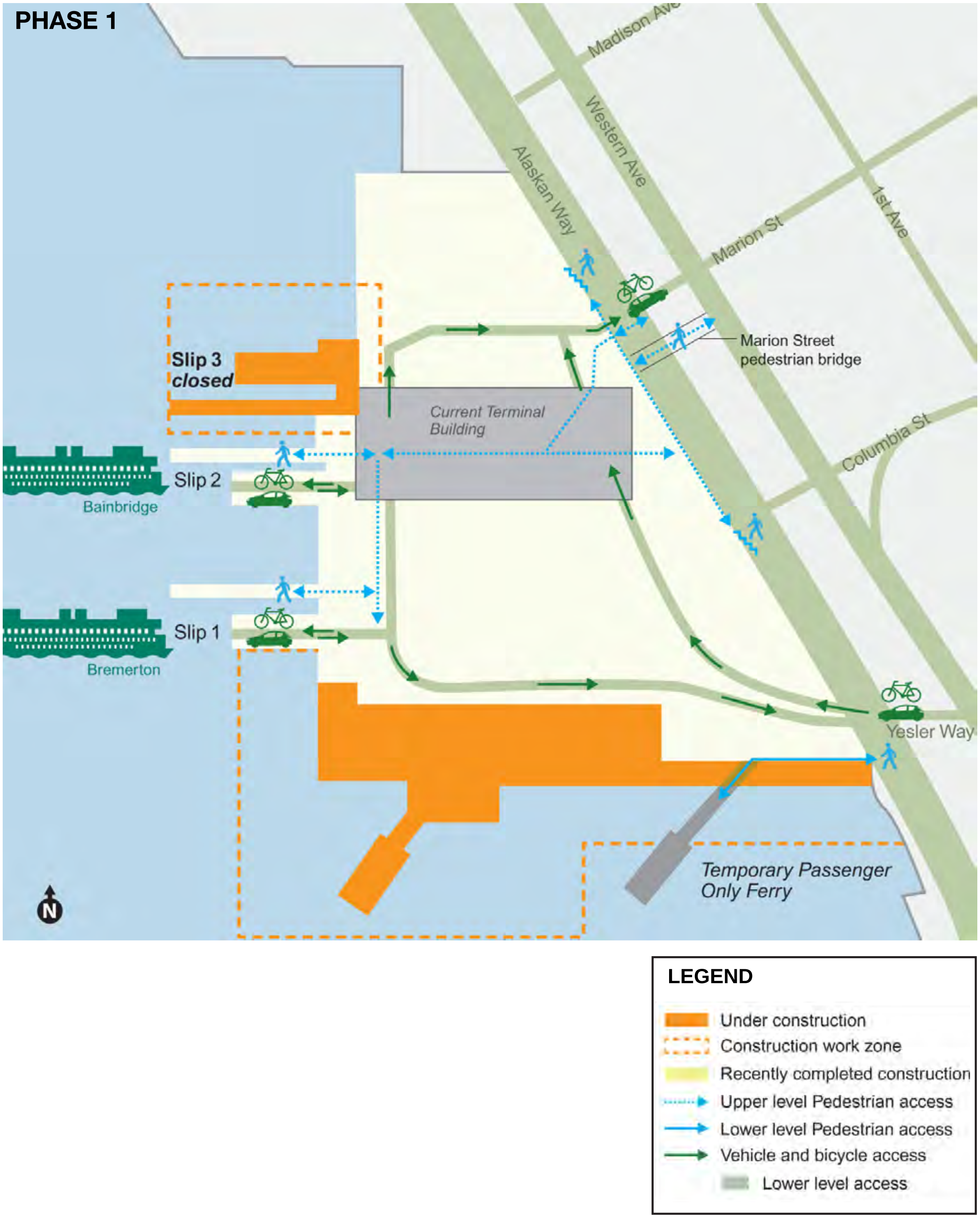
Phase 1 is scheduled to begin in 2015 and would last approximately 9 to 12 months. Vessel operations of the facility during this phase would be out of Slips 1 and 2.

3.3.2 Phase 2

During Phase 2 (Exhibit 3-5), the Slip 1 OHL walkway would be removed. The new terminal building would be built in stages; the first (southern) portion of the building would be built during this phase. The new terminal building would require a new pile foundation to support it. To accomplish this, a portion of the concrete trestle would be removed, piles driven, and the trestle portion rebuilt. These piles would be installed with both vibratory and impact hammers to the necessary depth. A barge would be anchored south of Slip 2 to support construction equipment necessary for the work.

An elevated walkway would be constructed to connect the POF slip to the new terminal building during Phase 2. It would be supported by drilled shafts.

During Phase 2, vessels would operate out of Slips 2 and 3. Phase 2 construction activities are estimated to take approximately 22 months, with one season of in-water work.



FILE NAME: Ex03-4_Phase1.ai / CREATED BY: JAC/ DATE LAST UPDATED: 03/24/14

Washington State Ferries

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

Washington State Department of Transportation

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NOT TO SCALE

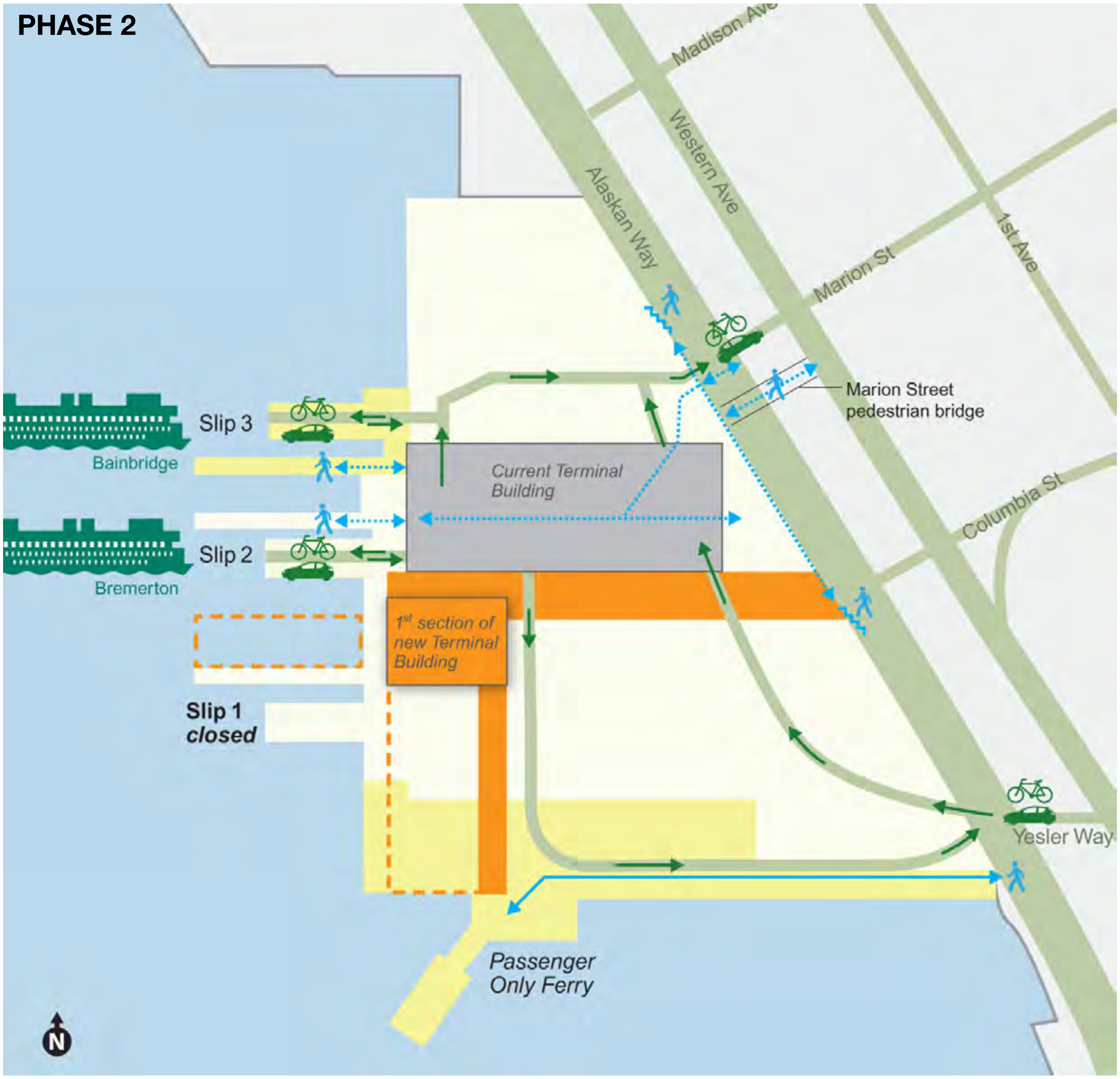
SOURCE: Google Earth, 2011; WSDOT, 2011

Exhibit 3-4

Construction Phase 1

Seattle Terminal Project

Seattle, Washington



LEGEND

- Under construction
- Construction work zone
- Recently completed construction
- Upper level Pedestrian access
- Lower level Pedestrian access
- Vehicle and bicycle access
- Lower level access

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NOT TO SCALE

SOURCE: Google Earth, 2011; WSDOT, 2011

Exhibit 3-5

Construction Phase 2

Seattle Terminal Project

Seattle, Washington

FILE NAME: Ex03-5_Phase2.ai / CREATED BY: JAC/ DATE LAST UPDATED: 03/24/14

3.3.3 Phase 3

During this phase (Exhibit 3-6), passenger processing would move into the new section of the terminal building constructed in Phase 2. The Slip 2 transfer span and overhead loading would be temporarily removed and the vehicle attendant crew building under the Slip 2 OHL would be demolished. The existing terminal building would then be demolished, and a strip of the north (timber) trestle approximately 100 feet wide immediately north of the existing concrete trestle would be demolished and replaced with a new steel and concrete trestle supported by concrete-reinforced steel piles. The demolition would remove about 750 timber piles and 75 concrete-reinforced steel piles. Piles would be vibrated out of the substrate to the extent possible to minimize disturbing contaminated sediments. The new concrete-reinforced steel piles would be driven with both vibratory and impact hammers to the appropriate load-bearing depth.

Two temporary vehicle bridges would span the 100-foot gap during construction. After the gap is replaced with new piles and decking, the center third of the new terminal building would be constructed and the Slip 2 vehicle and OHL spans reinstalled using steel piles. Temporary pedestrian bridges would maintain a link to the Marion Street Overpass and from Slip 3 to the new terminal building. A derrick and barge would be anchored south of the slip.

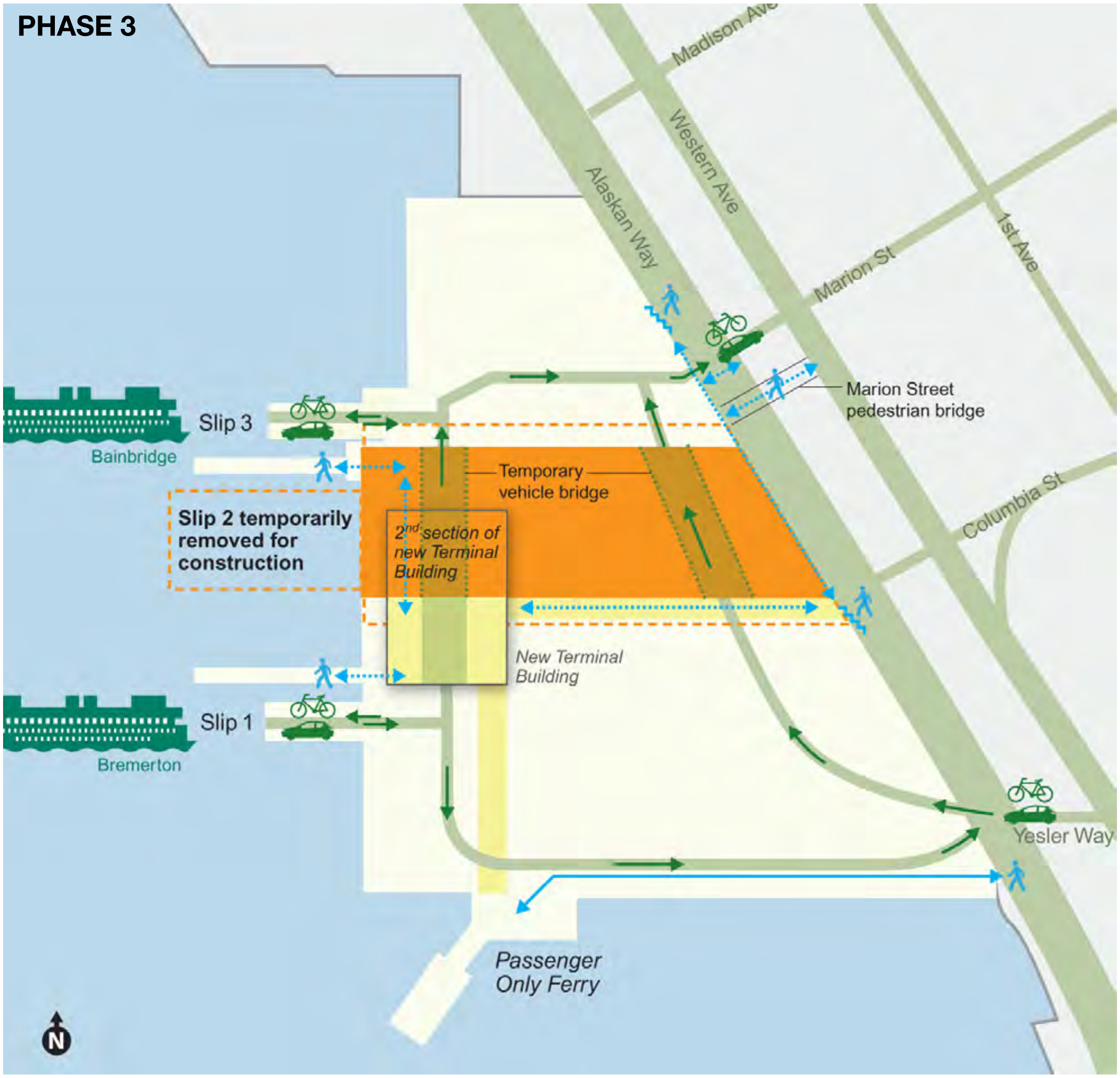
During this phase, vessels would operate out of Slips 1 and 3. Phase 3 is estimated to take approximately 21 to 24 months, with one season of in-water work. The schedule now estimates that Phase 3 would occur from June 2018 through February 2020. The last eight to eleven months would overlap with the start of Phase 4.

3.3.4 Phase 4

In Phase 4 the remaining portion of the north (timber) trestle would be demolished (Exhibit 3-7). Approximately 1,267 piles would be removed, consisting of 1,187 timber piles and 80 concrete-reinforced steel piles.

These piles would be removed using vibratory methods to the extent possible to minimize suspending potentially contaminated sediments. Afterward, a section of fill estimated to be 7,700 cubic yards (about 14,500 square feet of surface area) contained behind a sheet pile bulkhead would be removed. The fill would be dredged while the bulkhead is still in place and either disposed of at an open water site (if it meets Dredged Material Management Program provisions) or hauled offsite to an upland disposal facility. Once the fill has been removed and the area restored to match the bathymetry (sea floor contours) on either side, the bulkhead would be removed.

After removal of the bulkhead, the remainder of the new trestle would be constructed using concrete-reinforced steel piles. The final third of the new terminal building would be constructed and temporary pedestrian bridges replaced with permanent structures. The upper-level slab for potential future retail spaces would be constructed, along with the framework for the lower level retail spaces on each side of the escalators. A new sediment cap would be placed in accordance with an approved plan developed in cooperation with Ecology.



LEGEND

- Under construction
- Construction work zone
- Recently completed construction
- Upper level Pedestrian access
- Lower level Pedestrian access
- Vehicle and bicycle access
- Lower level access
- Temporary vehicle bridge

Washington State Ferries

Washington State Department of Transportation

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NOT TO SCALE

SOURCE: Google Earth, 2011; WSDOT, 2011

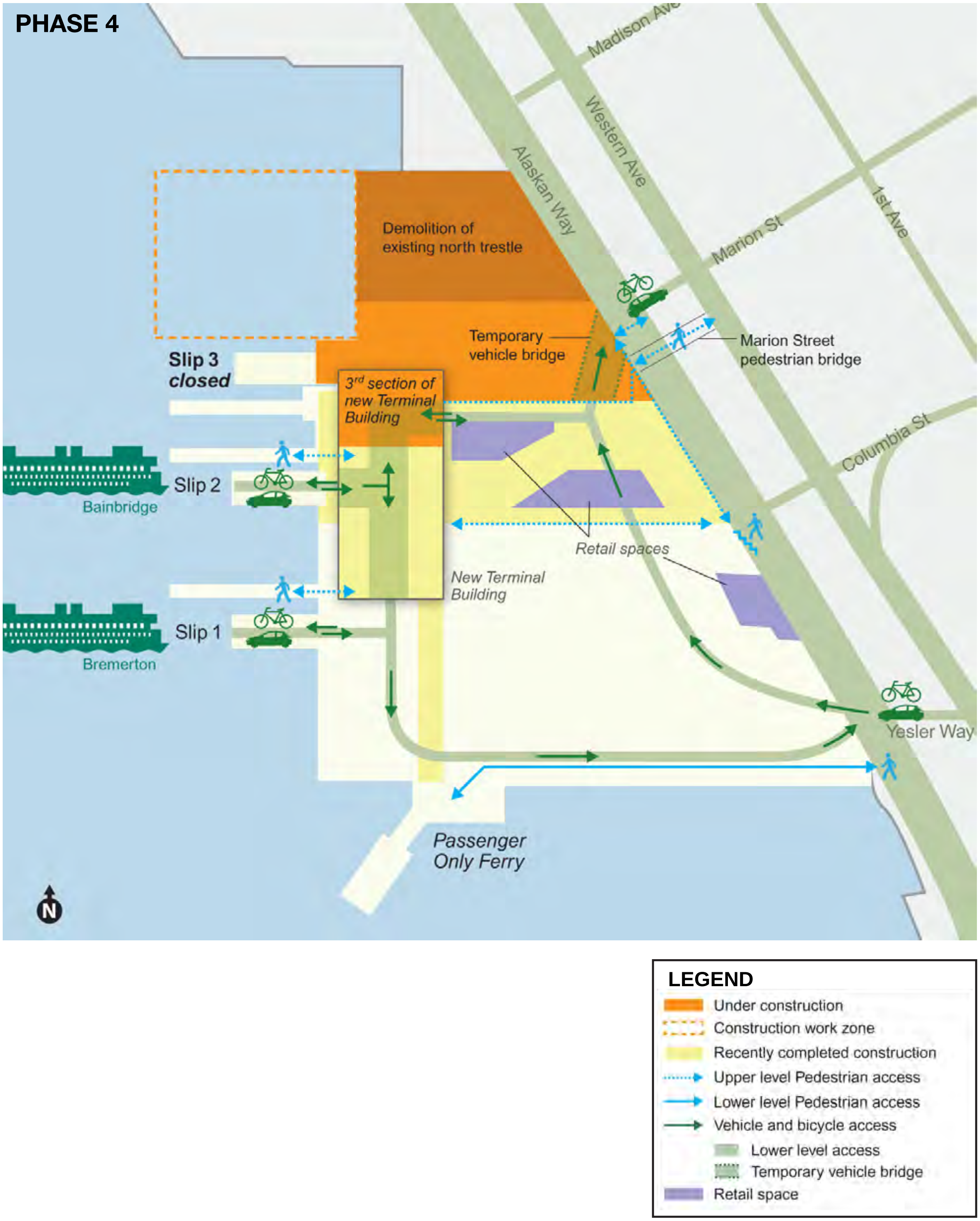
Exhibit 3-6

Construction Phase 3

Seattle Terminal Project

Seattle, Washington

FILE NAME: Ex03-6_Phase3.ai / CREATED BY: JAC/ DATE LAST UPDATED: 03/24/14



Washington State Ferries

Washington State Department of Transportation

NOT TO SCALE

SOURCE: Google Earth, 2011; WSDOT, 2011

Exhibit 3-7

Construction Phase 4

Seattle Terminal Project

Seattle, Washington

FILE NAME: Ex03-7_Phase4.ai / CREATED BY: JAC/ DATE LAST UPDATED: 03/24/14

During this phase, vessels would operate out of Slips 1 and 2. Phase 4 activities are estimated to take approximately 22 to 25 months, with one season of in-water work. Early activities for Phase 4, estimated to begin in April 2019, would overlap by eight to eleven months with Phase 3.

3.3.5 Three Phase Construction Alternative

A team of engineering, marine construction, and cost specialists conducted a risk assessment and value engineering review of the proposed project at WSDOT's request in early 2013. One of the recommendations from that study was to consider a three-phase construction program, rather than the proposed four phases. The three-phase approach could reduce the project's construction duration by as much as one year. This option could reduce in-water effects to the marine environment, but could also reduce vehicle holding capacity on the dock and thus potentially increase queuing along Alaskan Way during periods of peak ferry use. The possible impacts of a three-phase construction approach would be studied more thoroughly, and appropriate environmental re-evaluation would be prepared, before a change from the four-phase construction schedule would be authorized.

3.4 Alternatives Considered but Not Carried Forward

As previously discussed, the project is focused on preserving existing assets, consistent with the WSF Long-Range Plan and legislative direction. A team of engineers, architects, environmental scientists, operations specialists, and others evaluated various alternatives to determine whether they could meet the project's purpose and need.

WSDOT considered an alternative that eliminated the POF from the Seattle Ferry Terminal project, and proposed that option during the public scoping period. Based on feedback received during scoping, and additional legislative direction, WSDOT worked closely with the King County Ferry District to incorporate the POF into a revised project. WSDOT also considered relocating the POF to the north side of the terminal; this alternative was eliminated based on potential navigation and safely conflicts with the WSF ferries and with the fire boats operating out of Fire Station No. 5, to the north of the site.

WSDOT also considered two design options: replacing the terminal in its existing configuration, or reconfiguring the terminal by removing vehicle holding area on the north side and replacing it on the south side. The advantages of reconfiguring the terminal's layout led to its selection as the Build Alternative. These advantages include reduced pedestrian-vehicle conflicts, improved operational efficiencies, and environmental benefits such as increased near shore open water area and a narrower facility profile along Alaskan Way.

As a result of this analysis of alternatives, only one Build Alternative is analyzed in this Environmental Assessment.

Chapter 4 Affected Environment and Environmental Consequences

This chapter analyzes the potential environmental consequences of the No Build and Build Alternatives for the Seattle Ferry Terminal Project. The discussion includes a description of the resource study area, the methodology used for the analysis, impacts from construction, potential long-term impacts, and mitigation measures that could reduce identified impacts. The project's impacts are primarily related to construction, which would be phased over a six-year period from 2015 through 2021. In-water work would require demolition, pile removal and installation, and construction of new over-water decking. The discussion in this chapter has been organized to reflect the scale of impacts likely to be caused by the project; it begins with potential ecosystem impacts, then addresses elements of the environment closely associated with those potential ecosystem impacts (noise and vibration, water resources, hazardous materials, geology and soils), and finally addresses other elements of the environment potentially affected by the project.

The discussion that follows, as well as the biological opinions that have been issued by the United States Fish and Wildlife Service and the National Marine Fisheries Service (Appendix B), demonstrate that the project's construction impacts will be temporary, but will occur in sensitive marine waters over a period that may last for six years. These temporary impacts are moderated substantially by the proposal's commitments to minimize construction impacts in ways that have been scientifically established to be effective, and by the substantial long-term benefits of the completed project to the marine environment. Long-term operational impacts are minimal, as the project will maintain existing service levels at the ferry terminal while reducing seismic risks and pedestrian-vehicle conflicts.

4.1 Summary of No Build and Build Effects

Resource	No Build Alternative	Build Alternative
Ecosystems	**Construction**: Ongoing repair and maintenance of the Seattle Ferry Terminal would continue. Replacement of piles or other portions of the deteriorating facility would generate noise, turbidity, and other impacts similar to that described for the Build Alternative. The ongoing repair and maintenance program would have shorter periods of active construction, but would continue throughout the lifetime of the facility. **Long-Term:** Pollutants from the trestle would continue to discharge untreated to Elliott Bay. The north trestle, including creosote-treated timber piles and associated contaminated fill, would continue to harm seafloor species and to slowly release hazardous materials into the water column. The sediment cap would not be expanded. **Beneficial:** None.	**Construction:** In-water work (especially pile removal and installation) would mobilize sediments, temporarily degrading water quality. Disturbing sediments beneath and near the trestle could spread known contamination. Pile installation would also generate noise levels that could disturb or harm aquatic species. Constructing the south trestle would increase overwater cover until the north trestle is removed in Phase 4. Mitigation would include limiting in-water work to agency-approved periods to avoid fish impacts, monitoring for the presence of marine mammals, use of bubble curtains to minimize pile driving noise impacts on fish, and sediment containment best management practices (BMPs). **Long-Term:** The project would result in approximately 5,200 square feet of new over-water coverage. Mitigation would include replacement of equivalent ecological functions, either in Elliott Bay or elsewhere in Puget Sound. **Beneficial:** The Build Alternative would remove about 7,400 tons of creosote-treated pilings and about 3,500 cubic yards of contaminated sediment, and install a new cap, increasing benthic and nearshore habitat. Stormwater treatment for the new trestle sections would be provided, improving water quality. The project would result in a net increase of approximately 150 linear feet of open shoreline along the Alaskan Way frontage.

Resource	No Build Alternative	Build Alternative
Noise and Vibration	**Construction:** Construction activities would cause noise during maintenance activities similar to that described for the Build Alternative but at a much smaller scale and more localized to the area of work. The No Build Alternative could require replacement pile driving close to Fire Station No. 5. Because the north trestle would remain closer to the fire station under the No Build Alternative, the vibration and noise impacts may be greater than when removing the piles in the Build Alternative; however, the No Build impacts would be much shorter in duration per occurrence, but could be required multiple times throughout the lifetime of the facility. **Long-Term:** None. **Beneficial:** None.	**Construction:** Construction would cause noise and vibration for a 6-year period. Pile driving and removal would cause the greatest noise and vibration impacts. The northeast corner of the construction site is located about 260 feet from the nearest residential units. Pile driving would not be conducted at night, and the project would comply with the Seattle noise ordinance or with the terms of a noise variance. Potential adverse vibration effects to Fire Station No. 5 would be mitigated by cutting piles within 35 feet of the fire station rather than vibrating them out, and monitoring vibration levels during demolition and construction. If monitoring data show vibration levels approaching the damage threshold, WSDOT will halt vibratory extraction of piles and cut them at the mudline until the vibration levels do not approach the damage threshold of 0.5 PPV. Monitoring would also be conducted for vibration levels near sensitive cast iron and brick utility lines, and measures taken to avoid impacts if vibration levels approach damage thresholds. A public information and outreach program and a noise complaint procedure will be developed and implemented during construction. **Long-Term:** None. **Beneficial:** Removal of the timber trestle would shift terminal operations approximately 165 feet to the south, further away from Fire Station No. 5.
Water Resources	**Construction:** Replacement of piles or other portions of the deteriorating facility as part of the maintenance program would generate turbidity and other impacts similar to that described for the Build Alternative. The ongoing repair and maintenance program would have shorter periods of active construction, but would continue throughout the lifetime of the facility. **Long-Term:** Currently, stormwater from the site's impervious surfaces discharges directly into Elliott Bay with only oil-water separators on the southern portion of the dock. The No Build Alternative would result in no changes to water quality compared to current conditions. The sediment cap would not be expanded.	**Construction:** The removal and installation of piles would cause turbidity plumes and stir up contaminants and sediment. Dust from exposed surfaces and construction materials and debris containing contaminants may blow into the water, reducing water quality. Construction equipment used in the water could leak small amounts of fuel and engine fluids into Elliott Bay. Mitigation would include implementing a Construction Stormwater Pollution Prevention Plan comprised of a Temporary Erosion and Sediment Control Plan; Spill Prevention, Control, and Countermeasures Plan; Concrete Containment and Disposal Plan; and Fugitive Dust Plan. **Long-Term:** None.

Resource	No Build Alternative	Build Alternative
Water Resources (continued)	**Beneficial:** None.	**Beneficial:** Pollutant loadings to Elliott Bay would be substantially reduced by stormwater treatment facilities for the new and replaced impervious surfaces. Approximately 3,500 cubic yards of contaminated sediment would be displaced and removed during pile installation, and a new sediment cap would be placed beneath Colman Dock to prevent leaching of materials into the marine environment. The Build Alternative also includes removal of approximately 7,400 tons of creosote treated timber piles from the marine environment as part of the demolition of the timber trestle.
Hazardous Materials	**Construction:** Contaminants present in sediments and fill material behind the retaining wall would remain in place. Similarly, hazardous building materials would remain onsite. These materials would only be removed if required as part of ongoing maintenance. **Long-Term:** Contaminated materials under the northern (timber) trestle would remain uncapped. **Beneficial:** None.	**Construction:** The removal of creosote piles would disturb contaminated sediment, suspending it into the water column. Chemically-treated wood adjacent to piles also may be brought to the surface during pile removal. Portions of piles may remain buried in sediment if broken during the removal process. Contaminated sediment, soil, wood, and building materials would be disturbed during construction, resulting in potential short-term negative impacts. These would be localized to the work zone water column and possibly a small area adjacent to Alaskan Way used for contaminated soil stockpiling and truck loading. Mitigation would include BMPs, WSDOT standard specifications, or other requirements specified in regulatory approvals. **Long-Term:** None. **Beneficial:** New stormwater treatment facilities would reduce pollutant loadings to the bay. The Build Alternative would remove about 7,400 tons of creosote-treated pilings and about 3,500 cubic yards of contaminated sediment, and install a new cap to prevent leaching of remaining contaminants into the water column. Terminal building demolition would remove hazardous materials, primarily asbestos.
Geology and Soils	**Construction:** None. **Long-Term:** There is a potential for slope instability in the area of the bulkhead structure supporting the northeast corner of the terminal parking lot. Existing structures do not meet current seismic requirements for new construction, and are at a substantial risk of damage or catastrophic failure from seismic hazards.	**Construction:** None. **Long-Term:** Risk of inundation of the parking areas and ground level portion of the terminal building from a tsunami is not reduced because these areas would be constructed at the same elevation as existing facilities.

Resource	No Build Alternative	Build Alternative
Geology and Soils (continued)	**Beneficial:** Structures replaced as part of the maintenance program would be built to meet seismic building code requirements applicable at the time of construction.	**Beneficial:** Removal of the bulkhead and fill material supporting the northeast corner of the parking lot would resolve the slope instability risk in that area. Since new construction would meet current seismic code standards, overall risk of damage or catastrophic failure due to an earthquake is substantially reduced relative to the No Build Alternative.
Historic, Cultural and Archaeological Resources	**Construction:** Fire Station No. 5 could be adversely impacted by vibration associated with demolition and construction that is part of the ongoing maintenance program. When these activities are close to the fire station, WSDOT would monitor vibration levels and implement additional protection measures if needed. **Long-Term:** None. **Beneficial:** None.	**Construction:** Potential adverse effects to Fire Station No. 5 would be mitigated by implementing BMPs and monitoring vibration levels during demolition and construction. If monitoring shows that vibration levels are approaching the damage threshold, additional measures would be used to protect the structure. **Long-Term:** None. **Beneficial:** None.
Transportation	**Construction:** Construction would consist of maintenance activities, which would include limited replacement of piles and other deteriorated portions of the facility. Although maintenance repairs occasionally reduce vehicle holding space or close holding lanes, these repairs would be over a shorter time frame than the Build Alternative, and construction-related impacts are assumed to be minimal; however, they could happen throughout the life of the facility. **Long-Term:** Potential load restrictions or permanent closures of sections of the dock due to degrading conditions could reduce vehicle holding capacity substantially and cause queue impacts on Alaskan Way. Reduced holding capacity could also interfere with on-time sailing schedules over time. Projected increases in pedestrian ridership could cause the existing design inadequacies for pedestrians to become even more apparent, and potentially unsafe.	**Construction:** The reduced vehicle holding capacity in Phase 4 would cause the most disruption to transportation. Vehicles would likely spill back onto Alaskan Way causing delays and increased queues at nearby intersections. Mitigation would include active management of the holding lanes and would result in a vehicle holding capacity similar to existing conditions. A Construction Traffic Management Plan would be implemented to help minimize potential traffic effects during special events and other days with high demand. **Long-Term:** None.

Resource	No Build Alternative	Build Alternative
Transportation (continued)	**Beneficial:** None.	**Beneficial:** Beneficial effects include improvements to both safety and operations. Safety improvements: • Reconfiguration of trestles to locate exit lanes at north and south edges of facility eliminates the existing bicycle-pedestrian-vehicle conflict point near the north exit. • New elevators and stairways on Alaskan Way improve pedestrian safety and reduce conflicts with vehicles. • New OHL at Slip 3 is ADA compliant and widened to accommodate increased pedestrian volumes. • New King County POF facility connection to terminal building and Marion Street pedestrian bridge by an overhead walkway, reducing pedestrian-vehicle conflicts. • Reconfiguration eliminates conflict between traffic exiting at Marion and incoming traffic crossing to enter holding lanes north of Marion. Operations improvements: • Reconfiguration of the trestles allows exit lanes to be located at the north and south edges of the deck, minimizing conflicts with incoming traffic and reducing the time it takes to offload vessels.
Land Use	**Construction:** None. **Long-Term:** None. **Beneficial:** None.	**Construction:** Temporary construction effects on adjacent land uses and the local street system include noise, dust, vibration, glare, traffic detours, traffic delays, and visual disturbance. The existing terminal building houses several traveler/convenience retail uses. Retail uses would be removed during demolition of the old terminal building in Phase 3. Some vendors may continue service during construction by kiosk/cart. Mitigation would include the Traffic Management Plan, described above, and advance coordination with property owners and businesses within the study area to provide advance notice of construction activities. **Long-Term:** None. **Beneficial:** Although currently unfunded, future street level retail structures (approximately 14,000 square feet) would improve the streetscape and urban design of the terminal facility, which could attract a greater number of pedestrians to the area. Other waterfront businesses and land uses would benefit from the increased activity.

Resource	No Build Alternative	Build Alternative
Visual Quality	**Construction:** Depending on the repair work being completed, there would be temporary impacts to visual quality during each construction event, possibly including the presence of barge-mounted construction equipment, which would likely be minor and for a relatively short duration. **Long-Term:** None. **Beneficial:** None.	**Construction:** Construction activities typically detract from visual quality. Barge-mounted cranes and drill rigs would extend into views of Puget Sound and the Olympic Mountains from each of the key viewpoints. Construction barriers would screen views to some of the less visually attractive aspects of the construction process; however, they could also block desirable views from the sidewalk. **Long-Term:** A change in the terminal building's orientation to run parallel to the waterfront could increase the appearance of bulk as seen from the east. The new building configuration would reduce some views compared to the No Build Alternative. **Beneficial:** The new buildings would be of a design and quality that complement and fit in with the surrounding environment better than the existing structures.
Air Quality	**Construction:** There would be minor air quality effects associated with maintenance and repair projects; however, air quality effects from construction for the No Build Alternative would be less than the effects from the Build Alternative because the scale of construction would be much smaller. **Long-Term:** None. **Beneficial:** None.	**Construction:** Construction would generate fugitive dust, pollutants, and exhaust. If uncontrolled, particulate matter would also be generated by construction trucks entering roadways, depositing dust and mud on paved streets. If construction traffic were to reduce the speed of other vehicles in the area, emissions from traffic would increase slightly while those vehicles are delayed. Temporary odors may be detected by people near asphalt paving operations, but would decrease with increased distance from the source. Construction emissions and other air quality impacts would be mitigated by implementing BMPs, as described in the sections above. **Long-Term:** None. **Beneficial:** None.
Navigable Waterways	**Construction:** None. **Long-Term:** None. **Beneficial:** None.	**Construction:** None. **Long-Term:** None. **Beneficial:** None.

Resource	No Build Alternative	Build Alternative
Socioeconomics and Environmental Justice	**Construction:** None. **Long-Term:** Decreased ferry service caused by deteriorating facility conditions could degrade transit connections for low-income or minority populations. **Beneficial:** None.	**Construction:** During construction Phase 1, King County's POF would be moved slightly west of the current location, and eventually to the southwestern edge of new concrete trestle. The temporary construction closure would require the POF facility to close for approximately 5 days. **Long-Term:** None. **Beneficial:** None.

4.2 Ecosystems

An ecosystem is a biological community interacting with its physical and chemical environment as an integrated, dynamic unit. Ecosystems consist of living organisms, including human beings, and the environment they inhabit. Understanding this relationship is integral to the environmental review process. This analysis describes biological conditions in the project area and how the project alternatives would affect them.

For more information, see the *Ecosystems Discipline Report* (WSF, 2013c), on which this summary is based.

4.2.1 Ecosystems Study Area

The project area encompasses both terrestrial and aquatic ecosystems. The terrestrial portion of the project area includes the downtown Seattle waterfront from approximately the south end of Harbor Island to the north end of Alaskan Way South. The aquatic portion of the project area covers all of Elliott Bay, from the Magnolia neighborhood to the north, to the Alki neighborhood to the south, and east to Colman Dock (Exhibit 4-1). The study area was defined based on the potential for ecosystem effects.

4.2.2 Methodology

Information provided by the design team about the project footprint and construction methods was reviewed to determine the extent of the study area. Existing data on wildlife and habitats in the study area from published and unpublished reports, maps, surveys, and federal, state and local agency data, as well as information summarized in other discipline reports (DRs) prepared for the project, were also reviewed. Numerous investigations of the project site and vicinity were performed between December 2011 and May 2012 to document wildlife and habitats in the study area. Regulations protecting species or habitat were reviewed, and the project's compliance with those regulations was assessed. The construction phasing plan was discussed with the project team, and the biologist analyzed potential direct and indirect effects of the construction on elements of the ecosystem. Long-term effects following construction were analyzed as well. Finally, measures were developed to minimize or avoid potential effects from project construction and operation.

Federal, state and local laws protect upland, wetland, and marine wildlife habitat. Habitat protection is necessary for the continued presence of wildlife species in urban environments.

Federal laws that apply to project construction and operation include:

- Bald and Golden Eagle Protection Act;
- Clean Water Act;
- Clean Air Act;
- Coastal Zone Management Act;
- Endangered Species Act (ESA);
- Magnuson-Stevens Fishery Conservation Management Act;

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Exhibit 4-1

Aquatic Resources Study Area

Seattle Terminal Project

Seattle, Washington

Washington State Ferries

Washington State Department of Transportation

SOURCE: City of Seattle, 2009

FILE NAME:Ex04-1_AquaticResourcesStudyArea.ai / CREATED BY: JAC/ DATE LAST UPDATED: 02/03/14

- Marine Mammal Protection Act (MMPA);
- Migratory Bird Treaty Act; and
- National Environmental Policy Act.

Applicable state laws include:

- Hydraulic Code;
- Model Toxics Control Act (MTCA);
- Shoreline Management Act of 1971; and
- State Environmental Policy Act.

Applicable local laws include:

- Seattle Shoreline Master Program.

4.2.3 Affected Environment

The project area is in central Puget Sound, an inlet of the Pacific Ocean formed by repeated glaciation over the past several thousand years. Volcanic activity and seismic events have also helped shape the landscape. Mudflows from Mount Rainier have filled the Duwamish Valley south of Seattle, moving the mouth of the Duwamish River to its current location. Earthquakes have also redirected the flow of the Duwamish by raising and lowering landforms along the waterfront.

4.2.3.1 Terrestrial habitat

Prior to European settlement, the Seattle waterfront was located approximately where First Avenue now runs through downtown Seattle. The shoreline consisted of intertidal mud and sand flats interspersed with gravel beaches and vegetated wetlands, bordered by upland bluffs (Burke Museum 2013).

Over the past 150 years, filling, dredging, and grading along the shoreline have dramatically altered the waterfront. The waterfront is nearly 100 percent developed, and vegetation is limited to landscaped strips and isolated patches of unmaintained scrub dominated by non-native plants. Animals that use these habitats are adapted to human activity and disturbance. The only terrestrial species observed during site visits were birds typically found in urban environments.

4.2.3.2 Nearshore and Aquatic habitat

Physical Characteristics

The Elliott Bay Seawall forms the shoreline in the project area. Common nearshore features within the area include constructed bulkheads with manmade structures such as piers, wharves, and buildings extending over the water, and steeply sloped banks armored with riprap or other fill materials (e.g., concrete slabs and miscellaneous debris). There are very few intertidal habitats within the project area and these are less than 0.5 acre in size (Anchor QEA 2011). A habitat mapping survey in 2010 documented sand, shell hash, and silt as the primary substrates in the project area, with some gravel and cobble. In the operating ferry slips, propeller wash has washed away fine particles, leaving coarser sand (Anchor QEA 2011).

At the Seattle Ferry Terminal, the nearshore intertidal habitat extends gradually from mean higher high water (MHHW) to about -10 feet mean lower low water (MLLW). The habitat transitions quickly to deeper subtidal habitat beyond about -14 feet MLLW. The slope is approximately 13 percent along the east and west sides of the site. Steep slopes (greater than 25 percent) exist upland of the site. The subtidal slope is approximately 8 percent. The depths of terminal structures are shown in Exhibit 4-2.

Exhibit 4-2 Depth of Structures at Seattle Ferry Terminal

Structure	Depth (feet below MLLW)
Slip 1	44.3
Slip 2	41.2
Slip 3	47.5
POF Landing	40
Floating Dolphins	66

Water currents are influenced primarily by tides, with some influence from the Duwamish River, which is the primary source of freshwater to the bay. The mouth of the Duwamish is approximately one mile south of the ferry terminal. Discharges from the Duwamish River range from 250 cubic feet per second (cfs) in summer to 6,000 cfs in winter. In Elliott Bay, river water flows north along the Seattle waterfront. Ebb tides tend to enhance this flow, while flood tides stall or reverse the flow pattern.

Tidal flow circulation velocities at Colman Dock are very low, ranging from about 0.02 to 0.08 feet per second. Tidal flow is not a significant factor in sediment transport or bottom scouring processes (Shepsis, pers. comm.).

Chemical Characteristics

In the 2012 Washington State Water Quality Assessment 303(d) list, Ecology lists Elliott Bay as not meeting water quality criteria for nearshore fish habitat, and for exceeding thresholds for ammonia-N, dissolved oxygen, temperature, arsenic (inorganic), fecal coliform bacteria, and endosulfan (an organochlorine insecticide) (Ecology 2012). Contaminated sediments have also been identified at the project site, as discussed in the Hazardous Materials sections of this document.

Biological Characteristics

The shoreline of Elliott Bay is almost entirely developed, and the area has a high level of recreational and commercial boat traffic. Despite this high level of human activity, the bay still contains a number of biological resources. Aquatic plants, invertebrates, fish, and other vertebrate species are common in the bay, and numerous rare species have been observed in the bay or nearby in Puget Sound. Recreational, commercial, and tribal harvest of fish and shellfish occurs at several locations in the bay throughout the year.

Surveys of aquatic habitats along the Seattle shoreline have most commonly observed sea lettuce, sugar kelp and red algae. Bull kelp beds were documented at several locations around the terminal, particularly west of the north timber trestle (Anchor QEA 2011). No eelgrass was observed during the 2011 or 2003 surveys (Anchor QEA 2011).

Seafloor productivity is very low due to the condition and type of substrates, intense vessel traffic along the waterfront and at the ferry terminal, and an altered shoreline. However, over 30 species of invertebrates were observed during seawall surveys including annelids (tubeworms), arthropods (crustaceans), cnidarians (jellyfish and anemones), echinoderms (starfish), poriferans (sponges), mollusks (cephalopods, gastropods, bivalves), and tunicates (Anchor QEA 2011).

Elliott Bay is in the migratory path of several anadromous salmonid species and supports many resident fish species. The closest salmon-bearing river system is the Duwamish River, which is located approximately one mile south of the ferry terminal. Puget Sound Chinook, coho, chum and pink salmon, steelhead, and sea-run cutthroat trout have all been documented in the bay. Dive and video surveys for the Elliott Bay Seawall Project identified 24 fish species in the project area. The most abundant fish species observed during surveys were perch species (Anchor QEA 2011).

According to WDFW Priority Habitats and Species (PHS) data, there are no known forage fish spawning areas within Elliott Bay (WDFW, 2013b). Shoreline development has reduced the availability of forage fish spawning habitat.

Several species of seabirds were observed during site visits. Glaucous-winged gulls, double-crested cormorant, surf scoter, and common goldeneye were all seen from the dock or nearby shoreline, and numerous other species have been documented in the bay. Seabirds tend to be more numerous during the winter months when birds from the outer coast move inland to calmer waters.

Special Status Species and Habitat

Special Status species are rare species or species of interest that are protected or listed at the federal or state level. A number of special status species have been documented, or could occur, in the project area (Exhibit 4-3).

The ESA provides for the conservation of species that are endangered or threatened with extinction throughout all or a significant portion of their range, and the conservation of the ecosystems on which they depend. Twelve threatened or endangered species and five species of concern have been documented or could occur in the project area; critical habitat (areas containing the physical and biological habitat features essential to supporting one or more life stages of the species) for four of those species occurs in the project area. ESA-listed species are shown on Exhibit 4-3. A Biological Assessment (BA) has been prepared for this project as required by Section 7 of the ESA; the BA contains detailed descriptions of the life histories of ESA-listed species, their occurrence in the project area, and potential project impacts to those species.

Exhibit 4-3 Special Status Species in the Project Area

Common Name	Scientific Name	Status[1]	Occurrence in Project Area	Critical Habitat[2]
MAMMALS				
Southern resident killer whale	*Orcinus orca*	FE, SE	Likely	Designated, occurs in project area
Transient killer whale	*Orcinus orca*	SE	Likely	None designated
Humpback whale	*Megaptera novaeangliae*	FE, SE	Not likely	None in project area
Gray whale	*Eschrichtius robustus*	SS	Likely	
Dall's porpoise	*Phocoenoides dalli*	SM	Likely	
Harbor porpoise	*Phocoena phocoena vomerina*	SC	Likely	
Harbor seal	*Phoca vitulina*	SM	Likely	
Steller sea lion	*Eumetopias jubatus*	ST	Likely	
California sea lion	*Zalophus californianus*	None	Documented[3]	
BIRDS				
Marbled murrelet	*Brachyramphus marmoratus*	FT, ST	Documented[4]	Designated, none in project area
Bald eagle	*Haliaeetus leucocephalus*	FCo, SS	Documented[5]	
Common loon	*Gavia immer*	SS	Likely	
Clark's grebe	*Aechmophorus clarkii*	SC	Likely	
Horned grebe	*Podiceps auritus*	SM	Documented[11]	
Red-necked grebe	*Podiceps grisegena*	SM	Documented[11]	
Western grebe	*Aechmophorus occidentalis*	SC	Likely	
Great blue heron	*Ardea herodias*	SM	Likely	
Green heron	*Butorides virescens*	SM	Likely	
Osprey	*Pandion haliaetus*	SM	Likely	
Caspian tern	*Sterna caspia*	SM	Likely	
Common murre	*Uria aalge*	SC	Likely	
FISH				
Puget Sound Chinook salmon	*Oncorhynchus tshawytscha*	FT, SC	Documented[6]	Designated, occurs in project area
Puget Sound steelhead	*Oncorhynchus mykiss*	FT	Documented[6]	Proposed, occurs in project area
Coho salmon	*Oncorhynchus kisutch*	FCo	Documented[6]	
Coastal-Puget Sound bull trout	*Salvelinus confluentus*	FT, SC	Documented[6, 7]	Designated, occurs in project area

Common Name	Scientific Name	Status[1]	Occurrence in Project Area	Critical Habitat[2]
Canary rockfish	*Sebastes pinniger*	FT, SC	Documented[8]	None designated
Yelloweye rockfish	*Sebastes ruberrimus*	FT, SC	Documented[8]	None designated
Bocaccio	*Sebastes paucispinus*	FT, SC	Likely[8]	None designated
Southern green sturgeon	*Acipenser medirostris*	FT	Not likely	Designated, none in project area
Pacific eulachon	*Thaleichthys pacificus*	FT, SC	Not likely	Designated, none in project area
Quillback rockfish	*Sebastes maliger*	FCo, SC	Documented[9]	
River lamprey	*Lampetra ayresi*	FCo, SC	Documented[9]	
Pacific herring	*Clupea harengus pallasi*	FCo, SC	Documented[10]	

[1] FE = Federal Endangered; FT= Federal threatened; FCo = Federal Species of Concern; SE = State Endangered; ST = State Threatened; SC = State Candidate; SS = State Sensitive; SM = State Monitored
[2] Only applies to federally listed species; [3] WDFW 1992; [4] Miller, pers. comm.; [5] WDFW 2012; [6] Salmonscape 2013; [7] Toft, pers. comm.; [8] Miller and Borton 1980; [9] Anchor QEA 2011 dive surveys; [10] Toft et al. 2004; [11] Seattle Audubon 2013

The Marine Mammal Protection Act of 1972 prohibits "take" of all marine mammals in US waters. Eight species of marine mammals may be present in the project area, two of which are listed as threatened or endangered under ESA.

The State of Washington maintains a species of concern list for any species that are threatened with extinction (endangered), likely to become endangered within the foreseeable future (threatened), vulnerable or declining (sensitive), or under review for possible listing in any of those categories (candidate).Twenty-eight state listed species have been documented or could occur in the project vicinity, several of which are also federally listed (Exhibit 4-3).

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) requires federal agencies to consult with NMFS on activities that may adversely affect essential fish habitat (EFH). EFH includes "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (DOC 2007). The Pacific Fishery Management Council has designated EFH for Pacific salmon, Pacific coast groundfish, and coastal pelagic species. EFH for all three groups is found in the project area.

The BA for the project includes a detailed discussion of EFH species that could occur in the project area and effects of the proposed project on EFH.

Commercial, Recreational and Tribal Fisheries

Commercial, recreational, and tribal fishing occurs in Elliott Bay throughout the year. Commercial fishing within the bay is fairly limited. Between 2005 and 2010 only clams, herring, rockfish, pile perch, sea cucumbers, skate, spiny dogfish, shrimp, and squid were commercially harvested (Singleton, pers. comm.).

Recreational catch records in the project area are from fishing area 10, which includes central Puget Sound from Seattle to Bremerton and is not specific to Elliott Bay. Salmonids, marine fish, and shellfish were all harvested from the area (Kraig, pers. comm.; WDFW, 2013a).

The Suquamish Tribe and the Muckleshoot Indian Tribe harvest spot shrimp and several salmonid species in Elliott Bay. Spot shrimp season is in April. Chinook are fished in June and July, and pink salmon in August and September. Coho are harvested in September and October, chum in October and November, and steelhead in December and January. The length of the fishery and numbers harvested depends on how many fish return to the Duwamish River each year (Narte, pers. comm.).

4.2.4 Construction Impacts

4.2.4.1 No Build Alternative

Under the No Build Alternative, construction activities would be limited to replacing structures as necessary to maintain existing levels of service. The No Build Alternative would be operated under WSF's rigorous program of inspections and maintenance.

Construction completed as part of the ongoing maintenance of the Seattle Ferry Terminal would result in impacts similar to that described for the Build Alternative below; however, the ongoing repair and maintenance program would have shorter periods of active construction over the lifetime of the facility.

4.2.4.2 Build Alternative

In-water work (especially pile removal and installation) would mobilize sediments, temporarily degrading water quality. Sediments underneath and adjacent to the trestle are known to be contaminated, and disturbing them could spread contamination. Pile installation would also generate noise levels that could disturb or harm aquatic species. Construction of the new south trestle would result in a temporary increase in overwater cover, until the northern timber portion is removed, approximately four years after construction of the new south trestle (see also Exhibit 2-2 for a diagram showing major terminal components).

The project would also result in several beneficial effects to ecosystems. Construction would remove creosote-treated timber piles, reducing the potential for harmful chemical compounds found in creosote to leach into the environment (see also Section 4.5 Hazardous Materials). The project would also remove a section of fill underneath the northern portion of the trestle once the trestle is removed, increasing benthic and nearshore habitat and offsetting the extension of the trestle to the south. Contaminants in the fill material would also be removed from the aquatic environment. Contamination would be further reduced by placing a sediment cap underneath the trestle. The project would provide additional water quality treatment for stormwater that flows off the trestle, reducing the amount of pollutants discharged to Elliott Bay.

Adverse Impacts

Water Quality

Pile driving, pile removal, placement of barge anchors, and removal of the sheet pile wall under the north trestle would all generate turbidity during in-water work. Factors affecting the amount of turbidity generated during pile removal include the type and number of piles removed, the removal technique used, and the characteristics of the bottom sediments. Exhibit 4-4 shows the number and types of piles removed and installed during each phase of construction for the project.

Of the in-water work, pile removal has the greatest potential to create turbidity. There are several methods of pile removal, such as vibratory extraction, wrapping piles with a cable or chain and pulling the piles with a crane (“direct pull”), and cutting piles at or below the mud line. Vibratory extraction would be the preferred method of pile removal for timber and steel piles and the method that would likely generate the least turbidity. Concrete piles cannot be vibrated out and would need to be removed by direct pull.

Turbidity during construction is expected to be minimal, based on WSDOT experience with similar projects. Washington State turbidity standards require that the turbidity not exceed 5 NTU (nephelometric turbidity units) over background at 150 feet from the activity. Turbidity measurements during pile removal and installation using a vibratory hammer at the WSF Friday Harbor ferry terminal did not exceed water quality standards (WSF 2005). Another study conducted during a pier replacement project in Manchester, WA, found that turbidity at the point of disturbance was less than 1 NTU above the 0.2 – 2.0 NTU background levels (Roni and Weitkamp 1996). One pile pulling study at Jimmycomelately Creek showed turbidity levels of 10 to 20 NTU over background extending much farther from the base of the pile (between 60-150 feet; Weston Solutions and Pascoe Environmental Consulting 2006). However, currents at the project site are very low energy, and would not likely spread turbidity beyond 25 feet from the base of the pile during removal or installation.

The fill area underneath the north trestle would be dredged as part of the project. This area is contained behind a sheet pile wall, which would remain in place until dredging is complete, preventing sediments from spilling into the bay. Some turbidity would be generated when the sheet pile wall is removed, similar to that caused by pile removal. Turbidity caused by pile installation and placement of barge anchors on the sea floor would likely be even smaller and highly localized.

Elevated turbidity may cause indirect impacts to aquatic resources, including:

- Mortality, gill tissue damage, and physiological stress to fish, including juvenile salmonids;
- Burial, abrasion of body parts, and clogging of filtration systems of crustaceans and other marine invertebrates who filter the water for their food;
- Reduced light levels affecting behavior and feeding of aquatic animal species; and
- Reduced photosynthesis by burial of aquatic plants or reduced light levels.

Based on the physical attributes of the sediments, and the turbidity measurements taken at Friday Harbor and Manchester discussed above, WSF expects that increases in turbidity resulting from pile removal and installation would be localized to the immediate vicinity at the base of the piles and would not exceed water quality standards; therefore direct mortality of fish is unlikely. However, fish may experience reduced foraging success in the vicinity of the piles being removed. Fish and other mobile species are likely to avoid the project area during construction. Aquatic plants and non-mobile invertebrates within the project footprint could be buried and killed or weakened by extended periods of reduced light. Although impacts would be highly localized, they would occur for the duration of in-water work.

Sediments in the project vicinity are contaminated, and in-water work has the potential to spread contamination. The extent and duration of suspension of contaminants would be similar to that of sediments, discussed above. Exceedances of compounds found in creosote (PAHs, dibenzofuran, hexachlorobutadiene, and dimethyl phenol), mercury, and zinc have all been detected in sediments in the project footprint.

Exhibit 4-4 Approximate Number of Piles Removed and Installed During Each Construction Phase

Phase	Activity		Pile Type	# of Piles	Pile Diameter (in.)	Total Area (ft^2)	Activity		Pile Type	# of Piles	Pile Diameter (in.)	Total Area (ft^2)
1	Demolition	Demolish POF slip Remove portion of south trestle and concrete piling	Concrete	14	14	16	Construction	Slip 3 transfer span	Drilled shaft	2	80	70
			Concrete	2	16.5	3			Steel	10	30	49
			Concrete	18	18	34		Slip 3 OHL	Drilled shaft	1	108	64
			Steel pile	5	36	35			Drilled shaft	1	84	38
			Steel pile	2	30	10		Slip 3 HPU platform	Steel/concrete	4	30	20
		Remove Slip 3 structures	Vehicle-Ram Tower	16	H-pile	16		Inner dolphins	Steel	12	30	59
			Passenger-Ramp Tower	6	H-pile	6			Steel	6	36	42
			Vehicle-Ramp Bridge Seat: Steel pile	9	14	10		Temporary dolphins	Steel	7	24	22
			Concrete-encased timber	16	30	79		South trestle	Concrete	253	18	471
			Timber	49	12	38			Drilled shaft	4	72	113
		Remove Slip 2 right dogleg wingwall	Timber	97	13	89		POF slip platform and walkway	Concrete	132	18	246
		Remove Slip 3 left dogleg wingwall	Timber	97	13	89		POF slip float and gangway	Steel	5	36	35
									Steel	2	30	10
2		Remove concrete trestle and piling	Concrete	45	18	84		Install pile foundation for terminal building	Steel/concrete	69	30	339
			Concrete	84	16.5	132						
3		Remove existing trestle (100-ft strip)	Timber	748	12	587		Construct new trestle	Steel/concrete	236	30	1,158
		Remove foundation for existing building	Concrete –filled steel pile	76	12	60		Reinstall slip 2 transfer span bridge seat	Steel	10	30	49
								Stormwater concrete vault	Steel/concrete	24	30	118
4		Demolish north timber trestle	Timber	1,187	12	932		Construct new trestle	Steel/concrete	225	30	1,104
		Remove foundation for existing building	Concrete-filled steel pile	80	12	63		Stormwater concrete vault	Steel/concrete	12	30	59
		Remove fill under north trestle	Steel sheet pile wall	n/a	n/a	14,500						
			Demolition total	**2,551**	**---**	**16,783**			**Construction total**	**1,015**	**---**	**4,066**
											Total increase in benthic habitat post-project	**12,717**

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Creosote is a mixture of compounds, primarily PAHs, used to protect wood from degradation by aquatic organisms in aquatic environments (EPA 2008; NOAA 2009). PAHs and other components of creosote are harmful to fish, shellfish, and other marine organisms, particularly those species that use the creosote piles for spawning habitat or that eat the eggs of the species that have laid spawn on the timber (Stratus 2006). PAHs are released from creosote-treated wood and can cause cancer, reproductive and immune system problems, and impair growth and development in fish exposed to even low concentrations (NOAA 2009). Hexachlorobutadiene can be lethal to fish and crustaceans at concentrations as low as 32 ppb.

Zinc exposure can adversely affect growth, reproduction and survival of aquatic organisms. Zinc can interfere with embryonic development of fish (Eisler 1993) and fish have demonstrated avoidance of zinc in laboratory studies (Sprague 1968).

Contaminated sediments would be disturbed during in-water work, particularly pile removal. As discussed in the section on turbidity above, the sediment plume would be limited to about 25 feet from the base of the pile and is unlikely to extend beyond the project footprint due to the low current velocities in Elliott Bay. Turbidity is anticipated to settle out less than an hour after sediment disturbance. Implementation of best management practices (BMPs) such as using vibratory removal methods to the extent possible and responding with additional measures based on results of water quality monitoring would minimize the spread of contaminants.

Noise and Disturbance

Piles will generally be vibrated out of the seafloor. This removal process does not create harmful noise levels for marine life; however, noise from pile installation can harm fish, marine mammals, and birds. The project would install several types of piles, by both impact and vibratory methods. Steel piles and casings for drilled shafts would be vibrated into the sediment. Concrete piles and concrete-filled steel piles would be driven with an impact hammer.

Different pile driving techniques have different effects on fish and marine mammals. When piles are installed with an impact hammer, a detonation in a cylinder lifts a heavy hammer, which then drops several feet onto the pile, driving it into the ground. It is mainly the high energy noise caused by the impact of the hammer on the pile that can affect aquatic species. Vibratory pile driving, on the other hand, produces less energy and is generally the method preferred by resource agencies for pile installation. Vibratory pile driving, however, creates continuous noise, and is more of a concern for marine mammals that use echolocation to hunt and communicate.

Drilled shafts are constructed by installing a hollow steel casing six to ten feet in diameter with a vibratory hammer. The material inside the casing is then excavated using an augur or a clamshell dredge and disposed of upland. Rebar is then placed in the shaft and concrete poured into the shaft.

The level of sound produced during pile driving depends on several variables, including the type of hammer used and the type and size of piles being used. The distance that the sound travels underwater and in air also depends on several variables.

High levels of underwater sound can injure or kill fish, and cause alterations in behavior (Turnpenny et al. 1994; Turnpenny and Nedwell 1994; Popper 2003; Hastings et al. 1996; Popper and Schilt 2007, Popper and Hastings 2009). Fish with swim bladders, such as salmonids, are more susceptible to barotraumas (injuries, such as hemorrhage and rupture of internal organs, caused by pressure waves) from impulsive sounds. Death from barotrauma can be instantaneous or delayed up to several days after exposure.

Elevated noise levels can also cause sublethal injuries, such as a reduced ability to detect predators and prey or damage to hearing (Turnpenny et al. 1994; Hastings et al. 1996, Popper and Schilt 2007). Exposure to high noise levels can cause a temporary shift in hearing sensitivity for periods lasting from hours to days, which can have the indirect effect of reducing the survival, growth, and reproduction of fish by increasing the risk of predation and reducing foraging or spawning success.

Noise can result in fish avoiding foraging or spawning grounds (Engas et al. 1996). The indirect effect of these avoidance responses may range from insignificant, to permanent long-term effects if feeding or reproduction is impeded. Feist et al. (1992) found that impact pile driving of concrete piles affected juvenile pink and chum salmon distribution, school size, and schooling behavior.

Pile driving noise may affect diving birds that commonly use Elliott Bay in the vicinity of the site such as grebes, marbled murrelets, and scoters. Birds are harmed by sound pressure levels in the range of those levels that harm fish and mammals (Fitch and Young 1948; Yelverton et al. 1973; Yelverton and Richmond 1981). Noise in the marine environment could also reduce marbled murrelet foraging efficiency (USFWS 2009).

For marine mammals, whales in particular, sound is one of the most critical sensory pathways of information. Whales communicate with each other over short and long distances with a variety of clicks, chips, squeaks, and whistles. They also use echolocation to find prey and navigate. Underwater noise may reduce the audibility of signals, impairing foraging and communication, increasing energetic expenditures, reducing hearing sensitivity, and causing behavioral changes (Krahn et al. 2004; Southall et al. 2007). Changes in behavior can range from minor changes in orientation or breathing to interrupted feeding or avoidance of an area (Richardson et al. 1995; Moore and Clarke 2002). Noise can also cause non-auditory physiological changes such as alterations in cardiac rates and respiratory patterns (Krahn et al. 2004; Southall et al. 2007). Very loud noises at close range may cause hearing damage, other physical damage, or even death of marine mammals (Richardson et al. 1995). Although vibratory pile driving produces less energy and is generally the preferred method of pile installation, it does produce continuous noise. NMFS has established a lower underwater disturbance threshold for marine mammals for continuous noise, such as that produced by a vibratory hammer. As a result, noise impacts from vibratory pile installation may extend over a broader area than those generated by impact pile driving.

Noise attenuation devices, such as a bubble curtain, would be deployed during impact pile driving to reduce noise levels. The amount of noise attenuation achieved by bubble curtains averages about 12 decibels. Timing restrictions and monitoring for the presence of birds and marine mammals in the project area would all help reduce impacts of pile driving noise on aquatic species.

Overwater cover

There would be a temporary increase in overwater cover of up to approximately 46,000 square feet, until the north timber trestle is demolished in Phase 4. Exhibit 4-5 shows the changes in overwater cover for the project by phase during construction. Direct overwater cover may reduce the amount of ambient light, which could reduce the amount of photosynthetically active radiation (PAR) available to macroalgae. A reduction in PAR could result in a die-back and/or mortality of macroalgae and fish species associated with aquatic vegetation such as lingcod and greenling (Haas et al. 2002).

Exhibit 4-5 Change in Overwater Cover (OWC) by Construction Phase

Phase	Project Element			OWC Change by Project Element (ft^2)	Total Cumulative Difference in OWC
Phase 1 (~Aug 2015 – Apr 2016)	Demolition	Demolish POF slip and portion of south trestle		-10,700	+44,890
		Remove Slip 3 structures	Transfer span, apron and tower	-3,400	
			Bridge seat	-350	
			OHL	-1,900	
			Building	-1,800	
		Remove Slip 2 right dogleg wingwall		-900	
		Remove Slip 3 left dogleg wingwall		-900	
	Construction	Slip 3	Transfer span	+3,600	
			OHL	+1,900	
			HPU platform	+300	
			Inner dolphin	+740	
			Temp dolphin	+200	
		South trestle		+37,000	
		POF slip	Platform and walkway	+15,300	
			Float and gangway	+5,800	
Phase 2 (~July 2016 – May 2018)	Demolition	Remove concrete trestle and piling		-16,300	+44,890
	Construction	Install pile foundation for terminal building		+16,300	
Phase 3 (~June 2018 – Feb 2020)	Demolition	Remove existing trestle including transfer span bridge seat and OHL platform		-45,000	+46,164
	Construction	Construct new trestle		+45,830	
		Reinstall slip 2 transfer span bridge seat		+444	
Phase 4 (~Apr 2019 – June 2021)	Demolition	Demolish north timber trestle		-76,000	+5,164
		Demolish retained fill area		-14,500	
	Construction	Construct new trestle		+49,500	

Several species of kelp and algae have been documented in the vicinity of the terminal. Macroalgae at the southern edge of the terminal would likely be shaded out by extending the trestle to the south.

Although substrates at the project site are heavily altered, 30 species of invertebrates were documented in the project vicinity during surveys for the Elliott Bay Seawall Project. Shading impacts and reduced primary productivity may indirectly cause species at the southern edge of the trestle to be reduced in number or diversity.

Juvenile salmonids depend on nearshore habitats for food and refuge. The movement of migrating juvenile salmonids may be affected by dark-edge and light-edge over-water structures, such as docks and piers (Southard et al. 2006). Overwater structures, such as ferry terminals, bridges, and temporary work trestles, may directly affect juvenile salmon, by disrupting migratory behavior along the shallow-water nearshore zone.

The response of fish to overwater cover is complex; individuals of some species readily pass under overwater cover, some pause and go around, schools may disband upon encountering overwater cover, and some schools pause and eventually go under en masse (Nightingale and Simenstad 2001). Observations discussed by Southard et al. (2006) demonstrate that the shading caused by ferry terminals and other overwater cover can deter or delay juvenile salmonid movement, and this effect may be decreased at low tides when ambient light can better filter beneath the terminal structure. Delays in migration could lead to increased energy expenditure. The temporary increase in overwater cover for the Build Alternative could impede salmonid migration along the shoreline.

Beneficial Effects

Removing Creosote-Treated Timbers

PAHs that leach from creosote-treated wood accumulate in sediments, resulting in chronic and dietary exposure of marine organisms, primarily benthic species (NOAA 2009; Stratus 2006). Detectable leaching can occur for years and perhaps much longer (Stratus 2006). A study conducted in British Columbia found elevated PAH concentrations within 24.6 feet of creosote-treated pilings within the first year after installation. After 10 years, that distance declined to 8.2 feet. Both in-water structures, such as timber pilings, and overwater structures, such as docks, can be a source of creosote in aquatic environments (NOAA 2009).

The project would remove approximately 7,400 tons of creosote-treated timber, eliminating the potential for this material to leach any more creosote into the environment. Timber piles would be removed completely to the extent possible by vibrating the piles from the sediment. If piles break during vibratory extraction, broken piles would be removed by wrapping a chain around the pile and pulling it from the sediment. If piles cannot be removed using a chain, they would be cut at or below the mudline and the holes filled with clean material. Piles would not be removed using a clamshell or hydraulic jet, both of which can generate high levels of turbidity and risk spreading contaminated sediment.

Benthic and Shoreline Habitat

The new concrete trestle would occupy about 30 linear feet of shoreline habitat. Shoreline habitat is the landward portion of the nearshore zone where variations in wave energy, sunlight, sediment movement, water depth, and salinity provide a variety of environments that support a diverse array of species, and where biological processes such as photosynthesis and carbon cycling occur at greater rates (WDFW

2010). In addition, installing pilings would affect about 1,783 square feet of benthic habitat. Impacts to nearshore and benthic habitat would be offset by removing the north trestle and its 7,700 cubic yards of associated fill. The area would be restored to match the bathymetry on either side of the fill prism. Removing the fill and north trestle would open up approximately 180 linear feet of shoreline (for a net increase of 150 feet) and increase benthic habitat in the project area by about 12,650 square feet, allowing macroalgae and benthic organisms to re-colonize the area. This would provide a better migration corridor along the shoreline for juvenile salmonids.

Stormwater Treatment

Stormwater generated by roadways, parking lots, and other infrastructure used by vehicles contains pollutants detrimental to aquatic life. The primary constituents of concern with respect to federally protected salmonids are total suspended solids (TSS), copper, and zinc. In laboratory studies (Baldwin et al. 2003), dissolved copper has been shown to reduce juvenile salmonids' ability to smell in fresh water, and fish sometimes avoid water with elevated levels of dissolved zinc (Sprague 1968).

The project would install oil-water separators and stormwater vaults below the deck to provide water quality treatment for all new and replaced areas of the terminal. The vaults would collect and hold runoff, allowing suspended solids to settle; WSDOT would periodically clean the vaults and remove the solids to maintain proper functioning. The south trestle is not equipped with vaults, and provides only limited stormwater treatment. Oil-water separators collect runoff on the southern (concrete) portion of the dock, while stormwater is not treated on the north (timber) trestle before it enters Elliott Bay. Pollutant loads discharged to Elliott Bay from the project site would be reduced substantially. Existing and post-project pollutant loads are shown in Exhibit 4-6.

Exhibit 4-6 Pre- and Post-project Pollutant Loads

Scenario	Pollutant Load (lb/yr)[1]				
	TSS	TCu	DCu	TZn	DZn
Existing	1608	0.407	03095	2.48	0.712
Proposed	148	0.13	0.079	0.61	0.41
Percent Reduction	**91%**	**68%**	**17%**	**75%**	**42%**

[1]TCu = total copper; DCu = dissolved copper; TZn = total zinc; DZn = dissolved zinc

Capping Contaminated Sediments

Sediments in the project footprint are contaminated, as described earlier. Some contaminated sediment would be removed during pile installation and removal of the fill area at the northeast corner of the site. Some contamination would remain in the sediment, from the creosote-treated piles that would be removed by the project and from other historic sources. During construction, a sediment cap would be placed in the north trestle area; final design and placement would be developed in coordination with the Washington Department of Ecology. Without a sediment cap, pollutants would continue to slowly release hazardous materials into the water column and harm seafloor species.

4.2.5 Long-Term Impacts

4.2.5.1 No Build Alternative

Under the No Build Alternative, the project would not provide any new stormwater treatment, and some pollutants from the trestle would continue to discharge to Elliott Bay with only minimal treatment. The north trestle and associated fill would not be removed, providing no opportunity for restoration of shoreline and benthic habitat. Contaminated fill and creosote-treated piles would continue to harm seafloor species and to slowly release hazardous materials into the water column.

4.2.5.2 Build Alternative

Operational impacts of the Build Alternative consist of stormwater treatment, permanent new overwater cover, and changes in the amount of shoreline habitat. Under the Build Alternative, the project would provide water quality treatment for all new and replaced impervious surfaces, as described in the Beneficial Effects discussion above, reducing pollutants in the vicinity of the terminal.

The project has been designed to minimize new overwater cover to the extent possible. Following avoidance and minimization efforts during preliminary design, the total overwater coverage would increase by about 5,200 square feet (1.7% of the existing Seattle Ferry Terminal's 300,000 square foot overwater footprint), as a result of the addition of a new walkway from the King County POF to Alaskan Way and new stairways and elevators from the POF to the upper level of the terminal.

Extending the trestle to the south would reduce linear shoreline habitat by approximately 30 feet. Removing the north timber trestle and the associated fill prism would open up about 180 linear feet of shoreline, for a net gain of about 150 linear feet of shoreline. Removing the fill would also increase benthic habitat by approximately 12,650 square feet.

4.2.6 Mitigation

Several features have been incorporated into the project design to minimize impacts to ecosystems in the project area. To reduce impacts of overwater cover, the size of the new terminal has been reduced to the extent possible. WSDOT would mitigate for the impacts of additional overwater cover by restoring an area of equivalent ecological function, in Elliott Bay or elsewhere in Puget Sound. Options include removal of some overwater cover at Pier 48, which is owned by WSDOT, or participation in King County's In Lieu Fee (ILF) Mitigation Program, certified under 2008 federal rules and overseen by federal and state resource agencies. For additional information on the ILF program, see the Ecosystems Discipline Report in Appendix C. In addition, light-penetrating surfaces (LPS) such as glass blocks would be incorporated into the design of the POF walkway to offset shading impacts. LPS could allow more light to reach the seabed, increasing PAR and primary productivity, minimizing shading impacts that could interfere with juvenile salmonid migration along the waterfront.

Extending the trestle to the south and installing new piers would result in impacts to shoreline and benthic habitat. These impacts would be outweighed by additional shoreline and benthic habitat created by the removal of the north trestle and associated fill. New stormwater treatment would be provided by the project to reduce pollutant loading and improve water quality in the vicinity of the trestle.

Construction of the project would temporarily degrade water quality that could disturb or injure aquatic species. Turbidity is anticipated to settle out less than an hour after sediment disturbance. Implementation of BMPs such as using vibratory removal methods to the extent possible and responding with additional measures based on results of water quality monitoring would minimize the spread of contaminants and ensure compliance with Washington State water quality standards. During dredging of the fill prism under the north trestle, the sheet pile wall containing the fill would be left in place until dredging is complete to prevent sediments from the dredge prism from drifting into the bay. If turbidity standards are exceeded, measures would be immediately taken to comply with permit conditions. BMPs would be updated or additional BMPs implemented to prevent a recurrence of the exceedance.

To minimize pile driving noise, the project would remove and install piles using vibratory methods to the extent possible. A noise attenuation device such as a bubble curtain would be deployed during impact pile driving of steel piles. Underwater noise levels would be monitored to make sure the project does not exceed noise levels described in the BA. If noise levels exceed those anticipated in the BA, WSDOT would stop work and consult with the NMFS and USFWS to improve existing BMPs or implement additional BMPs to minimize noise impacts.

WSDOT would monitor for the presence of marine mammals and marbled murrelets during construction per the requirements of the BA and MMPA. If those species enter the harassment or injury zones during pile driving, work would stop until the animals have left the area.

For any construction work within or above water, a Hydraulic Project Approval (HPA) would be required from the Washington State Department of Fish and Wildlife. Work would be limited by the HPA to selected work windows specifying the time of year construction activities may occur.

4.3 Noise and Vibration

Construction and construction-generated traffic would cause noise for the estimated 6-year construction period. In addition, two historic sites are located adjacent to the project site (the Seattle Fire Station No. 5 on the north, and the Washington Street Boat Landing on the south) that may be sensitive to construction-generated vibration. The potential direct and indirect effects of noise and vibration, and measures to minimize them, are addressed in this section.

Information in this section is summarized from the *Noise and Vibration Discipline Report* (WSF, 2013i).

4.3.1 Noise and Vibration Study Area

The project is located at the Seattle Ferry Terminal along the Seattle central waterfront. The study area evaluated for noise and vibration effects includes areas likely to be affected by construction and operation noise or vibration. Potential noise- and vibration-sensitive uses near the project limits include two residential buildings near the site, the Washington Street Boat Landing, Fire Station No. 5, and commercial office space. The study area extended approximately 400 feet from the project site's boundaries for screening of potential impacts according to the noise impact criteria discussed below.

4.3.2 Methodology

Regulations, policies, and procedures for estimating and controlling noise and vibration impacts have been established at the federal, state, and local levels. At the federal level, FTA noise and vibration guidance is found in the *Transit Noise and Vibration Impact Assessment* (FTA 2006), while FHWA guidance is found in 23 CFR 772.

FTA's modeling tools and criteria are most appropriate for analyzing the noise effects from ferry and ferry terminal operations, because they address point sources such as transit stations and bus terminals; consequently, FTA guidance has been used primarily for analyzing noise generated from the terminal site. FHWA's methodology is appropriate for addressing automobile and truck noise along road corridors; therefore, FHWA's Traffic Noise Model TNM 2.5 has been used to analyze potential effects from automobile and truck noise associated with SR 519 (Alaskan Way) traffic to and from Colman Dock.

Construction noise is addressed separately from operational noise. Although the Washington State Department of Ecology has construction noise rules included in WAC 173-60, Ecology defers regulatory authority to the local officials.

Seattle regulates noise under SMC 25.08, Noise Control. The ordinance establishes provisions specific to construction noise, including daytime and nighttime sound levels and the methodology to be used in measuring construction noise levels. The city ordinance also establishes criteria for obtaining a noise variance if required.

The analysis of noise generated during operation of the project includes an initial screening to determine whether noise and/or ground-borne vibration impacts may be a concern for a proposed project. A second screening criterion, distance from potentially affected land uses, is then applied. For the project, potentially sensitive land uses within the project area include the Washington Street Boat

Landing, a resource listed on the National Register of Historic Places (NRHP); Fire Station No. 5, a resource not listed but eligible for listing on the NRHP; and two residential buildings nearby. The residential buildings include a 20-unit condominium building located north of the project site and on the east side of Alaskan Way, about 260 feet from the nearest corner of the project site, and the new Post Apartments, located about 360 feet from the project site on Western Avenue at Marion Street. The Washington Street Boat Landing, Fire Station No. 5, and the condominium building are shown on Exhibit 4-7. In addition to these sensitive receptors, some areas of downtown Seattle have underground utility lines that are highly susceptible to damage from vibration. In particular, cast iron water mains, brick sewers, and other older structures can be damaged.

Noise measurements were taken from readings at three monitoring locations near the project boundaries; these locations are also shown on Exhibit 4-7. In addition, other available sources, including the Alaskan Way Viaduct Replacement Project noise study and the Elliott Bay Seawall Noise and Vibration Analysis, provided data used for this analysis.

4.3.3 Affected Environment

4.3.3.1 Noise and Vibration Fundamentals

Sound is mechanical energy transmitted by pressure waves through a medium such as air. The sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. Sound pressure level is measured in decibels (dB), a logarithmic loudness scale with 0 dB corresponding roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of pain. Because sound pressure can vary by over one trillion times within the range of human hearing, the logarithmic loudness scale is used to calculate and manage sound intensity numbers conveniently.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that deemphasizes the frequencies below 1,000 Hertz (Hz) and above 5,000 Hz. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA).

Due to its variation from instant to instant, community noise levels must be measured over an extended period of time to characterize the noise environment and to evaluate cumulative sound impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are as follows:

Leq: The equivalent sound level is used to describe noise over a specified period of time, typically 1 hour, in terms of a single numerical value (i.e., the average noise exposure level for the given time period).

Lmax: The Lmax is the instantaneous maximum noise level measured during the measurement period of interest.

Washington State Ferries

Washington State Department of Transportation

N

SOURCE: Google Earth, 2011; WSDOT, 2011

Exhibit 4-7

Noise Measurement Locations

Seattle Terminal Project

Seattle, Washington

FILE NAME:Ex04-2_ NoiseLoc.ai / CREATED BY: JAC/ DATE LAST UPDATED: 02/03/14

L_{dn}: The day-night average sound level (also written as DNL) is the energy average of the A-weighted sound levels occurring during a 24-hour period, accounting for the greater sensitivity of most people to nighttime noise by weighting ("penalizing") nighttime noise levels by adding 10 dBA to noise between 10:00 p.m. and 7:00 a.m.

There are several different methods used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts on buildings. Typically, ground-borne vibration generated by manmade activities attenuates rapidly with distance from the source of the vibration. Sensitive receptors for vibration include structures (especially older masonry structures), people, and vibration-sensitive equipment.

4.3.3.2 Existing Noise Environment in the Project Area

Traffic on the Alaskan Way Viaduct (AWV) is a predominant source of noise in the project area. Existing sources of noise near the Colman Dock come mainly from road traffic, with some localized industry as well as high-altitude aircraft over flights. Existing sound levels measured at the three monitoring sites are shown in Exhibit 4-8.

Exhibit 4-8 Existing Sound Levels

Site No.	Location	Time Period	Measurement Date / Time	FHWA 15 min. L_{eq} (dBA)	FTA L_{dn} (dBA)	Day / Night Range (L_{dn}) (dBA)
Site 1	North side of Colman Dock Near Fire Station No. 5	24 hr.	Aug. 8-9 2012	NA	76.3	68 - 85
Site 2	South side of Colman Dock Near Toll Booths	24 hr.	Aug. 8-9 2012	NA	72.7	64.8 – 81.1
Site 3	North side of Colman Dock 28 feet from SR519	15 min.	Aug. 8 2012 2:10 PM	73.9	NA	NA

4.3.4 Construction Impacts

4.3.4.1 Construction Impacts Common to Both Alternatives

Both the No Build and Build Alternatives would produce noise from internal combustion engines. Earth-moving equipment, material-handling equipment, and stationary equipment are all engine-powered. Mobile equipment operates in a cyclic fashion, but stationary equipment (e.g., pumps, generators, and compressors) generate sound levels that are fairly constant. Truck noise would be present during most construction stages. Other noise sources would include impact equipment and tools such as pile drivers. Impact tools could be pneumatically powered, hydraulic, or electric. Pile driving is likely to produce the highest noise levels during construction.

Construction noise would be intermittent, occurring at different times and at various locations in the project area. The maximum noise levels of construction equipment under the Build Alternative would be similar to the typical maximum noise levels from construction equipment shown in Exhibit 4-9.

Exhibit 4-9 Typical Noise Levels from Construction Equipment

Construction Equipment	Noise Level (dBA, L_{eq} at 50 feet)
Hoe ram (concrete breaker)	90
Excavator	81
Roller	80
Concrete Mixer	79
Crane, Mobile	81
Dozer	82
Paver	77
Backhoe	78
Vibratory Pile Driver	101
Impact Pile Driver	107

Source: FHWA, 2006; Laughlin pers. comm. 2013

Maximum noise levels from construction equipment would range from approximately 77 to 107 dBA at 50 feet. Construction noise at locations farther away would decrease at a rate of 6 to 8 dBA per doubling of distance from the source. Because various pieces of equipment would be off, idling, or operating at less than full power at any given time, and because construction machinery is typically used to complete short-term tasks at any given location, average L_{eq} daytime noise levels would be less than the maximum noise levels. Within Seattle city limits, construction noise levels may not exceed a maximum L_{eq} (7.5 minutes) of 99 dBA at 50 feet or the nearest property line (whichever is farther) (SMC 25.08.425). FTA guidance suggests that adverse community reaction may occur at a 1-hour L_{eq} of 90 dBA for daytime and 80 dBA for nighttime construction noise exposure in residential areas and 100 dBA for daytime and nighttime noise exposure in commercial and industrial areas.

Construction noise is allowed to exceed the City noise limits by 15 to 25 dBA for short periods during the day (7:00 a.m. to 10:00 p.m. on weekdays and 9:00 a.m. to 10:00 p.m. on weekends and legal holidays). Impact equipment such as jackhammers may not exceed a L_{eq} (h) of 90 dBA or a L_{eq} (7.5 minutes) of 99 dBA, and may be operated only from 8:00 a.m. to 5:00 p.m. on weekdays and from 9:00 a.m. to 5:00 p.m. on weekends and legal holidays, unless otherwise allowed by a noise variance.

Demolition of existing structures and impact and vibratory pile driving would cause the most vibration. Other sources of vibration during construction would be from concrete, asphalt, and deck removal; excavator-mounted pulverizers and shears; and jackhammers, hoe rams, and core drills.

4.3.4.2 No Build Alternative

The No Build Alternative would generate noise from periodic replacement of deteriorated piles or other sections of the trestle during any given replacement work. This noise would be similar to the noise produced by the Build Alternative, but for a much shorter duration and much smaller in scale. Noise from internal combustion engines, from other construction equipment, and from pile-driving would be produced. Construction noise and vibration would be just as disruptive but would occur for a shorter time period.

Maintenance and replacement work on the north trestle would produce noise and vibration effects to Fire Station No. 5 and the firefighters working there. The No Build Alternative would require replacement pile driving, as close as a few feet from the fire station. Because the north trestle would remain closer to the fire station under the No Build Alternative than the Build Alternative, the vibration and noise impacts on that structure would likely be greater than would occur when removing the piles in the Build Alternative; however, individual repair projects under the No Build alternative would be much shorter in duration.

4.3.4.3 Build Alternative

Project construction is currently planned to occur in four phases over approximately six years (69-72 months). Construction noise and vibration are likely to occasionally annoy some nearby residents and businesses. Construction workers would also be subjected to noise while working on the site.

Pile driving would generate the greatest construction noise impacts. *Impact* pile driving would generate noise levels of 77 to 107 dBA at 50 feet; peak noise from *vibratory* pile driving would be 101 dBA at 50 feet (Exhibit 4-9). Clam shovels, which would be used to excavate fill, generate noise levels in the 80-90 dBA range. Noise levels at the corner of the nearest residence, a 20-unit condominium building, would be no more than 87 dBA during the project's noisiest activities, due to its distance from the project site, and that would diminish as the work moved to the south and west. The Post Apartments are located about 100 feet further from the project site than the 20-unit condominium building, and an intervening building partially screens the apartments; noise levels at the Post Apartments would thus be lower than 87 dBA at the noisiest.

Pile driving would also cause vibration impacts. Because vibration attenuates rapidly over distance and because the pile driving would be at least 200 feet away from the Washington Street Boat Landing, damage from pile driving is very unlikely. However, vibration-sensitive utilities, such as cast iron water mains, brick sewers, and older utility structures located in the waterfront area, could be affected. Special provisions would be needed to protect existing utility lines in these areas during pile driving and installation, and would be determined in coordination with the utility service providers. Existing pipes and other facilities would be field-verified during final design to ensure work does not accidentally damage them.

Pile removal and demolition of the north trestle would be located close to Fire Station No. 5 and could generate vibrations that approach the FTA's 0.5 inches per second PPV threshold. Piles within 35 feet of the fire station would be cut at the mudline rather than removed using vibratory extraction. WSDOT would also monitor vibration levels for pile removal within 50 feet of the station, and would cut piles at the mudline instead of vibrating them out if vibration levels approach the 0.5 PPV damage threshold. Pile removal and installation for all construction phases other than the demolition and removal of the north trestle would be farther from the fire station and are not expected to have adverse vibration effects.

4.3.5 Long-Term Impacts

4.3.5.1 No Build Alternative

Maintaining existing facilities, including the slips, terminal building, and trestle, would occur under the No Build Alternative. Current traffic patterns, ferry slip locations, and operation schedules would not change except as needed to accommodate maintenance tasks. Noise and vibration from ferry operations would remain at or below current levels.

4.3.5.2 Build Alternative

Holding capacity, traffic volumes, and driveway locations would not change under the Build Alternative. Reconfiguring the trestle would shift terminal operations approximately 165 feet to the south. This reconfiguration would reduce noise by 5 to 10 dB at Fire Station No. 5 where firefighters sleep.

4.3.6 Mitigation

4.3.6.1 Construction Noise Minimization Techniques

As a major public construction project, the project will require a noise variance under the Seattle Noise Control code. Well in advance of construction, requirements for minimizing construction noise would be developed in coordination with the City and specified in the noise variance. Mitigation will include:

- Prohibit pile driving at night.
- Limit use of impact equipment other than pile driving to between 8:00 a.m. and 5:00 p.m. on weekdays and between 9:00 a.m. and 5:00 p.m. on weekends and legal holidays. If impact equipment use cannot be limited to those hours, a noise variance from the City would also be required.
- Limit the noisiest construction activities other than use of impact equipment to the hours between 7:00 a.m. and 10:00 p.m. on weekdays and between 9:00 a.m. and 10:00 p.m. on weekends and legal holidays. A noise variance would be required from the City for construction outside of these hours.
- Develop and implement public outreach, information, and complaint response procedures for the duration of construction. These procedures will include a 24-hour noise complaint line with clear lines of communication and authority for investigating complaints and implementing other measures to reduce or mitigate the noise causing the complaint.
- Crush and recycle concrete off site, away from noise-sensitive uses. If recycled on site, an operations plan would be required to define the locations and hours of operation.
- Construct temporary noise barriers or curtains around stationary equipment and long-term work areas. This could reduce equipment noise by 5 to 10 dBA.
- Use noise mitigation shields when generators and compressors are needed between the hours of 10:00 p.m. and 7:00 a.m. Monday through Friday and between 10:00 p.m. and 9:00 a.m. Saturday, Sunday, and legal holidays, unless otherwise allowed by the Seattle Department of Planning and Development.

- Use the quietest equipment available, and require adequate mufflers, intake silencers, and engine enclosures, which could reduce noise by 5 to 10 dBA.
- Minimize idling time and turn off construction equipment during prolonged periods of non-use.
- Properly maintain all equipment.
- Train equipment operators on methods for noise reduction.
- Where possible, locate stationary equipment away from sensitive receiving properties.
- Notify nearby residents and businesses prior to periods of intense nighttime construction.
- Use broadband, ambient-sensitive, or strobe backup warning devices or use backup observers in lieu of backup warning devices for all equipment except dump trucks. Backup observers and broadband or strobe backup warning devices must be used for dump trucks between 10:00 p.m. and 7:00 a.m. Monday through Friday, and between 10:00 p.m. and 9:00 a.m. on Saturday, Sunday, and legal holidays.
- Use rubber bed liners between 10:00 p.m. and 7:00 a.m. Sunday night through Friday, and between 10:00 p.m. and 9:00 a.m. from Friday night through Sunday morning.
- Remove spilled material by hand when possible, rather than using scraping equipment.

4.3.6.2 Construction Vibration Minimization Techniques

Vibratory pile extraction may cause vibration levels that approach the FTA damage threshold of 0.5 PPV within 33 feet of Fire Station No. 5. To avoid vibration damage, piles within 35 feet of the fire station would be cut at the mudline rather than removed using vibratory extraction. WSDOT would also monitor vibration levels for pile removal within 50 feet of the station, and would cut piles at the mudline instead of removing them by vibratory extraction if vibration levels approach the 0.5 PPV damage threshold.

Vibration from other construction activities can be reduced by either restricting their operation to predetermined distances from historic structures or other sensitive receivers (such as sensitive utilities), or using alternative equipment or construction methods.

Finally, acoustic monitoring would be required whenever vibration-producing activities occur within 200 feet of a sensitive receiver (e.g., cast iron water pipes or brick sewers). The monitoring data would be compared to the project’s vibration criteria to ensure that ground vibration levels do not exceed the corresponding damage risk criteria for buildings and sensitive utilities. If vibration levels approach the damage risk criteria, WSDOT would stop work and consult with the appropriate regulatory agencies to improve existing BMPs or implement additional BMPs to minimize impacts.

4.3.6.3 Mitigation of Long term Impacts

No long-term adverse noise or vibration impacts are anticipated from the No Build or Build Alternatives. No mitigation is proposed.

4.4 Water Resources

The project could adversely affect surface water quality, primarily by releasing contaminants in stormwater runoff and through the consequences of in-water construction. Potential direct and indirect effects of the project on surface water are considered in this section. The project would not affect groundwater.

Information in this section is summarized from the *Water Resources Discipline Report* (WSF, 2013m).

4.4.1 Water Resources Study Area

The study area includes all water resources within the immediate vicinity of the proposed project's construction activities, including all of Elliott Bay. Construction would be over water, and would be separated from the upland area by the Elliott Bay Seawall. Drainage from the adjacent city sidewalk and Alaskan Way are not hydraulically connected to the project site, and existing outfalls from the city conveyance system would not be modified.

4.4.2 Methodology

Federal and state laws addressing water quality were reviewed, and the information about the existing stormwater infrastructure on and near the project site was collected. Existing surface water quality conditions were reviewed from available existing sources. The potential effects of the No Build and Build Alternatives were analyzed for both construction and operation. Measures to minimize or eliminate potential adverse effects were also developed.

The Clean Water Act (CWA) is the primary federal law governing water quality in the United States. An array of federal and state regulations and permits, many of which are under the authority of the CWA, control activities ranging from discharges into waters of the United States to construction or fill within waters. Surface water quality standards are implemented through the CWA Section 401 certification process, and water quality must comply with the Water Pollution Control Act (Chapter 90.48, RCW) and the state's Water Quality Standards (Chapter 173-201A, WAC). WSDOT also must comply with the agency's NPDES permit and the WSDOT Highway Runoff Manual (WSDOT 2011).

The project would include stormwater treatment for new and replaced impervious surfaces. "New" impervious surfaces are those built for the new south concrete trestle area (51,000 square feet, shown on Exhibit 3-2). "Replaced" impervious surface is the new concrete trestle replacing the timber trestle (100,000 square feet).

4.4.3 Affected Environment

The project is located in Elliott Bay, an embayment in central Puget Sound. Current sources of pollution in the project area include stormwater runoff from urbanized impervious surfaces, discharges into Elliott Bay from combined sewer overflows (CSOs), and pollution from the Duwamish River, which enters the bay approximately one mile south of the project site. The existing terminal provides only limited stormwater treatment. Simple oil-water separators collect runoff on the southern (concrete) portion of the dock, while stormwater is not treated on the north (timber) trestle before it enters Elliott Bay.

Ecology lists fecal coliform for Elliott Bay as a Category 5 impairment. Elliott Bay is also included in the 2012 Washington State Water Quality Assessment 303(d) list as not meeting water quality criteria for nearshore fish habitat, and for exceeding thresholds for ammonia-N, dissolved oxygen, temperature, arsenic (inorganic), fecal coliform bacteria, and endosulfan (an organochlorine insecticide) (Ecology 2012). Contaminated sediments have also been identified at the project site, as discussed in the Ecosystems and Hazardous Materials sections of this document.

4.4.4 Construction Impacts

4.4.4.1 No Build Alternative

Construction completed during ongoing maintenance of the Seattle Ferry Terminal would cause impacts similar to those of the Build Alternative but they would be at a smaller scale, more localized, and over a shorter duration, but would likely occur throughout the life of the facility.

4.4.4.2 Build Alternative

Erosion and debris associated with demolition and construction may enter the water. Sediment and debris entering Elliott Bay could temporarily increase the turbidity of the water. Wind-blown dust from exposed surfaces and other fugitive dust and erosion from construction materials containing contaminants may be carried to adjacent waters, impairing their water quality.

Construction would require the operation of equipment over open water and on the terminal deck. There is an inherent risk of water quality impairment with construction activities. For example, the rupture of a hydraulic fluid line on a work barge or other heavy construction equipment could cause toxic material to spill into open waters. Equipment used to construct the in-water structures may potentially leak small amounts of fuel and engine fluids into the bay. Required pollution prevention measures are discussed further below. In the unlikely event of a large spill on the deck or barges, without sufficient containment and cleanup measures, contamination could be significant enough to adversely affect nearshore water quality in Elliott Bay.

The project would include removing and driving piles into the sediment and constructing support columns using the drilled shaft method. Pile removal and installation can generate temporary turbidity. Factors affecting the amount of turbidity generated during pile removal include the type and number of piles removed, the removal technique used, and the characteristics of the bottom sediments. The removal of the piers and support pilings may result in near shore turbidity plumes, as well as the re-suspension and entrainment of some contaminants and sediment into the water column. Without measures in place to contain such turbidity, wave action and currents could then transport the re-suspended contaminants to nearby areas, potentially resulting in minor indirect adverse effects on aquatic organisms before settling back onto the floor of Elliott Bay.

The generation of turbidity is less of an issue with pile installation because the impact is highly localized. Pile driving would result in temporary turbidity increases as bottom sediments are displaced. Installing hollow steel pilings would create less water column turbidity, but would require the containment, removal and disposal of contaminated sediment from inside the pile casing prior to concrete pouring. If displaced water within piles or drilled shafts is not removed and managed carefully, uncured concrete could make contact with marine water, locally increasing the pH and turbidity of the water. Turbidity and pH levels of 8.5 and higher can have detrimental effects on aquatic organisms.

4.4.5 Long-Term Impacts

4.4.5.1 No Build Alternative

Currently stormwater from the site's impervious surfaces discharges directly into Elliott Bay with limited treatment. As it collects and drains off road pavement, stormwater typically picks up pollutants that cars and trucks deposit. These pollutants include oils, suspended solids, copper, and zinc. Simple oil-water separators currently collect runoff on the southern (concrete) portion of the dock, while stormwater is not treated on the north (timber) trestle before it enters Elliott Bay.

The No Build Alternative would result in a continuation of existing conditions at the dock, including continued discharges of contaminated stormwater.

4.4.5.2 Build Alternative

The Build Alternative would not have any long-term adverse effects on water quality. It would have several beneficial effects. WSDOT would install oil-water separators and stormwater vaults below the deck to provide water quality treatment for all new and replaced areas of the terminal. The vaults would collect and hold runoff, allowing suspended solids to settle; WSDOT would periodically clean the vaults and remove the solids to maintain proper functioning. Allowing the solids to settle in vaults before the stormwater is released removes much of the pollution.

Pollutant loadings from the terminal to Elliott Bay would be substantially reduced as a result of the new stormwater treatment, including reductions of total suspended solids, total and dissolved copper, and total and dissolved zinc. These pollutants are deposited on the impervious surface areas used for vehicle holding. Estimates of pre-and post-project pollutant loads are shown above in Exhibit 4-6.

This alternative also removes 3,500 cubic yards of contaminated fill and approximately 7,400 tons of creosote-treated timber piles, which would prevent ongoing releases of pollutants into the water column. It also places a sediment cap to prevent any remaining contaminated sediment from continuing to release hazardous substances into the water column.

4.4.6 Mitigation

4.4.6.1 Construction

The following measures would be taken to reduce or eliminate the effects of construction activities on water resources, and would be requirements of the contract between WSDOT and the Contractor:

- Turbidity control measures - Implemented to contain sediments in the near shore areas for activities such as pile driving and removal, removal of fill material behind the retaining wall at the northeast corner of the site, and for overwater work. Sediment curtains and other BMPs would minimize the movement of suspended sediments.
- Ecology-approved Construction Stormwater Pollution Prevention Plan (SWPPP) - This would serve as the overall stormwater mitigation plan and would include: Temporary Erosion and

Sediment Control Plan; Spill Prevention, Control, and Countermeasures Plan; Concrete Containment and Disposal Plan; and Fugitive Dust Plan.

- Temporary Erosion and Sediment Control Plan (TESC) – Developed for land or deck areas to contain and minimize sediment transport from construction areas. Staging would be defined and scheduled so that BMP placement may be identified to minimize the potential sediment and spill transport. Requirements for fugitive dust control, monitoring and inspection would be specified.
- Spill Prevention Control and Countermeasures Plan (SPCC) – Developed to reduce the potential for accidental spills, minimize their quantity, contain and clean-up any materials that could cause pollution to the water resources and surrounding environments. Maintenance and operation requirements for equipment and vehicles would be prescribed, on-site spill response materials identified, secondary containment called out and other BMPs for spills discussed along with response procedures and training specified.
- Water Management Plan – Identifies methods to contain and treat turbid water removed from construction zones.
- Pier construction and removal - Conducted in compliance with the Washington State Hydraulic Code requirements (WAC 220-110-060) and WSF guidance for minimizing adverse effects associated with dock demolition and pier removal.

In addition, BMPs would be implemented to accomplish the following:

- Contain soils and slurry associated with pile removal and installation to minimize turbidity.
- Retrieve any floating debris generated during construction activities using a containment system, and dispose of collected debris onshore in an appropriate manner.
- Contain dredged sediments on a barge. The barge storage area shall consist of filter material and an edge to effectively serve as a curb or lip around the perimeter of the barge.
- Employ oil-absorbent materials to contain and clean-up any oil sheen observed. Dispose of used absorbent material in a landfill that meets the liner and leachate standards of the state minimum functional standards (WAC 173-304).
- Use a floating containment boom or silt curtain surrounding in-water work areas.
- Select and use construction equipment and techniques to minimize disturbance to or transport of bottom sediments.
- Select and implement BMPs to properly prevent pollutants from entering the water during construction activities and pile removal.
- Monitor and use adaptive management strategies if problems are identified.

For any construction work within or above water, a Hydraulic Project Approval (HPA) would be required from the Washington State Department of Fish and Wildlife. Work would be limited by the HPA to selected work windows specifying the time of year construction activities may occur.

The project would also comply with any minimization measures developed during consultation with NOAA Fisheries Service and U.S. Fish and Wildlife Service in compliance with the ESA, the Magnuson-

Stevens Fishery Conservation Management Act, and MMPA. The project would also meet applicable permit requirements of local, state, and federal agencies with jurisdiction over aquatic lands and shoreline areas; these permits typically include commonly applied mitigation measures or BMPs as well as project-specific mitigation requirements.

4.5 Hazardous Materials

The purpose of this section is to identify and evaluate known or potentially contaminated sites in the project area that may be disturbed by construction or incur cleanup liability for WSDOT, and to identify measures that could minimize or eliminate those potential impacts.

Hazardous materials may be encountered during pile installation, demolition, and excavation activities. Hazardous materials would also be used and could be spilled during project construction and operation. Identification of hazardous materials that could be encountered, used, or spilled allows WSDOT to plan appropriate responses to potential impacts of such materials. Identification of existing areas containing hazardous materials allows WSDOT to develop plans to avoid or minimize the associated risks.

Information in this section is summarized from the *Hazardous Materials Discipline Report* (WSF, 2013f).

4.5.1 Hazardous Materials Study Area

The study area for purposes of analyzing hazardous materials extends 400 feet east of Colman Dock, the distance judged to encompass areas from which contamination could reasonably be expected to migrate in groundwater from upland sources to the project footprint. This area also includes the project site and the open waters surrounding the site, as shown in Exhibit 4-10.

4.5.2 Methodology

Evaluation of the types and distribution of hazardous materials likely to be encountered within the proposed project footprint is based on data and information gathered during the site screening process. Potential effects were determined by superimposing the proposed project layout over existing features and areas of identified environmental concern. General use of hazardous materials both during construction and maintenance of WSDOT facilities has been evaluated over many years on similar projects. Standard approaches have been developed to identify and address the potential effects posed by these activities.

4.5.3 Affected Environment

Review of available federal and state regulatory databases, including EPA and Ecology registers and other historical information, indicates that 27 sites in the study area have documented releases or potential releases of hazardous materials (Exhibit 4-10). A potential project impact rating of low, medium, or high is assigned for each site identified.

Four sites were determined to pose no potential for impact based on location relative to Colman Dock, the fact that the site had been cleaned up, or there was no report of a hazardous material release. Twenty-two of the Hazardous Materials Sites that are, or may be, contaminated with hazardous materials received a “Low-Moderate Impact” rating. These sites were or are currently used as gasoline stations, automobile repair shops, and dry cleaning facilities; a number of facilities stored petroleum products in underground storage tanks (USTs). Only Colman Dock (Site Number 1) was identified with a “High Impact” rating, based on documented sediment contamination (WSF, 2013f).

0 125 250 500

Feet

Washington State Ferries

Washington State Department of Transportation

N

SOURCE: Herrera, King County 2007

Exhibit 4-10

Hazardous Material Study Area

Seattle Terminal Project

Seattle, Washington

FILE NAME:Ex04-10_HazMatStudyArea.ai / CREATED BY: JAC/ DATE LAST UPDATED: 10/31/13

> Why are project area sediments contaminated with creosote?
>
> Creosote is commonly used as a wood preservative for railroad ties, telephone poles, and marine pilings. At least some creosote contamination found in sediments in the vicinity of Colman Dock is likely due to the leaching of creosote from the timber pilings used to support docks and other structures associated with past and present uses of the waterfront.

Contamination exists in onsite sediments beneath much of the Colman Dock structure (Herrera, 2012). Sediments are contaminated with metals, light and heavy polynuclear aromatic hydrocarbons (PAHs) typically associated with creosote, and semi-volatile organic compounds (SVOCs) typical of stormwater runoff. Limited sampling results for polychlorinated biphenyls (PCBs) indicate the possible presence of PCBs across the project site, although no samples collected exceeded Ecology's Sediment Management Standards (SMS) criteria. Contaminated sediments beneath the southern portion of Colman Dock are covered by a cap consisting of approximately one and one-half feet of clean, commercially obtained sand (placed in 1989 after pier demolition and prior to driving piles for the southerly expansion of Pier 50). A 2004 study indicated that the cap was intact and covered by four to eight inches of more recent sediment.

The soil and groundwater contaminants that may exist on nearby upland sites, based on historical property use, include petroleum hydrocarbons (gasoline, diesel, waste oil), gasoline components (benzene, toluene, ethylbenzene and xylene (BTEX)), heavy metals (cadmium, chromium, copper, lead, mercury, and zinc), and dry cleaning solvents (Stoddard Solvent and perchloroethylene (PCE)).

Investigations conducted to support the Alaskan Way Viaduct Replacement Project identified groundwater contaminated with metals along the west side of the viaduct, approximately 75 feet from Colman Dock. Other sampling identified VOCs, petroleum and PAHs in the upland areas near the site.

There is a low likelihood that contaminants from upland sites would migrate to the Colman Dock facility through groundwater and affect sediments, based on travel distances and substantiated by sampling along the viaduct. Any contaminants migrating to Colman Dock would be found in sediments, since the terminal is located entirely above water.

> What is the Model Toxics Control Act (MTCA)?
>
> The Model Toxics Cleanup Act is a toxic cleanup law that went into effect in March 1989 changing the way hazardous waste sites in this state are cleaned up. It sets strict cleanup standards to ensure that the quality of cleanup and protection of human health and the environment are not compromised. At the same time, the rules that guide cleanup under the Act have built-in flexibility to allow cleanups to be addressed on a site-specific basis.

Sampling of the material held behind the retaining structure at the northeast corner of the Colman Dock property (Landau Associates 2011b) identified several contaminants exceeding Model Toxics Control Act (MTCA) standards or SMS, including arsenic, lead, mercury, and benzo(a)pyrene (one of the PAHs). Further analysis demonstrated that the sediments did not qualify as hazardous waste.

A site visit and interviews were conducted to evaluate the current layout and operations relative to hazardous materials management and to gain perspective on current and historical practices. The following information was revealed:

- Stormwater drains are located across the entire dock, more than 25 of which are fitted with simple oil/water separators. Stormwater from all drains discharges to Elliott Bay.

- A hazardous materials storage building and a metal flammables locker are located just south of the main terminal building.
- A hydraulic trash compactor, hydraulic hoists to adjust vehicle transfer spans and an elevator that uses hydraulic fluid are located on the dock.
- Four dry-type transformers are located beneath the terminal building. It is unknown whether previous transformers contained PCBs.
- Asbestos-containing materials have been removed from the terminal building as part of renovations in the past, although some material remains in portions of the building that have not been updated.
- A septic tank collects waste from the break room, which is routed to the city sewer system; all other wastewater is piped directly to the sewer system.

4.5.4 Construction Impacts

Construction of the project would involve replacing pilings and support structures, decking, and existing above-decking structures. These activities would disturb contaminated sediment and require abatement of hazardous building materials.

4.5.4.1 No Build Alternative

Under the No Build Alternative, the older parts of the facility built in 1964 would not be replaced and the terminal, including King County's POF facility at Pier 50, would continue operating in its current configuration. Demolition or construction activity would be limited to replacement of individual piles or deck segments as part of WSF's rigorous program of inspections and maintenance. Contaminants present in the fill behind the retaining wall and in the sediments under the northern (timber) portion of the trestle, and hazardous building materials present in existing structures, would remain in place until structural components are replaced. The sediment cap under the southern part of the trestle would not be extended.

4.5.4.2 Build Alternative

Approximately 1,446 existing creosote-treated timber piles would be removed from the site. The removal process would disturb contaminated sediment, temporarily suspending it into the water column. Portions of piles may remain buried in sediment if they are broken during the removal process.

A new sediment cap would be placed beneath the northern portion of Colman Dock to prevent further leaching of materials into the marine environment. The final details of the design, location and extent would be determined in cooperation with the Department of Ecology. The sediment cap would cover any piles that break at or beneath the mudline during removal.

Approximately 7,400 tons of creosote-treated timber pilings would be removed from the site. This wood would be stockpiled on barges before being sent to an approved off-site upland disposal facility. In addition, hollow steel casings would be driven for the project's drilled shafts. Approximately 3,500 cubic yards of potentially contaminated sediment would be removed from the interior of the hollow steel casings as they are driven. This sediment would either be transferred directly to trucks or stockpiled prior to transport to a permitted disposal facility.

Approximately 7,700 cubic yards of contaminated fill situated behind the retaining wall at the northeast corner of the site would be removed. This soil would be characterized for disposal prior to transport to an appropriate disposal facility. Any contamination that is not recovered would be capped by the northern portion of the new sediment cap.

The small amount of remaining hazardous building materials (primarily asbestos) would be removed from the terminal building by a certified abatement contractor. This material would be stored in bags in a segregated area prior to transport from the site.

Contaminated sediment, soil, wood, and building materials would be disturbed during the construction process, resulting in potential short-term negative impacts to the environment. These impacts are expected to be localized within the work zone water column and possibly a small area adjacent to Alaskan Way used for contaminated sediment stockpiling and truck loading.

4.5.5 Long-Term Impacts

4.5.5.1 No Build Alternative

Operation of the Seattle Ferry Terminal under the No Build Alternative would continue under the current conditions. With no changes in operation, no long-term impacts differing from existing conditions are expected. Hazardous materials in contaminated sediment, fill, and pilings would continue to leach gradually into the water column.

4.5.5.2 Build Alternative

The project would result in an overall, long-term environmental benefit, primarily due to the removal of contaminated soil, sediment and creosote-treated wood, and the subsequent capping of the remaining potentially contaminated sediment. The remaining asbestos material in the terminal building would be removed as part of building demolition.

4.5.6 Mitigation

4.5.6.1 Mitigation for Construction Impacts

It does not appear that offsite sources of contamination would impact the Colman Dock property, so any impact mitigation would be associated with existing property conditions or releases associated with construction. Mitigation would be provided by using standard measures developed either as BMPs, WSDOT standard specifications, or regulatory requirements.

WSDOT would implement standard mitigation measures that are designed to prevent and control spills of hazardous materials and to protect the environment when stockpiling, transporting, and disposing of contaminated materials. WSDOT would also develop and implement project-specific mitigation measures that focus primarily on creosote pile removal, water quality management, and biological resource protection. Project-specific BMPs include:

- Complying with in-water work windows;
- Monitoring water quality and implementing appropriate modifications in response to negative data;

- Installing sediment curtains when removing and installing piles and during other in-water work that creates turbidity; and
- Having an oil containment boom available at all times.

> What is a sediment curtain?
>
> A sediment curtain is an impermeable barrier constructed of a flexible reinforced thermoplastic material. The upper hem has floatation material and the lower hem is weighted.

Proposed capping of contaminated sediments would be addressed in coordination with Ecology and the Corps of Engineers in compliance with the Clean Water Act and the Model Toxics Control Act. In particular, a Section 404 permit from the Corps of Engineers would specify water quality restrictions, sediment standards, monitoring requirements and adaptive management. WSDOT would work with Ecology to determine the proper management of any contamination that would remain in the off-shore sediment under the ferry terminal.

4.5.6.2 Mitigation for Long Term Impacts

Operation of the project would require use of hazardous materials needed to operate and maintain the facilities. Hazardous materials associated with these activities include gasoline, diesel fuel, motor oil, transmission fluid, radiator coolant, brake fluid, metals (associated with tire wear), hydraulic oil, paint, asphalt tar, paving oils, and tack. In addition to being used in vehicles and on the project's infrastructure, these hazardous materials would also be temporarily stored in one or more locations across the project area.

No Build

The No Build Alternative would be operated under WSF's rigorous program of inspections and maintenance, potentially resulting in replacement of timber piles.

Build Alternative

New stormwater treatment for the new and replaced impervious surface areas would improve the quality of stormwater discharged to the Sound. Periodic cleaning would be required to maintain proper vault function.

Although the number of vehicles using the terminal would remain approximately the same, the Build Alternative would improve traffic flow. This is expected to reduce vehicle accidents at the terminal, reduce the time some vehicles remain on terminal property, and may reduce the amount of hazardous materials leaked from those vehicles and spilled during vehicle accidents at the terminal.

4.6 Geology and Soils

The purpose of this section is to identify and describe geologic and soil conditions in and around the affected area, including regional and local geologic setting, significant features and landforms, and geologic hazards. The analysis considers potential direct and indirect impacts of the alternatives on geologic and soil conditions, as well as the potential direct and indirect impacts of these conditions on project alternatives.

Information in this section is summarized from the *Geology and Soils Discipline Report* (WSF, 2013e).

4.6.1 Geology and Soils Study Area

The local study area for the geology and soils analysis includes the project site and as well as the corresponding strip landward of the seawall to the west face of the Alaska Way Viaduct. The portion of the study area seaward of the seawall was included because the geologic and soil conditions there have the potential to directly impact, or be impacted by, construction and operation of the Build Alternative.

The regional study area (geologic setting and tectonics) includes the central portion of the Puget Lowland geologic province westward to the edge of the Cascadian Subduction Zone.

4.6.2 Methodology

Information used to assemble this report was obtained from existing reports developed for this project and other projects in the immediate vicinity, including:

- Elliott Bay Seawall Project EIS: Final Geology and Soils Discipline Report (Shannon and Wilson, 2012);
- Elliott Bay Seawall Project: Draft Geotechnical Data Summary Report (Shannon and Wilson, 2010);
- Alaskan Way Viaduct Replacement Project EIS: Final Earth Discipline Report (Shannon and Wilson, 2011); and
- Seattle Ferry Terminal Building Replacement and Trestle Preservation: Draft Geotechnical Engineering Report (Landau Associates, 2012).

These reports, in turn, used a number of primary sources of geologic and soils information, including:

- United States Geologic Survey Topographic and Geology Maps;
- Washington Department of Natural Resources Geologic Maps;
- Washington Department of Ecology Coastal Zone Atlas of Washington;
- City of Seattle Critical Areas Ordinance and Maps; and
- Alaskan Way Viaduct and Seawall Replacement Program field exploration reports.

No additional field exploration was conducted in support of this analysis.

Existing information describing the geologic and soil conditions (including hazard areas) within and near the project area was reviewed for this analysis, including information on the regional and local geologic setting, topography, geologic hazards, soil types and relevant properties, and geology and soils economic resources. Groundwater has not been investigated since the project area is over Elliott Bay and hydraulically disconnected from the upland by the seawall (WSDOT, 2012b).

4.6.3 Affected Environment

4.6.3.1 Geologic Setting

The study area is located in the central portion of the Puget Lowland, an elongated north-south structural basin located between the Olympic Mountains and the Cascade Range. Over the past 2 million years, this basin has been scoured and filled with sediments derived from at least six episodes of continental glaciation, with deposits ranging from 1,300 to 3,500 feet thick in the vicinity of the study area. The most recent of these glacial events occurred between 13,000 and 18,000 years ago, covering the area with approximately 3,000 feet of ice at its peak, and strongly influencing the present-day topography, geology, and groundwater conditions in the Seattle area.

4.6.3.2 Tectonics and Seismicity

The study area is located within a seismically active (earthquake prone) region. Most or all of this activity is produced by the interaction of the North American continental plate and the Juan de Fuca oceanic plate within the Cascadia Subduction Zone, which underlies most of western Washington, Oregon, and the adjacent Pacific Ocean. As these two plates collide, the Juan de Fuca Plate is being driven (subducted) beneath the North American Plate. The forces generated from this collision create stress in the rock layers within each plate, which is periodically released, resulting in an earthquake.

4.6.3.3 Groundwater

Groundwater flow in the Seattle area is controlled primarily by the complex distribution of fine- and coarse-grained deposits, local topography, and recharge and discharge areas. In the vicinity of the study area, the groundwater recharge area is on First Hill, though most of the potential recharge is intercepted by impervious surfaces and routed through the urban drainage system directly to Elliott Bay. The waterfront (including the project area) occurs along the primary discharge area for shallow groundwater flow. Groundwater monitoring performed in the area indicates that the groundwater level varies in near direct response to the tide, ranging in elevation from 7 to 15 feet below the ground surface.

4.6.3.4 Geologic Hazards

Geologically hazardous areas are defined as "areas that because of their susceptibility to erosion, sliding, earthquake, or other geological events, are not suited to siting commercial, residential, or industrial development consistent with public health or safety concerns" (WAC 365-190-030).

The Growth Management Act (GMA) requires all cities and counties to identify geologically hazardous areas within their jurisdictions and formulate development regulations for their protection (RCW Chapter 36.70A). The City of Seattle has developed regulations for environmentally critical areas (SMC 25.09), which include geologic hazard areas. These regulations can require detailed geotechnical studies or specific actions (or constraints on actions) to address issues of concern related to site soils and geology, geologic hazards, and facility design and construction. In addition, Seattle has developed seismic and other building code standards to reduce the risk of catastrophic failure of structures from geologic events and conditions such as liquefaction, seismic ground motion, and landslides.

The following sections summarize the types of geologic hazards that may be expected within the study area. Many of these hazards are interrelated.

Landslides/Steep Slopes

The City of Seattle defines landslide-prone critical areas as having a slope greater than 40% and a height differential greater than 10 feet. No slopes of that magnitude exist in the study area, including the fill area landward of the seawall. No deep-seated landslides are known within the study area. Geotechnical analyses conducted waterward of the seawall show an adequate factor of safety against instability out to about 150 feet west of the project footprint.

Erosion

The majority of the project area is waterward of the seawall. Wave action along the front of the seawall is sometimes severe enough to displace existing riprap and other fill materials, requiring periodic replenishment of the riprap protection. Landward of the seawall, groundwater seepage and subsurface erosion is allowing material to pass through gaps in the seawall, resulting in subsidence and cracking and failure of sidewalks and roadways. This is occurring mostly along older sections of the seawall immediately to the south of the project area.

Seismic Hazard – Liquefaction and Lateral Spreading

Soil liquefaction occurs when loose, saturated, sandy soils lose strength due to increased pore water pressure and behave like a viscous liquid (like quicksand). Liquefaction commonly occurs as a result of ground shaking during earthquakes and can result in ground settlement, lateral spreading, landslides, localized disruption due to sand boils, and reduced support for structural foundations. Buildings, bridges, piles, and other structures founded on or in liquefied soils may settle, tilt, move laterally, or collapse.

> What is "lateral spreading"?
>
> Lateral spreading is a type of landslide that commonly occurs on gentle slopes where the ground moves sideways.
>
> What are "sand boils"?
>
> Sand boils occur when liquefied soil is ejected at the ground surface giving the impression of boiling.

According to City of Seattle critical areas mapping, the entire study area is located within a liquefaction hazard zone. The mapped liquefaction risk has been further validated for many locations in and near the study area through soil testing.

Lateral spreading of soils under or landward of the seawall may cause it to tilt, move sideways, or collapse; this is likely to directly affect ferry terminal operations, and may affect the structural integrity of the terminal sub- and superstructure. Geotechnical testing and analysis of soils underlying the project area (Landau Associates 2012) indicates that the granular fill deposits and non-organic marine deposits would be subject to liquefaction and lateral spreading during a major earthquake. Liquefaction-induced ground subsidence beneath the terminal could range from 3 to 10 inches; this would reduce the structural capacity of the pile foundations.

Seismic Hazard - Fault Rupture

The study area is located close to the Seattle Fault Zone. There have been at least three earthquakes during which the surface was ruptured in the past 10,000 years (Nelson et al., 2000). The most recent event occurred about 1,100 years ago, with as much as 22 feet of vertical ground displacement (Bucknam et al., 1992). The northernmost extension of the main fault is approximately 1.5 miles south of the study area. Consequently, rupture of the ground surface and vertical displacement in and near the study area during an earthquake on the Seattle Fault is not anticipated.

Seismic Hazard - Ground Motion

Ground motion is usually the most significant contributor to structural damage and failure in an earthquake. Energy from an earthquake would be transmitted from bedrock at depth, through glacial and marine deposits and fill, to the study area. These intervening materials may increase or decrease the intensity of ground motion felt at the surface relative to that of the bedrock. The nature and magnitude of the change in ground motion depends on the material properties, the magnitude and proximity of the earthquake, and the frequency of seismic waves generated by the earthquake.

Liquefiable marine deposits and fill within the study area increase the risk of significant ground motion from an earthquake, but the risk is much lower for the well-consolidated glacial deposits. Increased ground motion can be transferred to structures, potentially increasing the amount of damage and the likelihood of partial or total collapse.

Seismic Hazard - Tsunamis and Seiches

Tsunamis are earthquake-generated waves that have very low amplitude (wave height) and a very long wavelength (distance between waves) in the open ocean, but which develop much greater amplitude and shorter wavelength in coastal waters.

A seiche (pronounced “saysh”) is a standing wave that forms on partially or totally enclosed bodies of water (like Puget Sound). This can be caused by seismic ground motion, landsliding, submarine sliding, tsunamis, sustained high winds, and rapid changes in barometric pressure (e.g. hurricanes and squall lines). Most seiches are small (a few inches in height), but have been known to be as large as several feet.

The extent and severity of seismically generated seiches and tsunamis depend on earthquake ground motion, sea floor displacement, and location. Studies have modeled the likely effects of a magnitude 7.3 to 7.6 earthquake occurring along the Seattle Fault, and determined that it would result in flooding of most of the study area with 1 to 6.5 feet of water (Gonzalez, 2003; Koshimura and Mofjeld, 2005). It is also likely that a tsunami generated by a large earthquake in the Pacific Ocean could have a measurable impact on the Seattle waterfront, but quantitative data on those impacts are not available.

4.6.4 Construction Impacts

4.6.4.1 No Build Alternative

Construction activity under the No Build Alternative is associated with future repair or replacement of existing structural components as determined by WSF’s inspection and maintenance program. This program includes replacement of existing timber piles with concrete piles as necessary to preserve the structural integrity of the terminal. This activity would have negligible impacts on local geology and soils conditions, including changes in type and the risk level of identified geologic hazards.

4.6.4.2 Build Alternative

Construction of the Build Alternative would, in general, have negligible impacts on local geology and soils conditions, including changes in type and risk level of existing geologic hazards. Some minor alteration in the bathymetry within the project area would occur at, and north of, the reconstructed north trestle, as a bulkhead and impounded fill are removed and the sediment cap is expanded. This alternative would have no direct or indirect impact on geotechnical conditions (slope stability, suitability for pile and drilled shaft foundations, liquefaction potential) in the project area. Incidental erosion associated with installation of drilled shafts and piles is also discussed in Section 4.4.4.2.

4.6.5 Long-Term Impacts

4.6.5.1 No Build Alternative

Potential impacts associated with the geologic hazards under the No Build Alternative are as follows:

Landslides/Steep Slopes

No part of the project area is within a designated landslide or steep slope critical area. There is a potential for slope instability in the area of the bulkhead structure supporting the northeast corner of the terminal parking lot (Landau Associates, 2012). The analysis determined that weight restrictions on or closure of this portion of the facility, and structural damage to the facility, possibly resulting in injury or death. The analysis determined that the remaining area under the terminal facility has an adequate factor of safety against slope instability.

Erosion

No part of the project is within a designated erosion hazard critical area. Erosion associated with the adjacent section of seawall (riprap and fill material removal by wave action, piping, and erosion of fill material from behind the seawall) is unlikely to cause damage to the terminal infrastructure, but may impact terminal operations if it results in damage to adjacent roadways and sidewalks.

Seismic Hazards

Existing structures do not meet current seismic requirements for new construction, and are at a substantial risk of damage or catastrophic failure from any of the identified seismic hazards (ground motion, fault rupture, liquefaction and lateral spreading, and tsunamis).

4.6.5.2 Build Alternative

Potential impacts to project operations associated with identified geologic hazards under the Build Alternative are as follows:

Landslides/Steep Slopes

Removal of the bulkhead and fill material supporting the northeast corner of the parking lot would resolve the slope instability risk in that area (see description under No Build Alternative above). The remaining area under the terminal facility would have adequate factors of safety against slope instability (i.e. little or no risk).

Seismic Hazards

Since new construction would meet current seismic code standards, overall risk of damage or catastrophic failure (and associated injury or death) from an earthquake or tsunami is substantially reduced compared to the No Build Alternative.

Risk of inundation of the parking areas and ground level portion of the terminal building from a tsunami would not be reduced because these areas would be constructed at the same elevation as existing facilities.

4.6.6 Mitigation

Under the No Build Alternative, replacement structures would be built to meet seismic building code requirements applicable at the time of construction. Seismic retrofits to existing structures may be implemented in the future; these retrofits usually only partially mitigate the baseline risk as compared to new construction.

Because all facilities under the Build Alternative would be designed and built to meet current seismic building code requirements, no mitigation would be necessary.

4.7 Historic, Cultural and Archaeological Resources

To comply with Section 106 of the National Historic Preservation Act (NHPA), the FTA and FHWA, with support from WSDOT, are required to determine if historic properties are located within the project's area of potential effect (APE) and to evaluate the project's direct and indirect effects on these properties. Historic properties are defined as "any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places [NRHP] maintained by the Secretary of the Interior" (36 Code of Federal Regulations [CFR] 800.16[l]1).

This section describes potential effects on NRHP-eligible resources, assesses the potential for finding unknown archaeological resources, and offers recommendations for the management and mitigation of effects to historic properties.

Information in this section is summarized from the *Cultural Resources Discipline Report* (WSF, 2013b).

4.7.1 Historic, Cultural and Archaeological Study Area

For this project, the APE is defined as the Colman Dock trestle footprint and open water areas west of the footprint where construction activities are expected to occur. The APE also includes Fire Station No. 5 directly north of the trestle, extends eastward to the edge of the Alaskan Way Viaduct, and includes the Washington Street Boat Landing at the southeast corner of the APE (Exhibit 4-11).

4.7.2 Methodology

Properties qualify for listing in the NRHP if they are least 50 years old, and meet at least one of four criteria of eligibility (36 CFR 60.4):

A. Association with events that have made significant contributions to the broad patterns of our history;
B. Association with the lives of persons significant in our past;
C. Embodiment of the distinctive characteristics of a type, period, or method of construction, or representation of the work of a master, or possession of high artistic value, or representation of a significant and distinguishable entity whose components may lack individual distinction; and/or
D. Has yielded or may be likely to yield important information about the past.

Properties eligible for listing in the NRHP must also retain substantial integrity of location, design, setting, materials, workmanship, feeling, and association.

An adverse effect is found when a project changes—directly or indirectly—any characteristic of a historic property that qualifies the property for inclusion in the NRHP (36 CFR 800.5(a)(1)). All characteristics that qualify a historic property for listing in the NRHP are considered.

The State of Washington also requires identification of historical, archaeological, and cultural resources under the Washington State Environmental Protection Act (RCW 43.21C). The Washington Heritage Register incorporates NRHP criteria into its evaluation system.

Exhibit 4-11

Area of Potential Effect
Seattle Terminal Project
Seattle, Washington

Washington State Department of Transportation

SOURCE: WSDOT Alaskan Way Viaduct Orthophotograph

FILE NAME:Ex04-11_AreaPotentialEffect.ai / CREATED BY: JAC/ DATE LAST UPDATED: 10/31/13

The City of Seattle's Historic Landmark Preservation Ordinance (Seattle Municipal Code [SMC] 25.12) protects properties of historic and architectural significance. Under the ordinance, an object, site, or improvement that is more than 25 years old may be designated for preservation as a landmark if it has significant character, interest or value; if it has integrity or the ability to convey its significance; and if it falls under one of six criteria (SMC 25.12.350):

1. It is the location of, or is associated with, an historic event;
2. It is associated in a significant way with the life of a person important in the history of the city, state or nation;
3. It is associated in a significant way with an important aspect of the cultural, political, or economic heritage of the community, city, state or nation;
4. It represents the characteristics of an architectural style, period, or method of construction;
5. It is an outstanding work of a designer or builder; or
6. It is an easily identifiable visual feature and contributes to the distinctive quality or identity of its neighborhood or the city because of its age, size, or because it physically stands out.

Qualified archaeologists and architectural historians conducted a literature review, reconnaissance-level survey of the built environment in the APE, and field work, including underwater surveys of two archaeological sites within the APE.

4.7.3 Affected Environment

Ten previously recorded cultural resources are located in the APE. Of these, one is listed in the NRHP (the Washington Street Boat Landing), two were previously determined eligible for listing in the NRHP (the Elliott Bay Seawall[1] and Fire Station No. 5), and one is a Seattle City Landmark (Pioneer Square Preservation District). Exhibit 4-12 summarizes the previously recorded cultural resources that are located in the APE.

Although several historically described Native American sites are located near the APE, none are located within the APE (Miss and Hodges 2007:16). This is expected, given that the APE was below the low water line prior to historical development (Bortelson et al. 1980: Sheet 7) and largely covered by piers during the historic period.

4.7.4 Construction Impacts

4.7.4.1 No Build Alternative

Under the No Build Alternative, existing facilities would be maintained, including emergency repair and replacement of structures and structural systems as needed. There could be minor noise and vibration effects associated with maintenance projects. However, effects from construction for the No Build Alternative would be less than the effects from the Build Alternative because the scale of construction would be much smaller, but likely would occur over the life of the facility. The No Build Alternative is not

[1] The Elliott Bay Seawall, a historic property, is located along the eastern margin of the Seattle Terminal. Since the project is anticipated to commence after the Elliott Bay Seawall Project, it is anticipated that the seawall will have been demolished by the time the project commences.

likely to result in any temporary direct or indirect impacts to historic, cultural or archaeological resources.

Exhibit 4-12 Previously Recorded Resources in the APE

ID	Resource Name	Resource Type	Description	NRHP Status	Author and Date
1	Fire Station No. 5	Historic Building	Modern fire station constructed in 1963.	NRHP eligible	Sheridan 2009
2	Elliott Bay / Alaskan Way Seawall	Historic Structure	Waterfront seawall, slated for replacement in 2016.	NRHP eligible	Sheridan 2009
3	Pioneer Square Preservation District	Local Historic District	Local preservation district governed by a preservation board.	N/A City of Seattle Landmark District	N/A
4	Pier 52/53 (Colman Dock)	Historic Building/ Structure	Ferry terminal building and dock built in 1966.	Not NRHP eligible	Durio 2004
5	Colman Dock	Archaeological Site	Built during the late-nineteenth century for shipping and later used for ferry traffic. The dock was built, rebuilt, and added to in several stages between 1882 and the present.	Not NRHP eligible	Corley 1969; Durio 2004
6	Seattle Steam Heat and Power Company Saltwater Suction Pipes	Historic Object	Twenty-four (24)-inch cast-iron pipes used to supply saltwater to the Steam Heat and Power Company and for fire prevention.	Not NRHP eligible	Schwab 2010
7	Yesler's Wharf and Decatur Anchorage Site	Archaeological Site & Other - Maritime	Built in 1854, Yesler's Wharf included a sawmill, cookhouse, and meeting hall. The wharf was destroyed during the great fire of 1889. The 117-foot sloop Decatur was anchored off Yesler's Wharf during the winter of 1855-1856 before it returned to duty off of South America.	Not NRHP eligible	Corley 1969
8	Site 45-KI-1012	Archaeological Site	A large mound of boulders and cobbles interspersed with timbers and remnant pilings with historic debris scatter.	Not NRHP eligible	Roberts 2011a; 2011b; SWCA 2012 ESA 2013; Marcotte and Johnson 2013a
9	Site 45-KI-1013	Archaeological Site	A historic debris scatter consisting of several concentrations of intact and broken bottles and ceramics with occasional modern trash.	Not NRHP eligible	Roberts 2011a; 2011c; SWCA 2012 ESA 2013; Marcotte and Johnson 2013a
10	Washington Street Boat Landing	Historic Structure	Galvanized iron shelter constructed in 1920.	NRHP Listed; also within the Pioneer Square Preservation District	Listed in 1973

4.7.4.2 Build Alternative

Fire Station No. 5

Fire Station No. 5 is located directly adjacent to the areas of proposed ground disturbance, so a model was developed to assess potential structural damage from vibrations, based on FTA (Hanson et al. 2006) and California Department of Transportation (Jones & Stokes 2004) guidance. The model determined how far vibrations from construction activities would spread before dropping below the FTA criteria threshold, which is a peak particle velocity (PPV) of 0.5 inches per second.

The model shows that Fire Station No. 5 may experience vibration effects during construction. This building is immediately adjacent to the northwest corner of the timber trestle slated for demolition during Phase 4 of the project. Current plans are to remove the timber piles in this area by vibrating them out. Fire Station No. 5 was built in 1963, and is of steel and concrete construction, which makes it vibration-sensitive at the 0.5 PPV criterion level. The modeled results show that pile driving activities would not drop below the 0.5 PPV thresholds until the vibrations have spread almost 12 feet through the muddy, sandy soil that supports these piles. For additional information on noise and vibration effects, see Section 4.3.4.3 of this EA.

Construction-related vibration effects would not be considered adverse unless they diminished an aspect of integrity that makes the building eligible for listing in the NRHP. FTA and WSDOT would avoid any adverse effect by cutting rather than vibrating out all piles within 35 feet of the fire station, by implementing BMPs before construction or demolition activities, and by monitoring the building for higher than expected vibration levels. If the monitored vibrations for pile removal beyond 35 feet approach the 0.5 PPV threshold, WSDOT would implement measures to protect the structure. DAHP has concurred that project effects on the fire station are not likely to be adverse (DAHP, 2013).

Elliott Bay Seawall

The Seattle Ferry Terminal Project is scheduled to begin construction after the Elliott Bay Seawall Project has completed seawall replacement in the vicinity of the ferry terminal. Therefore, although the Elliott Bay Seawall is eligible for listing in the NRHP and is located in the APE, the seawall is anticipated to have been demolished prior to construction of this project. Thus, this project would have no impact on that historic property.

Pioneer Square Preservation District

Although not a historic property, the Pioneer Square Preservation District is a City of Seattle landmark district, and effects from the project are considered as part of this analysis. A very small portion of the local landmark district is located in the APE, but the district as a whole would not be affected. Pursuant to SMC 23.66.030, the Pioneer Square Preservation Board reviews all proposed new uses, changes of use, or expansions of use in the district. No physical change to or use of any part of the district is expected during construction or operation of the project. No significant indirect effects during construction, including significantly increased traffic or closures, are anticipated.

Washington Street Boat Landing

The Washington Street Boat Landing was listed in the NRHP in 1973, and is also within the City of Seattle Pioneer Square Preservation District. The structure will be removed from its current location during construction of the Elliott Bay Seawall Project. It is anticipated that the structure will be reinstalled at or near its current location. The Seattle Ferry Terminal project is not anticipated to adversely affect the Washington Street Boat Landing, as described in Section 4.3.4 above. DAHP has concurred with this finding (DAHP, 2013).

4.7.4.3 Unanticipated Discovery

An Unanticipated Discovery Plan will be prepared for the project prior to construction. This plan will specify measures to be taken in the event of an inadvertent or unanticipated discovery of cultural or archaeological resources during construction. Unanticipated discoveries could occur during excavation of fill material behind the retaining wall at the northeast corner of the site or during installation of hollow casings for the drilled shafts, for example.

4.7.5 Long Term Impacts

4.7.5.1 No Build Alternative

Operation of the Seattle Ferry Terminal under the No Build Alternative would continue under the current conditions. With no changes in operation, no long-term impacts to historic, cultural or archaeological resources are expected.

4.7.5.2 Build Alternative

Operation of the Seattle Ferry Terminal after Build Alternative construction is complete is not expected to have any impacts on historic, cultural or archaeological resources, as activities would be generally the same as under the existing conditions.

4.7.6 Mitigation

FTA and FHWA determined that the project would have no adverse effects to historic properties. DAHP concurred with this finding on December 18, 2013 (DAHP, 2013). No tribes or consulting parties have objected to this effect determination.

FTA and WSDOT would avoid any adverse effects to Fire Station No. 5 by cutting piles rather than vibrating them out within 35 feet of the fire station, by implementing BMPs and monitoring the building for any unanticipated vibratory levels beyond 35 feet, and by taking other appropriate measures to protect the building from any damage during Phase IV of construction. See also Section 4.3.6 of this EA for additional noise and vibration mitigation.

4.8 Transportation

WSF plays a vital transportation role in the Puget Sound area. As a transportation service provider, the system carried nearly 23 million riders in 2009 and was the second largest transit system in Washington. As a marine highway, ferry routes are extensions of the state highway system and are essential to the transportation network in the State of Washington.

The Seattle Ferry Terminal is one of 20 terminals in the WSF system. This terminal supports transportation across Puget Sound between downtown Seattle and the communities of Bremerton and Bainbridge Island. This section of the EA describes the potential direct and indirect transportation effects of the proposed project.

Information in this section is summarized from the *Transportation Discipline Report* (WSF, 2013k; Appendix C).

4.8.1 Transportation Study Area

The primary study area for the transportation analysis encompasses the project area and nearby transportation facilities related to or affected by Colman Dock. The study area is bounded by Colman Dock on the west, 1st Avenue on the east, the intersection of Alaskan Way/Madison Street on the north, and the intersection of Alaskan Way S./S. Jackson Street on the south, as shown in Exhibit 4-14.

4.8.2 Methodology

Information on existing conditions, such as roadway conditions and traffic volumes, were collected from available sources. Forecasts of future traffic volumes were prepared, and operations at nearby streets and intersections were estimated for construction phases and following construction. Finally, ways to minimize or eliminate potential impacts were assessed.

Information on roadway conditions, channelization, and traffic controls, as well as traffic volumes for pedestrians, bicycles, and vehicles, was collected to assess existing conditions. WSDOT's *Alaskan Way Viaduct Replacement Project (AWVRP) Final Environmental Impact Statement* (WSDOT et al. 2011) was the source for much of this existing information.

The AWVRP EIS was also used for information on traffic volumes projected to be using the study area in the years 2015 and 2020. The forecasting model uses assumptions for regional population and employment growth as defined in Puget Sound Regional Council's adopted regional plan, *Destination 2030: Metropolitan Transportation Plan for the Central Puget Sound Region* (PSRC, 2001). These data were most recently updated in 2006.

To estimate the year 2015 traffic volumes, the analysis assumes that the Alaskan Way Viaduct is still standing and the bored tunnel is not yet open to traffic. Traffic volumes for year 2020 were estimated by applying an annual growth rate to 2015 conditions. It is assumed that while general ridership is forecasted to increase in the future (mostly in the number of pedestrian passengers), sailing frequency and vessel capacity on the assigned routes for 2015 and 2020 would be the same as for 2012. That is, the number and type of vessels will not change. Because vehicle holding capacity on the terminal is not being expanded, and current peak hour vehicle volumes through the site are at capacity, peak hour traffic volumes forecasted to enter and exit the Seattle Ferry Terminal were assumed to be similar for both 2015 and 2020.

Traffic volumes were forecasted for the weekday PM peak hour of 5:00 to 6:00 p.m. This peak hour corresponds to the hour-long period in the evening when overall traffic volumes and travel demand are at their highest levels. Generally, traffic volumes are at similar levels at other times during the evening commute period as well. Therefore, peak hour results are largely representative of travel conditions anytime between 4:00 and 6:00 p.m. The typical peak hour condition used in the analysis represents the 30th busiest day of the year, and so is intended to be a conservative assumption (i.e., it represents a worse condition than the "average" PM peak hour).

Seven signalized intersections along Alaskan Way were analyzed to determine intersection level of service (LOS) and delay:

1. Madison Street and Alaskan Way
2. Marion Street and Alaskan Way
3. Columbia Street and Alaskan Way
4. Yesler Way and Alaskan Way
5. S. Washington Street and Alaskan Way (pedestrian signal)
6. S. Main Street and Alaskan Way
7. S. Jackson Street and Alaskan Way

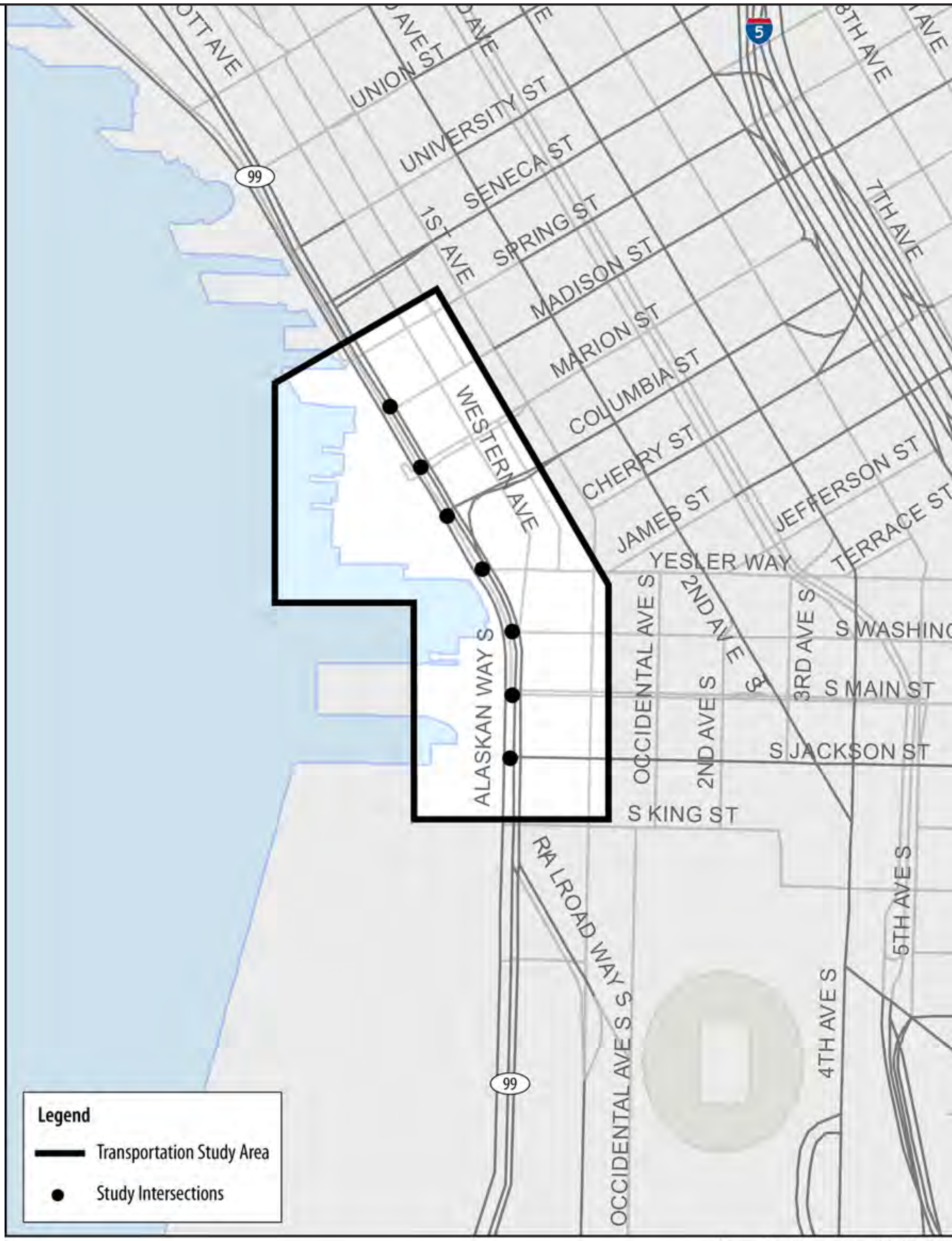
The traffic model used for the analysis estimates travel speeds, intersection delays, and queues, which are then used to assess levels of service (LOS) at the study intersections. Intersection LOS is based on the average delay per vehicle and is categorized as shown in Exhibit 4-13.

Exhibit 4-13 Level of Service Designations for Signalized Intersections

LOS for Signalized Intersections	Average Vehicle Delay (seconds)	Description
A	0 to 10	Little or no delay
B	>10 to 20	Short delays
C	>20 to 35	Moderate delays
D	>35 to 55	Long delays
E	>55 to 80	Very long delays
F	>80	Failure – extreme congestion

A queue spillback occurs in an area where vehicles cannot proceed through an intersection because the vehicles ahead are backed up from the next intersection. Queue spillbacks along Alaskan Way can occur during times when demand on Colman Dock is high. Queue spillbacks are identified for this project through results of the VISSIM simulation analysis.

The vehicle holding on Colman Dock and the loading and unloading of vehicles to the ferry vessels were replicated in the analysis to determine whether an adequate amount of holding is available to accommodate the typical weekday ferry traffic.



Basemap Data Source: City of Seattle, 2009

0 0.25
Miles

Washington State Ferries

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

N

Washington State Department of Transportation

SOURCE: City of Seattle, 2009

Exhibit 4-14

Transportation Study Area

Seattle Terminal Project

Seattle, Washington

FILE NAME:Ex04-14_ TransStudyArea.ai / CREATED BY: JAC/ DATE LAST UPDATED: 11/05/13

Travel forecasts were prepared for the construction phase of the Build Alternative that is expected to be most disruptive (Phase 4). Travel disruption during other construction phases is described in relation to this modeled phase.

4.8.3 Affected Environment

For this EA, the year 2015 was chosen to reflect the affected environment as this is the year construction is expected to begin on the project. Several projects near the study area are currently under construction but would be completed, or substantially completed, by then. The Alaskan Way Viaduct Replacement Project would be substantially complete by 2015. The bored tunnel is expected to be completed by the end of 2015, although to estimate traffic volumes on Alaskan Way the analysis assumed that the tunnel would not yet be open for traffic in 2015, when construction of the Seattle Ferry Terminal Project begins. Also in 2015, the existing viaduct would still be standing, with detours in place. In addition, construction of the Elliott Bay Seawall will be finishing in mid-2016. These projects would result in modified traffic patterns in the study area at the time that Seattle Ferry Terminal Project construction begins, and so need to be captured as part of the affected environment. Therefore, it was determined that 2015 would serve as a better description of the project setting in the EA than 2012 conditions, except where noted that only information for 2012 was available. When the tunnel opens, and seawall construction and viaduct demolition are completed, detours will be removed and traffic patterns would return to conditions that existed prior to tunnel and seawall construction and AWV demolition.

4.8.3.1 Ferry Service

The Seattle Ferry Terminal is the Seattle terminus for the Washington State Ferries service for Bainbridge Island and Bremerton routes, as well as for King County's passenger-only service from Vashon Island and from West Seattle. Vehicle access to Colman Dock is provided from Alaskan Way at Yesler Way, and exits are provided to Alaskan Way at Yesler Way and Marion Street.

The King County Ferry District currently operates passenger-only ferry service from Pier 50 through a lease with WSDOT. This water taxi service operates between Pier 50 and West Seattle, and between Pier 50 and Vashon Island. The passenger-only boats for both routes can accommodate 150 passengers and currently operate year round. In October 2012, the King County Ferry District announced plans to build two new boats. The new vessels are expected to hold between 225 and 250 passengers each and would replace the over 20-year old leased vessels currently in use. Delivery of the new vessels is anticipated in mid-2014.

The arterial intersection analysis estimates that 435 vehicles exit Colman Dock and 550 vehicles arrive at Colman Dock during the PM peak hour under 2015 conditions. Because these volumes represent a typical traffic day, there are days throughout the year when higher volumes occur. Vehicles enter Colman Dock from Alaskan Way northbound at Yesler Way using a signalized left turn. Prior to tunnel construction and AWV demolition work, right turns into the terminal from southbound Alaskan Way were prohibited during peak commuting periods except for registered carpools; these conditions will apply again after the viaduct is demolished. Vehicles pass through a toll area that has four booths and capacity for 35 queued vehicles. They then proceed to holding lanes that can accommodate approximately 596 passenger vehicles. Queued vehicles are directed from there onto the ferries.

Vehicles leave Colman Dock at two exits: Yesler Way and Marion Street.

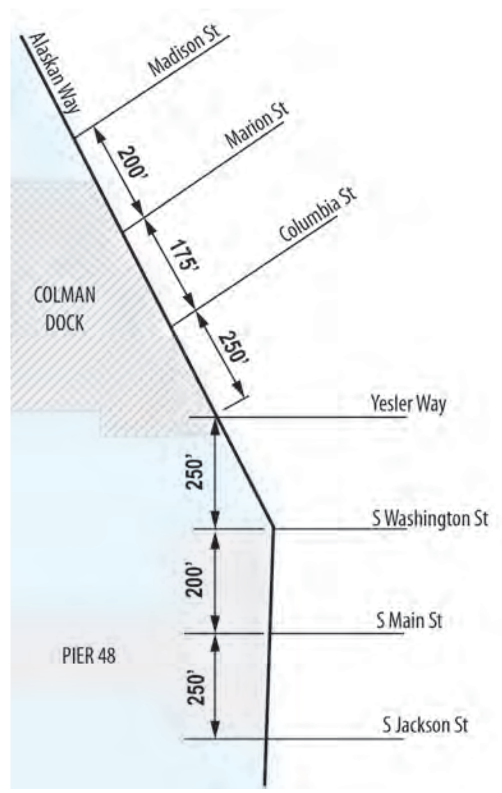
The majority of foot passengers arriving at or departing from Colman Dock use the Bainbridge Island route. Loading and unloading occurs at the upper level of Colman Dock, from which pedestrians use the Marion Street Overpass, a direct walkway above Alaskan Way that connects to Marion Street at First Avenue. Passengers can also enter and exit at Alaskan Way, where they can catch a bus or cross Alaskan Way. Signalized crosswalks crossing Alaskan Way are located at Marion Street, Columbia Street, and Yesler Way.

4.8.3.2 Traffic Operations

Traffic operations for 2015 conditions were assessed for LOS and delay. Intersections in the study area are expected to operate at LOS C or better during the 2015 PM peak hour.

Queues for the year 2015 conditions were also assessed. Exhibit 4-15 illustrates the predicted average queue lengths, in feet, along Alaskan Way. To capture queues that may be related to Colman Dock, northbound queues are reported for intersections from Yesler Way south, and southbound queues are reported for intersections north of Yesler Way.

Available queuing distance between intersections



Average peak hour queue lengths are not expected to cause spillback to adjacent intersections. However, at times during the peak hour, modeling showed that queues along both northbound and southbound Alaskan Way would spill back to adjacent intersections. At the intersection of Alaskan Way at Yesler Way, the high PM peak hour volumes in the single northbound left turn used by vehicles entering Colman Dock spill back beyond the adjacent intersection. This spillback is caused by left turning delay, not queue spillback from the ferry terminal. Analysis shows that the on-dock ferry holding lanes would accommodate the typical weekday peak hour volume of traffic.

The Seattle Department of Transportation (SDOT) released the Elliott Bay Seawall Supplemental Draft Environmental Impact Statement (SDEIS) in December 2013. In its construction planning for the seawall, SDOT anticipates changes to the detour pattern along Alaskan Way. Ferry queuing would switch from the current south-bound detour approach on Alaskan Way to a northbound approach as soon as the summer of 2014 (SDEIS, p. 2-9). This change would relocate the ferry-queuing spaces on Alaskan Way to an area outside of the active seawall construction zone, and could provide more queuing space than the previous detour plan, while the Alaskan Way-S. Jackson Street intersection would become more congested as a result of this revision (SDEIS, p. 2-15 and 3-5). SDOT and WSDOT have met regularly to coordinate this dynamic and complex construction activity, and continued close coordination will be an important component of successful completion for each.

Exhibit 4-15 Average PM Peak Hour Queues – 2015 Conditions

Street	Cross Street	2015 Conditions	
		Direction	Average Queue (feet)
Alaskan Way S.	S. Jackson St	NB through	405
Alaskan Way S.	S. Main St	NB through	125
Alaskan Way S.	S. Washington St	NB through	125
Alaskan Way S.	Yesler Way	NB through NB left SB through	40 185 40
Alaskan Way	Columbia St	SB through	10
Alaskan Way	Marion St	SB through	45
Alaskan Way	Madison St	SB through	20

4.8.3.3 Pedestrian

Pedestrian traffic conditions for 2015 were analyzed. Data from WSF show that overall foot passenger volumes are typically higher during summer than during fall and winter. Unlike overall pedestrian volumes in the downtown area, which are generally associated with typical workday activities and tend to peak during the weekday PM peak hour, pedestrian volumes along the downtown waterfront tend to peak during the weekend PM peak hour in summer.

Several inefficiencies at the current terminal complicate connections for pedestrians. The existing stairs from Alaskan Way up to the existing terminal, just north of Marion Street, are too narrow for current pedestrian demand. North of the Marion Street exit lanes, there is no pedestrian access at the terminal building level that is compliant with the Americans with Disabilities Act (ADA). The existing ramp from the second level of the main terminal building to Alaskan Way does not meet ADA standards. However, WSF does provide elevators to the terminal from the street level.

As a result of these inadequacies, all passengers with disabilities, luggage, or baby strollers who wish to travel north along Alaskan Way must first use the existing elevators or interior building ramp to reach Alaskan Way and wait while the ferry traffic exits at Marion Street until the traffic signal indicates they are able to cross. These conditions increase the potential for pedestrian-vehicular conflicts. During times when there is no offloading at Marion, pedestrians can usually cross with no conflicts.

4.8.3.4 Transit Service

King County Metro operates two routes along Alaskan Way in the study area, Route 16 and Route 66, both of which serve Colman Dock. They also provide bus service on the Route 99 Waterfront Streetcar Line. Route 99 does not directly serve Colman Dock. The closest stop to Colman Dock is at Alaskan Way/Spring Street. A substantial volume of vanpools from various transit agencies access downtown Seattle via WSF routes serving Bainbridge Island and Bremerton.

4.8.3.5 Event Traffic

Similar to conditions today, traffic levels near the stadiums are expected to intensify before and after events at Safeco Field and Century Link Field for 2015 conditions. Typical travel patterns would change as patrons search for parking, and pedestrian activity increases. As a result, local traffic conditions would be much more congested before and after events compared to typical, non-event conditions. Current estimates that indicate that between 15,000 and 20,000 additional vehicles, beyond background traffic levels, enter and exit the stadium area for a typical Seahawks game. This increase would carry over to the 2015 conditions.

Explicit detour routing and comprehensive traffic control measures would likely continue to be used on First Avenue S. and critical east-west arterials (e.g., S. Royal Brougham Way and S. Atlantic Street) for large events at Safeco Field and Century Link Field such as Seahawks and Mariners games and Sounders matches. These measures commonly include police-based traffic management commissioned and funded by the stadiums and required by the City for approval of the stadiums' traffic management plan.

4.8.4 Construction Impacts

4.8.4.1 No Build Alternative

Construction activities under the No Build Alternative would be related to WSF's ongoing inspection and maintenance program. Although maintenance repairs occasionally reduce vehicle holding space or close holding lanes, these repairs are much shorter term than the Build Alternative's six-year construction schedule, and construction-related impacts to transportation for the No Build Alternative are assumed to be minimal. However, effects from actions under the No Build Alternative would continue throughout the life of the facility.

4.8.4.2 Build Alternative

Because of the dynamic nature of construction activities, the transportation effects would vary according to the construction stage. As noted above in the Methodology section, the analysis of construction impacts is focused on construction Phase 4, which is expected to be the most disruptive, primarily because it is the phase during which the lowest vehicle holding capacity is available on Colman Dock. However, WSDOT plans to phase construction to keep ferries operating on their normal schedule as much as possible. Throughout the construction period, only two of the three slips would be operational at a time. The slip assignments would shift as the construction activities progress. There is the potential for ferry loading to take longer during peak travel times (such as holidays) when the holding lanes are restricted on Colman Dock, which could indirectly cause schedule delays.

To assess future conditions, the analysis assumed that Phase 4 conditions would occur in the year 2020. In 2020, the analysis assumed that the Alaskan Way Viaduct would be removed and the new bored tunnel would be in operation. More volumes were assumed for Alaskan Way. Exhibit 4-16 compares transportation elements of the four phases of construction to existing conditions and the Build Alternative.

Exhibit 4-16 Construction Activities and Approximate Durations by Phase

Phase	Vehicle Holding	Pedestrian Entrances	Exit Lanes	Slips Available	Duration of Construction
Existing Conditions	596	5	Marion St = 2 Yesler Way = 2	1, 2, 3	N/A
Phase 1	636	5	Marion St = 2 Yesler Way = 2	1, 2	12 months
Phase 2	542	5	Marion St = 2 Yesler Way = 2	2, 3	28 months
Phase 3	569	3	Marion St = 2 Yesler Way = 2	1, 3	24 months
Phase 4	498	3	Marion St = 2 Yesler Way = 2	1, 2	25 months
Full Build Out	611	4	Marion St = 2 Yesler Way = 2	1, 2, 3	N/A

Ferry Service

Ferry service would not change during construction compared to existing conditions. The same number of routes, at the same frequencies, would be provided.

Level of Service

Traffic operations during construction Phase 4 at signalized intersections in the study area were assessed to determine intersection LOS and average vehicle delay. Exhibit 4-17 presents traffic operations for study area intersections for the 2020 PM peak hour construction conditions. The operations at intersections to the south of the ferry terminal are anticipated to degrade from the 2020 No Build and Build Alternatives because of the reduced vehicle holding capacity on Colman Dock during Phase 4 construction. As a result, vehicles would be expected to spill back onto Alaskan Way and cause delays at study area intersections. All intersections in the study area except for Alaskan Way S. at Jackson Street and Alaskan Way at Madison Street are expected to operate at LOS D or better during the 2020 PM peak hour. The intersections of Alaskan Way S. at Jackson Street and Alaskan Way at Madison Street are anticipated to operate at LOS E and F, respectively, with high delay. The delay at Alaskan Way S. and Jackson Street is caused by spillback from vehicles making a northbound left-turn at Yesler Way onto Colman Dock. The delay at Alaskan Way and Madison Street is caused by spillback from the intersection of Alaskan Way at Marion Street in the southbound direction.

Exhibit 4-17 PM Peak Hour Level of Service – 2020 Construction Conditions

Street	Cross Street	2020 Conditions	
		LOS	Average Delay (seconds)
Alaskan Way S.	S. Jackson St	E	71
Alaskan Way S.	S. Main St	B	12
Alaskan Way S.	S. Washington St	A	10
Alaskan Way S.	Yesler Way	C	23
Alaskan Way	Columbia St	B	17
Alaskan Way	Marion St	B	20
Alaskan Way	Madison St	F	156

Queues

Exhibit 4-18 illustrates the predicted average queue lengths along Alaskan Way for 2020 conditions for No Build and for 2020 conditions during construction. Increases in queue lengths between 2015 and 2020 are expected with or without the project; these increases would be caused by the changed conditions along Alaskan Way (removal of the Alaskan Way Viaduct, including its ramps at Columbia and Seneca; operation of the new bored tunnel; and increased volumes on Alaskan Way). To capture queues that may be related to Colman Dock, northbound queues are reported for intersections from Yesler Way south, and southbound queues are reported for intersections north of Yesler Way.

Average peak hour queue lengths of nearly one-quarter mile are expected during construction at both S. Jackson Street in the northbound direction and Madison Street in the southbound direction. The additional queue lengths in the northbound directions are caused by a combination of signal delay and spillback from Colman Dock queuing on Alaskan Way. The additional queue lengths in the southbound direction are caused by signal delay for vehicles making the left turn from Alaskan Way onto Marion Street.

Exhibit 4-18 Average PM Peak Hour Queues – 2020 Conditions

Street	Cross Street	Direction	Distance to Next Intersection	2020 Average Queue (feet)	
				No Build	Constr. Ph. 4
Alaskan Way S.	S. Jackson St	NB through		930	1150
Alaskan Way S.	S. Main St	NB through	~ 250 feet	90	120
Alaskan Way S.	S. Washington St	NB through	~ 200 feet	115	140
Alaskan Way S.	Yesler Way	NB through NB left SB through	~ 250 feet	90 120 75	100 150 75
Alaskan Way	Columbia St	SB through	~175 feet	70	75
Alaskan Way	Marion St	SB through	~200 feet	180	190
Alaskan Way	Madison St	SB through	~225 feet	1310	1300

Pedestrians and Bicycles

During Phase 4, pedestrian entrances would be provided at stairs, escalators and elevators along Alaskan Way, as well as the overhead pedestrian bridge that crosses Marion Street. In addition to the new walkway from Alaskan Way to the passenger-only facility that would open during Phase 4, the overhead walkway from the new terminal building to the passenger-only terminal would also be in place. The overhead pedestrian bridge on Alaskan Way that crosses the Marion Street entrance, owned by the City of Seattle, would also be available during Phase 4 construction. Although expected to be removed during demolition of the viaduct, the City plans to replace the pedestrian bridge. There would likely be some temporary closures of the bridge during construction of the new terminal facilities. Pedestrian loading of vessels is expected to remain similar to 2015 conditions, with passengers accessing vessels via overhead loading.

What are "sharrows"?

Shared lane pavement markings, or "sharrows," are placed to guide bicyclists where to ride on the road and remind drivers to share the road. Unlike bicycle lanes, sharrows do not designate a lane for exclusive use by bicyclists.

Bicycles would continue to access the tollbooth via the travel lane marked with sharrows. The existing bicycle lane on the south side of Colman Dock would be maintained during construction (see Figure 4-20).

Transit Service and Connections

King County Metro has no current plans to increase bus service to Colman Dock in the future. Therefore, bus service to Colman Dock is expected to remain the same as the existing conditions for the Build Alternative. The Build Alternative would improve access and connections between the ferry terminal and buses, improve pedestrian and ADA access, add a new elevator, and provide for coordination with King County Metro on any future changes in Metro's bus service.

Event Traffic

Based on existing Safeco Field patronage counts, up to 47,000 attendees can be expected for a full-house baseball event, which may translate to roughly 14,000 additional vehicles on local arterials and regional facilities. Seahawks games, although typically held on Sundays, draw even larger crowds and result in greater levels of traffic demand. While a portion of the patrons for both types of events travel via ferry or public transit (5,000 to 7,000 persons), with some growth in these modes projected in the future, the majority of these event-goers are likely to continue to travel via private vehicle and/or carpool.

Construction activity on Colman Dock would include reduced vehicle capacity on Colman Dock, resulting in longer queues and wait times during large events when demand increases. The need for general traffic management for all transportation modes before and after events would continue throughout the construction period.

4.8.5 Long-Term Impacts

4.8.5.1 No Build Alternative

The No Build Alternative could have permanent adverse effects on traffic in the area. Planned changes to the transportation system within the study area would occur through the completion of other projects, but would not change the circulation patterns within the Seattle Ferry Terminal facility. The No Build Alternative would continue WSF's ongoing inspection and maintenance program beyond 2020. Although maintenance repairs occasionally reduce vehicle holding space or close holding lanes, these repairs are short-term. In the longer term, potential load restrictions or permanent closures of sections of the dock could reduce vehicle holding capacity substantially, and cause queue impacts on Alaskan Way. Reduced holding capacity could also have the indirect effect of interfering with on-time sailing schedules over time.

The Seattle Ferry Terminal serves 68 percent of the entire WSF system's foot passengers (4.2 million passengers at Colman Dock in 2010). The WSF Long-Range Plan forecasts walk-on ridership to grow by 31 percent on the Bainbridge Island route and 20 percent on the Bremerton route by 2030. The existing pedestrian inefficiencies would become even more apparent, and potentially unsafe, under the No Build Alternative. It is expected that some pedestrians (such as disabled passengers, those with luggage or with strollers) would continue to have to cross at-grade at the Marion Street exit because of inefficiencies in pedestrian access at this location.

Traffic volumes between the No Build and Build Alternatives are expected to be the same, as no changes in ferry service are proposed as part of the project. However, if the project is not constructed, it is likely that storage capacity under the No Build Alternative would be reduced on the existing dock over time because of safety concerns. Therefore, the queues shown in the resulting analysis would be longer under the No Build Alternative, compared to the Build Alternative.

Queue lengths along Alaskan Way following construction are expected to be the same with or without the project. However, under the No Build Alternative, portions of the terminal may over time face weight restrictions for safety reasons, and possible closure, because of structural deficiencies. This would reduce vehicle holding capacity on Colman Dock, resulting in longer queues along Alaskan Way for the No Build Alternative compared to the Build Alternative.

4.8.5.2 Build Alternative

Level of Service and Queues

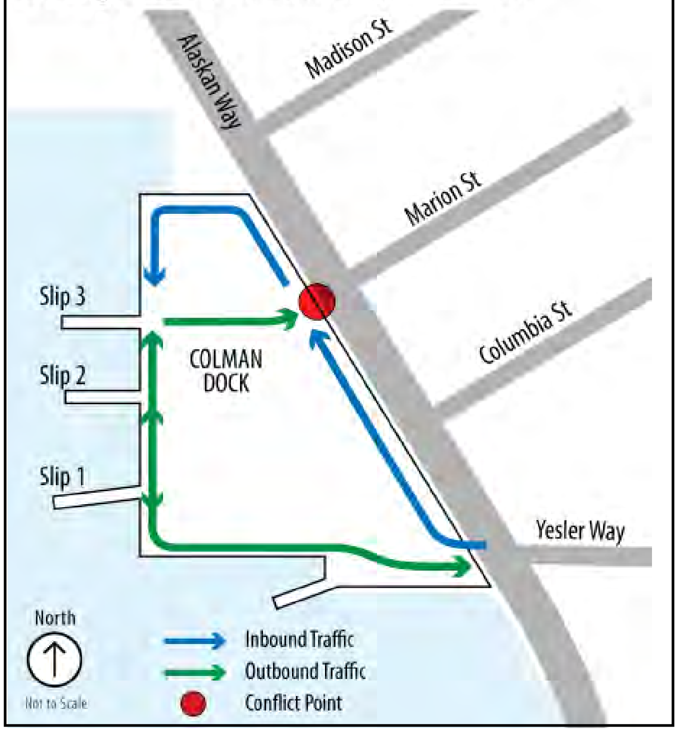
Ferry service provided by WSF is expected to remain unchanged from existing conditions. The number of routes, type of vessel, and frequency of service are all expected to be the same between the Build Alternative and the No Build Alternative.

To improve the safety and operational efficiency of Colman Dock, the Build Alternative would relocate the vehicle holding area north of the Marion Street exit to the new south portion of the terminal, thereby eliminating the existing vehicle conflict point near the Marion Street exit. This change on the dock requires the passenger-only ferry service located at Pier 50 to be relocated from its current location in the southeast corner of the trestle to a new location in the southwest corner of the trestle. The current and proposed vehicle circulation patterns are shown in Exhibit 4-19, while Exhibit 4-20 shows pedestrian and bicycle circulation.

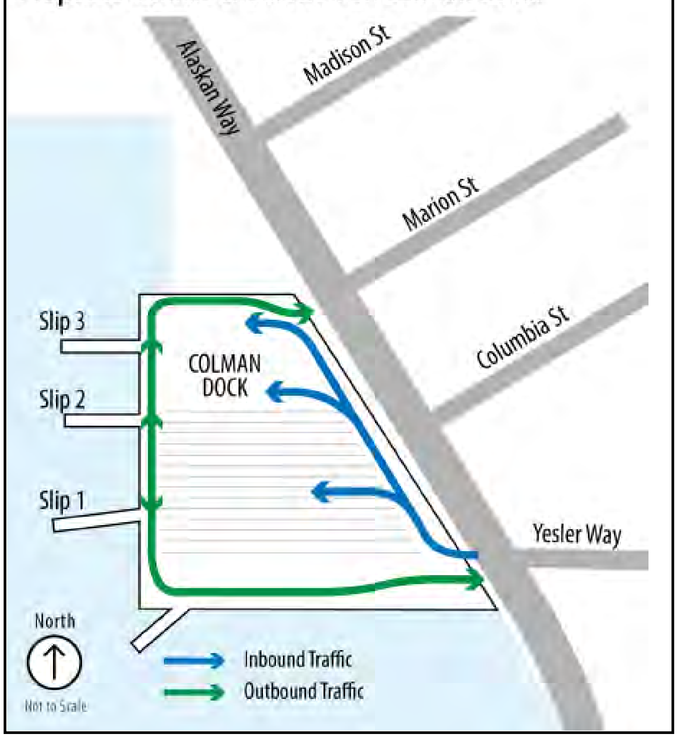
As there are no changes in traffic volumes or channelization along Alaskan Way proposed as part of the project, traffic operations results for 2020 are expected to be the same for the No Build and Build Alternatives.

Exhibit 4-21 presents traffic operations for study area intersections in the 2020 PM peak hour for the No Build and Build Alternatives. All intersections in the study area except for Alaskan Way at Madison Street are expected to operate at LOS D or better during the 2020 PM peak hour.

Existing vehicle circulation on Colman Dock.



Proposed vehicle circulation on Colman Dock.



Washington State Ferries

Washington State Department of Transportation

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SOURCE: City of Seattle, 2009

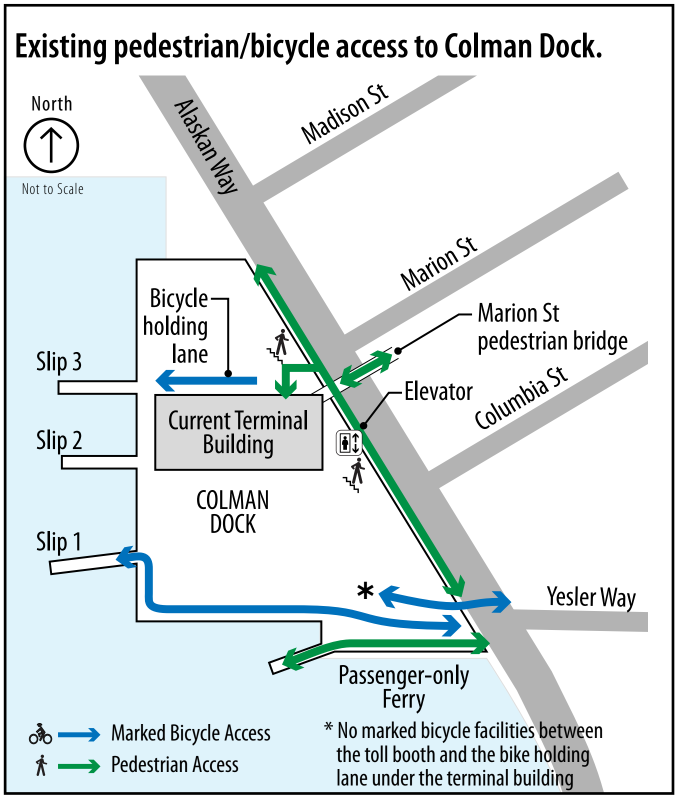
Exhibit 4-19

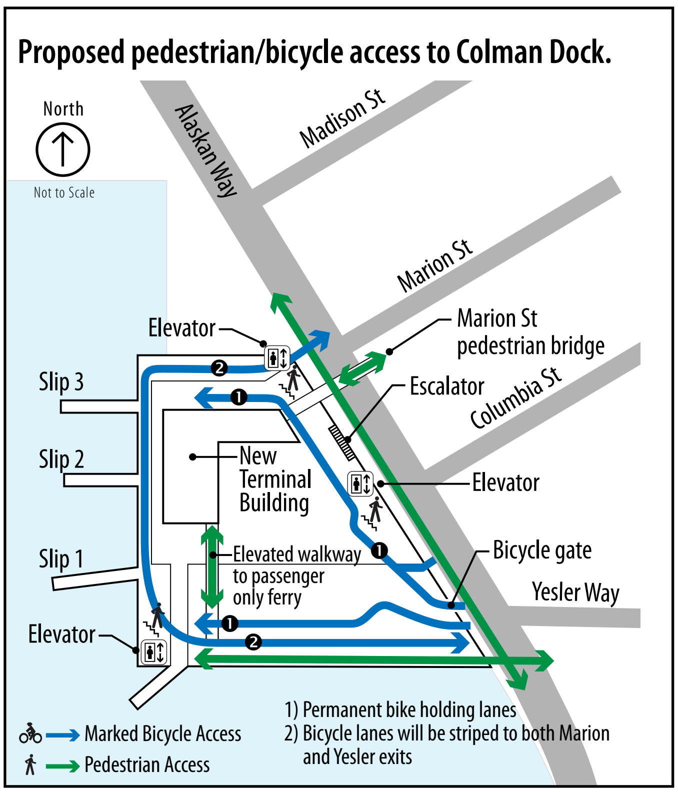
Existing and Proposed Vehicle Circulation

Seattle Terminal Project

Seattle, Washington

FILE NAME:Ex04-19_VehicleCirc.ai / CREATED BY: JAC/ DATE LAST UPDATED: 10/31/13





Washington State Ferries

Department of Transportation · United States of America

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Washington State Department of Transportation

SOURCE: City of Seattle, 2009

Exhibit 4-20

Existing and Proposed Pedestrian and Bicycle Circulation

Seattle Terminal Project

Seattle, Washington

FILE NAME:Ex04-19_BikePedCirc.ai / CREATED BY: JAC/ DATE LAST UPDATED: 01/13/14

Exhibit 4-21 PM Peak Hour Level of Service – 2020 Operational Conditions

Street	Cross Street	2020 No Build and Build Alternatives	
		LOS	Average Delay (seconds)
Alaskan Way S.	S. Jackson St	D	50
Alaskan Way S.	S. Main St	A	10
Alaskan Way S.	S. Washington St	A	8
Alaskan Way S.	Yesler Way	C	21
Alaskan Way	Columbia St	B	15
Alaskan Way	Marion St	B	19
Alaskan Way	Madison St	F	149

Pedestrian facilities and connections
As part of the Build Alternative, new elevators would be constructed north of the Marion Street exit on Alaskan Way to improve pedestrian safety and reduce potential conflicts between pedestrians and vehicles. Wider stairs designed to meet future pedestrian demand would be adjacent to the new elevators, and both the elevators and stairs would connect to the new terminal with a new elevated walkway. All pedestrian facilities would be designed to current codes and regulations, including ADA compliance.

In addition, improvements would be made to the pedestrian bridge over the Marion Street exit as part of the AWV project. These improvements would likely increase the volume of pedestrians who use the bridge and reduce pedestrian volumes crossing the Marion Street exit at Alaskan Way.

The new OHL facility at Slip 3 would be designed to accommodate the increased pedestrian volumes forecasted by the Long Range Plan for 2030 conditions at service levels matching those provided today, as well as to meet ADA standards.

Improvements would also be made to passenger-only ferry facility as part of the Build Alternative. In addition to an at-grade connection to Alaskan Way, the new facility would be connected to the future terminal building and the Marion Street pedestrian bridge by an overhead walkway in order to reduce the potential for pedestrian and vehicle conflict.

Bicycle Access
A new designated lane for bicycle riders is proposed for the Build Alternative. The dedicated lane provides a consistent and predictable location for bicycle travel; with bicycles moving in the dedicated lane, parallel to the vehicles being staged in adjacent lanes, the overall safety of the bicyclists would be improved and vehicle drivers would become more aware of the flow and staging requirements for the

bikes. Exiting bicycle lanes would be striped to both the Yesler and Marion exits. The bicycle storage area would be replaced near the stairs/elevator.

Safety

The Build Alternative is expected to improve pedestrian safety and reduce potential conflicts between pedestrians and vehicles, as described in the pedestrian section above. Safety under the Build Alternative would also be improved by eliminating the existing on-dock conflict point that currently exists between traffic offloading at Marion Street and traffic entering the holding lanes north of Marion.

Event Traffic

By the year 2020, sporting and other major events at Safeco Field and Qwest Field would likely continue to draw large crowds and result in high concentrations of traffic movements into and out of the stadium area before and after events. Vehicle and pedestrian-related congestion associated with such events would be managed in a manner similar to current practices in terms of detours, traffic control, and turning movement restrictions.

4.8.6 Mitigation

4.8.6.1 Build Alternative – Phase 4

Proposed mitigation for queuing impacts during Phase 4 of construction would include active management of the holding lanes and vehicle holding. This strategy would use on-site attendants to guide vehicles onto the dock to reduce the space between parked vehicles. Based on similar strategies that have been implemented during other major construction projects like the AWVRP, it is expected that the proposed mitigation for this project would increase the vehicle holding capacity during Phase 4 construction from 498 to 584 vehicles, similar to existing conditions. This mitigation would have an effect on the intersection level of service and intersection queues as shown below.

Level of Service

Exhibit 4-22 presents traffic operations for study area intersections for the 2020 PM peak hour construction with mitigation conditions. Intersection LOS and delay were evaluated to confirm that the proposed mitigation scenario shows operations similar to 2020 No Build and Build Alternatives. All intersections in the study area except for Alaskan Way at Madison Street are expected to operate at LOS D or better during the 2020 Phase 4 PM peak hour. The intersection of Alaskan Way at Madison Street is anticipated to operate at LOS F with high delay. This delay is caused by spillback from the intersection of Alaskan Way at Marion Street in the southbound direction, as vehicles wait for northbound traffic to clear before turning left (uphill).

Exhibit 4-22 PM Peak Hour Level of Service – 2020 Construction Conditions with Mitigation

Street	Cross Street	2020 Construction with Mitigation		Change in Delay with Mitigation (seconds)
		LOS	Average Delay (seconds)	
Alaskan Way S.	S. Jackson St	D	51	-20
Alaskan Way S.	S. Main St	B	10	-2
Alaskan Way S.	S. Washington St	A	8	-2
Alaskan Way S.	Yesler Way	C	22	-1
Alaskan Way	Columbia St	B	17	-3
Alaskan Way	Marion St	B	20	-0
Alaskan Way	Madison St	F	166	+10

Queues

Exhibit 4-23 illustrates the predicted average queue lengths along Alaskan Way. To capture queues that may be related to Colman Dock, northbound queues are reported for intersections from Yesler Way south, and southbound queues are reported for intersections north of Yesler Way.

With mitigation to increase holding capacity on Colman Dock, queue lengths along Alaskan Way are generally reduced. However, similar to the conditions expected after construction for both the 2020 No Build and Build Alternatives, average peak hour queue lengths of one-quarter mile or more during construction are expected at both S. Jackson Street in the northbound direction and at Madison Street in the southbound direction. Analysis shows that average PM peak hour queues during Phase 4 construction with mitigation are expected to be very similar to post-construction (2020) conditions, with or without the project.

Exhibit 4-23 Average PM Peak Hour Queues – 2020 Construction with Mitigation Conditions

Street	Cross Street	Direction	Distance to Next Intersection	2020 Construction with Mitigation Average Queue (feet)	Change in Queue with Mitigation (feet)
Alaskan Way S.	S. Jackson St	NB through		930	-220
Alaskan Way S.	S. Main St	NB through	~ 250 feet	90	-30
Alaskan Way S.	S. Washington St	NB through	~ 200 feet	115	-5
Alaskan Way S.	Yesler Way	NB through NB left SB through	~ 250 feet	90 120 75	-10 -30 -0
Alaskan Way.	Columbia St	SB through	~175 feet	70	-5
Alaskan Way	Marion St	SB through	~200 feet	185	-5
Alaskan Way	Madison St	SB through	~225 feet	1325	+25

4.8.6.2 Build Alternative – Construction Mitigation, All Phases

To help minimize potential traffic effects during special events as well as days with the highest demand at Colman Dock, WSDOT would develop a construction traffic management plan that would include the following:

- Prepare a traffic management plan (TMP), designed to implement strategies for minimizing the work zone impacts of the project. The TMP will be developed after a contractor has been selected, and will include traffic operations and public information components. Examples of traffic operations components include travel demand management for construction workers, signage clearly indicating detour routes and alternatives, way-finding signage for pedestrians and bicycles, and plans for maintaining safe access for pedestrians and bicycles. Public information components will include details on coordination and communication, both before and during construction, with stakeholders and the general public.
- Continue ongoing coordination with the Alaskan Way Viaduct Replacement Project and the Elliott Bay Seawall Project to ensure that detour plans developed as part of these projects are consistent with other construction activities and provide adequate access to Colman Dock.
- In coordination with the Elliott Bay Seawall Project, develop strategies for the use of Alaskan Way to improve traffic operations during construction that can accommodate ferry-queuing during special events.
- Coordinate with the Alaskan Way Viaduct Replacement Project and the Elliott Bay Seawall Project to create a signing and way finding strategy to help travelers access Colman Dock that is consistent with other construction activities.
- Update the management plan developed as part of the Alaskan Way Viaduct Replacement Project to increase on-dock vehicle storage to help reduce queuing on Alaskan Way.
- Identify and incorporate the needs of and impacts on pedestrian and bicycle flow, including mitigation for sidewalk closures and requirements related to the ADA.
- Develop procedures for coordinating with stakeholders and the implementation of road and lane closures.
- Provide for incident and emergency response.
- Develop methods and frequency of inspection and maintenance of all traffic control throughout the project area.
- Identify the personnel available to respond 24 hours a day and the authority to make decisions and ensure that issues are addressed in a timely and appropriate manner.
- Develop procedures for incorporating the needs of event traffic, including coordination with Seattle Center, Safeco Field, and Century Link Field.
- Develop procedures for communicating with public information personnel and the public.

4.9 Land Use

This analysis looks at the project's consistency with state, regional, and local land use plans and development regulations. It compares how the Build Alternative and No Build Alternative would directly and indirectly affect current and planned land uses in the vicinity. This section also identifies mitigation measures that could minimize land use impacts during project construction.

Information in this section is summarized from the *Land Use Discipline Report* (WSF, 2013g).

4.9.1 Land Use Study Area

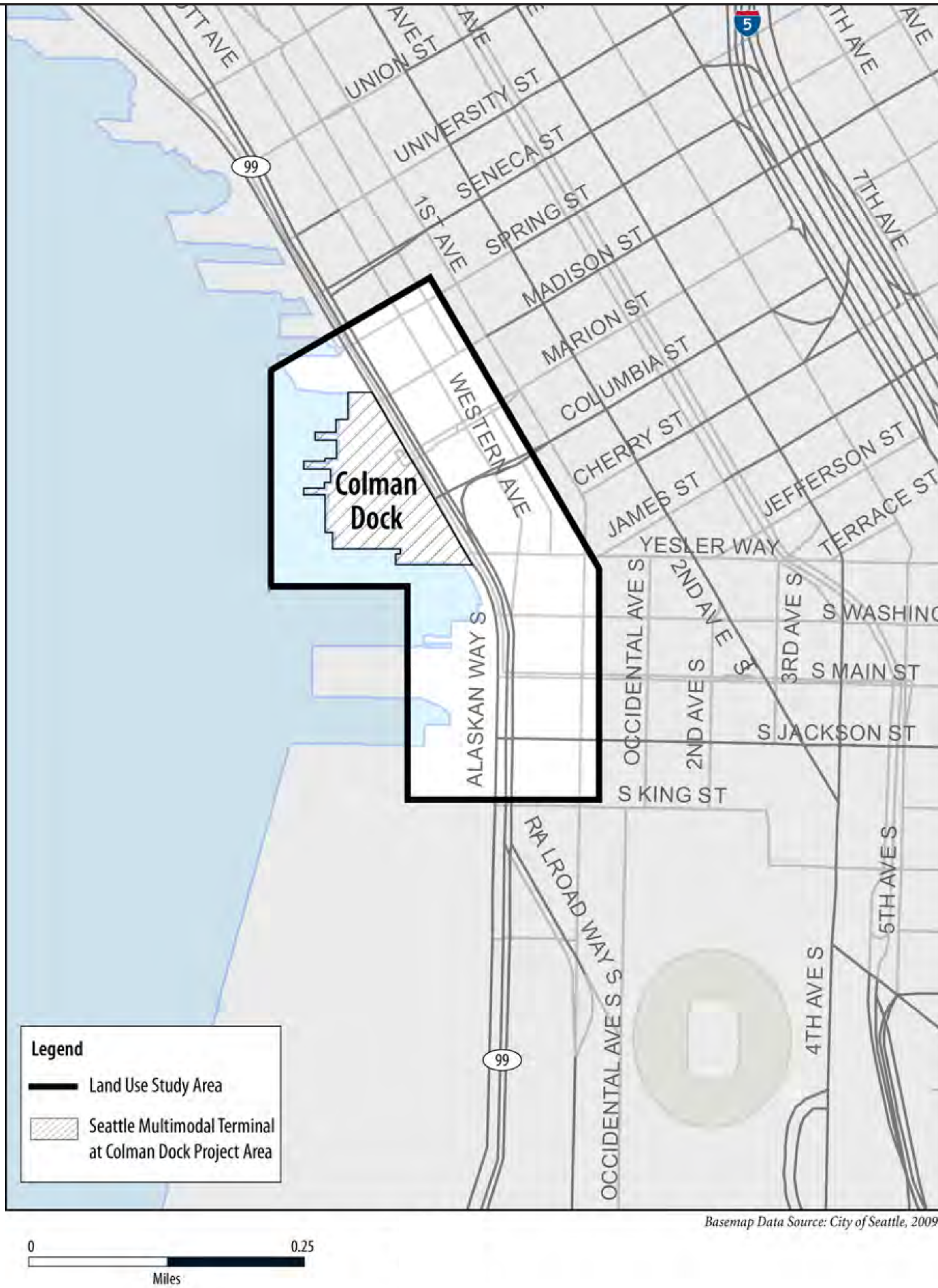
The land use study area for the project includes Colman Dock and areas east to 1st Avenue, bounded by the intersection of 1st Avenue and Spring Street in the north and the intersection of 1st Avenue S. and S. King Street in the south, as shown in Exhibit 4-24. This is the area identified where direct and indirect land use effects could occur during construction and operation.

4.9.2 Methodology

The land use analysis included review of applicable plans, policies, and regulations, review of existing land use conditions and trends in the area, and analysis of potential impacts from project construction and operation.

Land use in the study area is regulated through a number of state, regional, and local land use and transportation plans and development regulations for implementing local plans, including:

- Washington State Growth Management Act 1990
- Washington State Coastal Zone Management Act 1972
- Washington Transportation Plan 2007-2026 (Washington State Transportation Commission and WSDOT 2006)
- Washington State Ferries Long-Range Plan, 2009-2030 (WSF 2009)
- Vision 2040 (PSRC 2009b) and Transportation 2040 (PSRC 2010)
- City of Seattle Comprehensive Plan: Toward a Sustainable Seattle (Seattle 2009)
- Downtown Urban Center Neighborhood Plan (Seattle 1999b)
- Pioneer Square Neighborhood Plan (Seattle 1998)
- Commercial Core Neighborhood Plan (Seattle 1999a)
- Mayor's Recommendations: Seattle's Central Waterfront Concept Plan (Seattle 2006)
- Guiding Principles for Waterfront Seattle
- Seattle Department of Transportation's Action Agenda (SDOT 2012)
- Transportation Strategic Plan (Seattle 2005)
- Center City Circulation Report (SDOT 2003)
- Seattle Shoreline Master Program (Seattle 2012b)
- Seaport Shoreline Plan (Port of Seattle 2007)



Washington State Ferries

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

Washington State Department of Transportation

SOURCE: City of Seattle, 2009

Exhibit 4-24

Land Use Study Area

Seattle Terminal Project

Seattle, Washington

FILE NAME:Ex04-24_LandUseStudyArea.ai / CREATED BY: JAC/ DATE LAST UPDATED: 11/05/13

4.9.3 Affected Environment

The study area is located within three Seattle neighborhood planning areas: the Commercial Core, Pioneer Square, and the Greater Duwamish Manufacturing/Industrial Center. The primary land uses in the immediate area of the project are marine terminal/warehouse (Port of Seattle Terminal 46), vacant (Pier 48), government services (Seattle Ferry Terminal at Colman Dock; Seattle Fire Department Fire Station No. 5 at Pier 53), and office and parking uses. Other uses in the study area include retail/service businesses and a small number of residences (multi-family).

Current zoning in the study area consists of the following City of Seattle zones, which are illustrated on Exhibit 4-25:

IG1—Industrial General 1: Protects marine and rail-related industrial areas from an inappropriate level of unrelated retail, residential, and commercial uses by limiting them to a density or size limit lower than that allowed for heavy industrial uses. This zone also provides for ongoing, improved, redeveloped, and new water-dependent marine industrial land uses and activities.

Pioneer Square Mixed: Provides for less intensive uses than surrounding zoning in keeping with the historic designation of the Pioneer Square Preservation District.

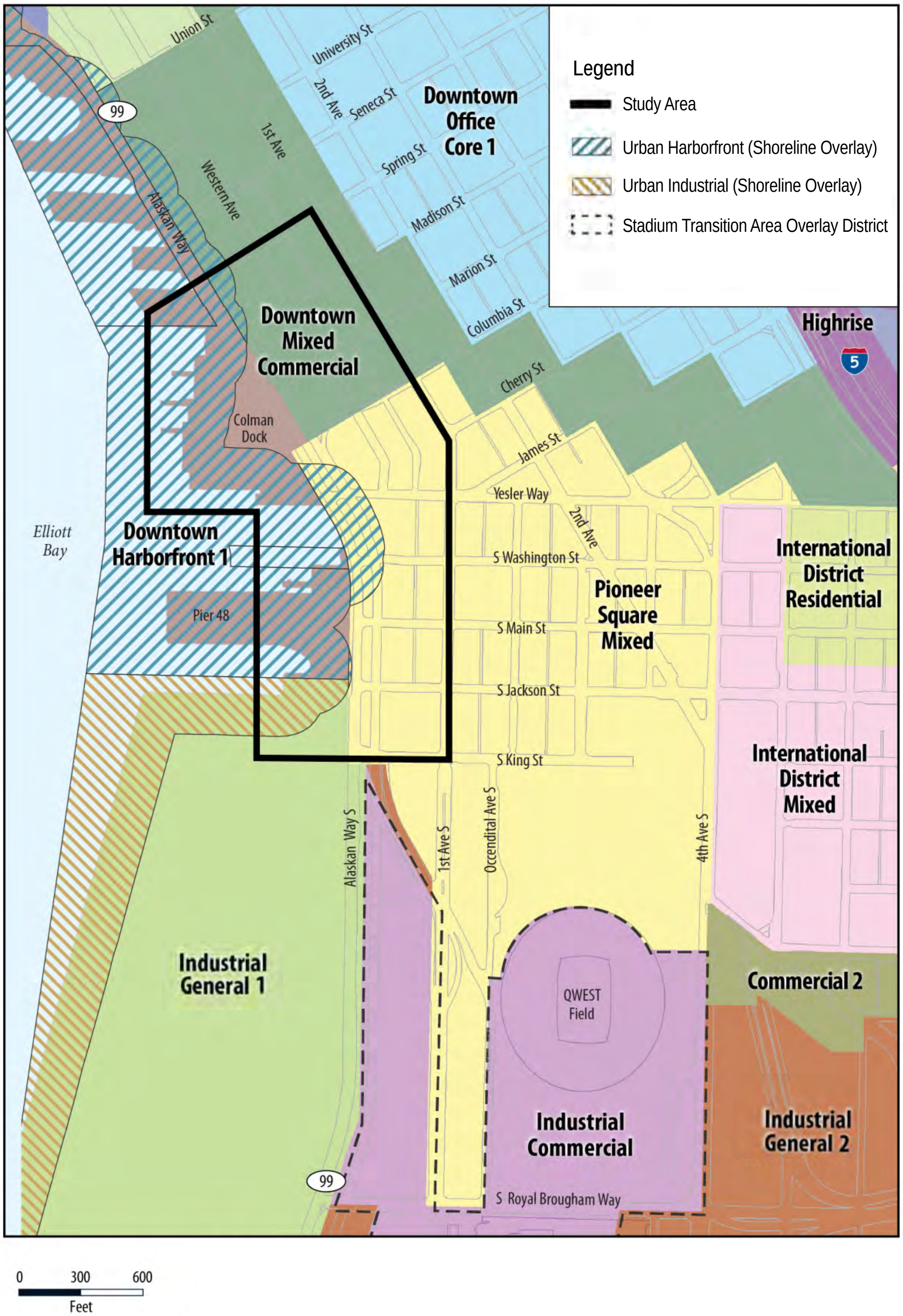
DMC—Downtown Mixed Commercial: This area historically served as a warehouse and commercial district serving the waterfront. Currently, it serves as a transition between the Pike Place Market, the waterfront, Pioneer Square, and the office core. Land uses transition from the higher-density office buildings in the Downtown Office Core 1 to older office/warehouse-style buildings near the waterfront and Pioneer Square that have historical character.

DH1—Downtown Harborfront 1: This designation applies to downtown areas along the Central Waterfront.

UH – Urban Harborfront: The Urban Harborfront Shoreline Environment designation is an overlay zone established by the Seattle Shoreline Master Program (SMP), and applies to waterfront lots and the adjacent harborfront area within the boundaries of downtown.

UI – Urban Industrial: The Urban Industrial Shoreline Environment designation is also an overlay zone in the SMP that applies to shorelines where the underlying zoning is Industrial.

Development along the Seattle waterfront has changed substantially in the past decade. The focus has broadened from primarily water-dependent, employment-related uses to include more tourism and recreation, retail shopping, meeting and convention activities, and entertainment. The vision laid out in the *Concept Design and Framework Plan for Seattle's Central Waterfront* (Central Waterfront Committee 2012) would further this trend by establishing a continuous public waterfront that would include a new surface street, pedestrian promenade, bike path, and a variety of open spaces that would draw visitors to the waterfront for a variety of cultural, social, and recreational activities.



SOURCE: City of Seattle, 2009

Exhibit 4-25

Study Area Zoning

Seattle Terminal Project

Seattle, Washington

FILE NAME:Ex04-25_ CurrentZoning.ai / CREATED BY: JAC/ DATE LAST UPDATED: 08/05/13

Land uses in Pioneer Square are primarily tourist, services, and residential, while the Greater Duwamish Manufacturing/Industrial Center is a mix of industrial and commercial uses consistent with City policies. This area generally trends toward increased diversity, with the presence of commercial uses mixed with warehouse and industry-oriented uses.

Infill development has occurred in the Pioneer Square neighborhood as part of an overall downtown growth trend. South of the Commercial Core, the trend has included occasional development projects that involve filling in available vacant parcels and remodeling existing buildings in Pioneer Square and along the First Avenue S. corridor, such as the proposed new sports arena at First Avenue S. and S. Massachusetts Street. Demolition of the Alaskan Way Viaduct would also increase the availability of property for redevelopment under the City's existing Industrial Commercial land use zone in the area. The Port of Seattle continues to improve and redevelop existing marine cargo facilities in the IG1 zone.

4.9.4 Construction Impacts

4.9.4.1 No Build Alternative

The No Build Alternative would not change existing land uses in the study area.

4.9.4.2 Build Alternative

With the Build Alternative, project construction would occur over approximately six years. Temporary construction effects on adjacent land uses and the local street system from noise, dust, vibration, glare, traffic detours, traffic delays, and visual disturbance would be generated. Because the vast majority of construction activities would be limited to the Colman Dock site, temporary impacts on surrounding land uses in the study area would be greatest immediately adjacent to the terminal, and would diminish with distance from the site.

Traffic delays and restricted mobility during transport of equipment and material to and from the construction site could temporarily affect land uses in the immediate vicinity of Colman Dock. However, most equipment and material deliveries are expected to be from the water side, by barge. When equipment and material deliveries would be made from surface streets rather than by barge, access to nearby land uses, primarily office uses and parking, would remain available from other roadways in the area. WSDOT would require the construction contractor to minimize traffic delays and to maintain access. Indirect effects to land uses outside the study area are unlikely during construction.

The existing terminal building houses several traveler/convenience retail uses. Retail uses would be removed during demolition of the old terminal building in Phase 3. Some vendors may continue service during construction by kiosk/cart.

4.9.5 Long Term Impacts

4.9.5.1 No Build Alternative

The No Build Alternative would not change existing land uses in the study area.

4.9.5.2 Build Alternative

The project would replace deteriorating structures at the existing ferry terminal that are at the end of their service life. No changes to existing zoning or land uses would occur.

This analysis reviewed state, regional, and local plans and regulations to determine the project's consistency with applicable goals and policies. The existing use of the project site as a ferry terminal and multimodal transportation hub would be maintained by the project. The use is consistent with applicable plans and regulations.

Adopted in 1990, the GMA (RCW Chapter 36.70A) requires state and local governments to manage statewide growth by identifying urban growth areas and preparing comprehensive plans, capital improvement programs, and development regulations. The GMA also requires the identification of transportation projects. The Seattle Ferry Terminal is consistent with the Washington State Growth Management Act (GMA), and is considered an essential public facility under its provisions.

The Build Alternative would be reviewed by Seattle's Department of Planning and Development (DPD) for consistency with the provisions of the Seattle Shoreline Master Program (SSMP). The SSMP applies to Seattle's shoreline zone, which includes water areas and land within 200 feet of the water's edge. The SSMP (Seattle Municipal Code (SMC) 23.60) regulates uses, establishes development standards for approved uses, requires protection of the shoreline environment, and includes requirements for public access to the shoreline for most developments. The SSMP is in the process of being updated, and Ecology approval of the SSMP is expected in 2014. The project would be consistent with the proposed changes. Ecology would certify the project's compliance with the Coastal Zone Management Act with a Coastal Consistency Determination after the City issues a Master Use Permit.

As noted above, the Seattle Ferry Terminal is located in the Urban Harborfront (UH) shoreline district. Water dependent passenger terminals are a permitted use in the UH designation. The UH designation generally requires permitted uses to provide regulated public access and view corridors according to standards found in SMC 23.60. The Build Alternative has been designed to be consistent with those provisions. WSDOT would work with DPD as the design advances, and ultimately a Master Use Permit issued by DPD would be required before construction could begin.

As part of the project, the existing terminal building would be demolished, resulting in the loss of approximately 14,000 square feet of current traveler/convenience retail uses. Future project elements include the development of approximately 14,000 square feet of retail space along the walkway to the Marion Street Overpass and within street-front retail structures along Alaskan Way. This feature of the design would allow retail uses consistent with DPD regulations to return to the Seattle Ferry Terminal Facility.

The project would not induce land use changes because it would maintain the existing principal use of the site as a passenger terminal. Future proposed unfunded project elements, once constructed, could indirectly benefit other land uses in the project area. Future street level retail structures would improve the streetscape and urban design of the terminal facility, which could attract a greater number of pedestrians to the area. Other waterfront businesses and land uses would benefit from the increased activity.

4.9.6 Mitigation

4.9.6.1 Construction

During construction of the Seattle Ferry Terminal Project, WSDOT would implement measures to ensure that traffic flow is maintained and negative effects on surrounding land uses are minimized. Mitigation measures to avoid or minimize adverse effects would include the following:

- Preparing and implementing a traffic management plan for minimizing the work zone impacts of the project as well as maintaining safe access for bicycles and pedestrians. Additional detail on the traffic management plan components is given in Section 4.8.6.2.
- Coordinating in advance with property owners, businesses and other stakeholders within the study area, including the Port of Seattle and King County Metro, and providing advance notice of construction activities, any required utility disruptions, and any required detours.

Additional mitigation for potential impacts to noise and air quality from construction activities, described in Sections 4.3.6 and 4.11.6, respectively, would also help mitigate land use impacts.

4.9.6.2 Operation

Because the project would support and be consistent with existing land uses and adopted plans and regulations, no mitigation would be required during project operation.

4.10 Visual Quality

Visual quality contributes to quality of life and enjoyment of the environment. Projects like the Seattle Ferry Terminal Project have the potential to either enhance or reduce the visual quality of their built and natural setting. Potential direct and indirect impacts to visual quality are often a concern identified by the public, especially in prominent or scenic landscape settings. This section evaluates the visual setting of the project and potential impacts to visual quality.

Information in this section is summarized from the *Visual Resources Technical Memorandum* (WSF, 2013l).

4.10.1 Visual Quality Study Area

The study area for analysis of potential visual quality impacts is the area where a viewer might perceive a substantive change in visual character as a result of the project. The boundaries of the analysis area for different projects can vary based on topography, the location of potential viewers, and the scale of the project. For example, hills or other features could screen the project from view, or the project may be visible from a certain location but so distant that it does not have a noticeable impact on the view.

Largely due the relatively small scale of the project, the study area selected for this analysis is a ½ mile radius around the project site, shown in Exhibit 4-26. At this distance and beyond, potential changes to visual quality which might be anticipated as part of the project would be only minimally perceptible to viewers.

4.10.2 Methodology

Visual resources are recognized in several federal, state and local regulations, including the following:

Federal regulations

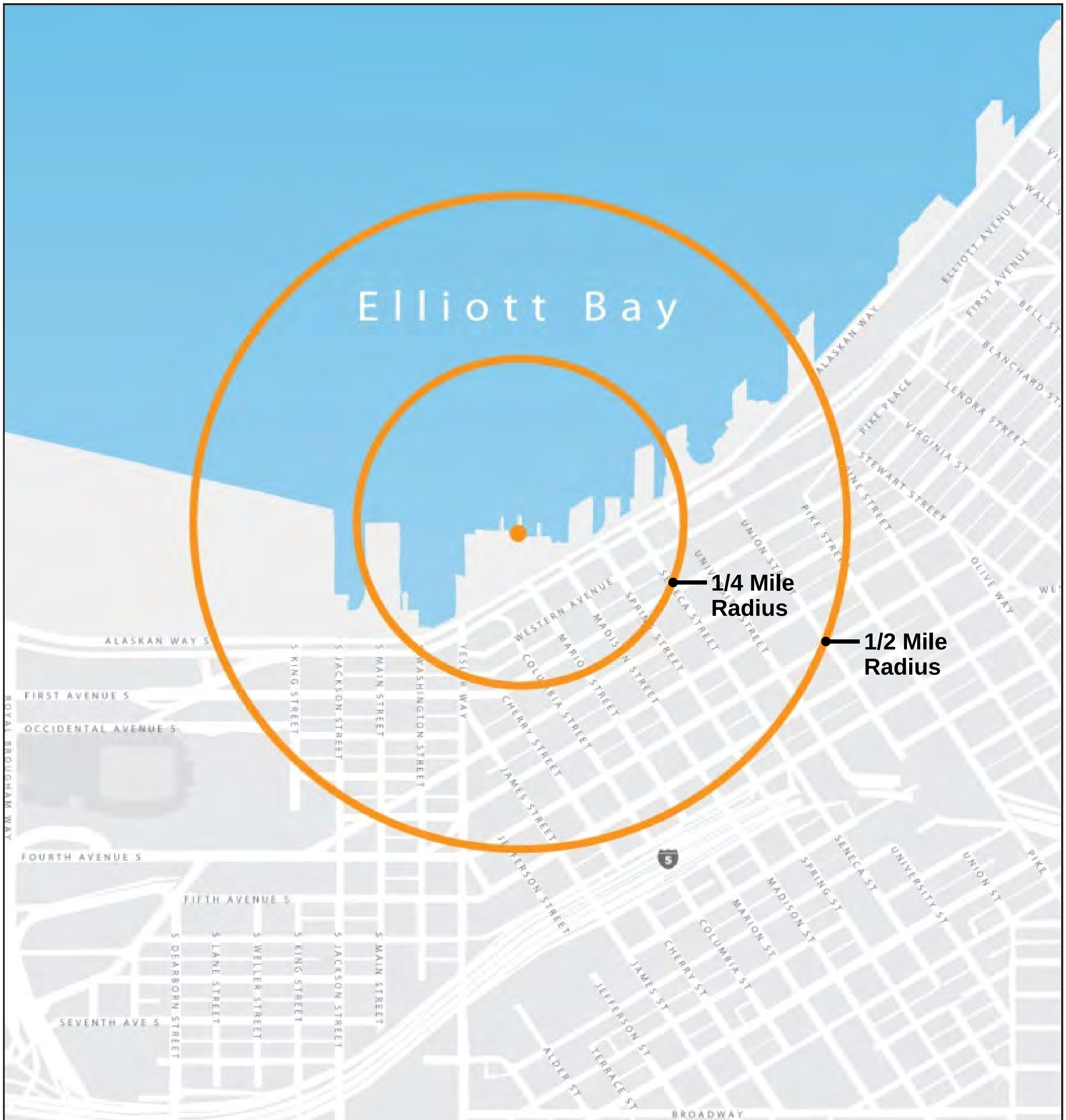
- NEPA, 42 USC Section 4231-4335; Section 101(b)(2)
- Council on Environmental Quality (CEQ); 40 CFR 1500-1508
- Section 4(f) of the Department of Transportation Act, 49 USC 303(b)-303(c)

State regulations

- SEPA (Chapter 197-11 WAC, Chapter 43.21C RCW)
- Transportation Commission and Transportation Department SEPA Rules (Chapter 468-12 WAC)

Local regulations

- Seattle Municipal Code 23.60.162, which implements development standards from the Seattle Shorelines Master Program
- Seattle Municipal Code 23.49.024, which regulates view corridors in the downtown neighborhood
- City of Seattle SEPA policies implemented in Seattle Municipal Code 25.05.675 P



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NOT TO SCALE

SOURCE: City of Seattle, 2009

Washington State Ferries

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

Washington State Department of Transportation

Exhibit 4-26

Visual Quality Study Area

Seattle Terminal Project

Seattle, Washington

FILE NAME:Ex04-26_VisualQualStudyArea.ai / CREATED BY: JAC/ DATE LAST UPDATED: 10/30/13

Under the City of Seattle Shoreline Master Program, projects in the central waterfront are required to provide view corridors to the water from a portion of the adjacent public right-of-way. Projects are also required to allow public access to locations within the property that can provide views to the water. Alternative design strategies which do not comply with the formulas identified in the statute, but meet the intent of the policy may be allowed with approval of the City planning director. The ferry terminal is specifically identified in the Shoreline Master Program as a location where an alternative site-specific approach to providing water access may be appropriate.

Under SEPA, the City of Seattle has documented a range of protected public views considered during the project review process. These views are not the only visual resources considered under SEPA, but are specifically recognized as important. The identified views are typically from public lands, primarily parks, and include views towards recognized scenic features including the Olympic Mountains, Cascade Mountains, Elliott Bay, and others. Potential impacts from locations identified as protected views are discussed in more detail below.

Assessment of visual quality includes an evaluation of the visual setting for a proposed project, as well as the aesthetic fit between a project and its setting. Assessment of visual quality also considers the perceptions that viewers may have of a proposed project.

While there can be variation in the perception of aesthetic quality among different viewers, there are also patterns of viewer response that have broad similarity. These patterns generally predict the anticipated public response to changes in visual resources. These typical patterns serve as the basis for accepted methods of documenting visual quality. This analysis is based on three complementary aspects of the visual environment that can be used to describe potential effects: visual character, visual quality, and viewer sensitivity.

The **visual character** of the project area is based on its physical characteristics without consideration of aesthetic value or viewer perception. Visual character includes colors, shapes, typical patterning, and other types of compositional elements that are characteristic of the natural and built landscape in the project area. Elements that might be considered as part of the visual character of the landscape include repeated building shapes, strong linear edges between visual elements (for example, the line between land and water), or typical colors in the landscape.

Visual quality is an assessment of how the public would likely value the visual character of the project setting. An accepted method for evaluating visual quality is to describe the visual setting for a project in terms of its vividness, intactness, and unity:

- Vividness describes how memorable and distinctive the visual character of the landscape is.
- Intactness describes whether the visual character of the landscape has been interrupted by encroaching elements, or has been modified in a way that reduces its visual quality.
- Unity evaluates how well the visual characteristics of the landscape blend together.

The final consideration for evaluating potential effects of the project is **viewer sensitivity**. This consideration recognizes that viewers differ in the importance they place on aesthetics depending on their circumstances. A tourist who is experiencing a view as a sightseer, for example, is likely to put more emphasis on scenic quality than a commuter driving past the same view in heavy traffic. In general, viewers who have more exposure to the scenery (for example residents or workers with window views) and viewers who are experiencing the scenery as part of a recreational activity are considered more sensitive to aesthetic quality than viewers who only experience scenery for a short time, or who are engaged in an activity that is focused on areas other than the scenery.

4.10.3 Affected Environment

The Seattle Ferry Terminal is located in an exceptionally scenic setting. Looking from the land side, the terminal is the foreground to Elliott Bay and Puget Sound, with West Seattle, nearby islands, and the Olympic Mountains rising in the background. It is bordered to the north by the historic waterfront neighborhood and to the south by tall cranes and cargo ships at the Port of Seattle. As described above, the visual resources in the study area can be evaluated by considering their visual character, which describes the form, color, and other physical features of the landscape, and their visual quality, which describes the typical value that a viewer might place on the visual resources.

4.10.3.1 Visual Character of Study Area

To the south, the visual character of the project setting is a mixture of urban development and natural features. Harbor Island cranes are prominent in the view, with strong linear and vertical character. Many of the cranes also have a characteristic orange color which contrasts with the darker color of the background. West Seattle is a strong horizontal element in the background. At the West Seattle waterline, a combination of exposed shoreline and prominent buildings create a lighter-colored horizontal band just at the water’s edge, while the hillside beyond is predominantly darker in color due to the vegetation.

To the west, the scene is dominated by Elliott Bay extending from the foreground to the background, with low rolling horizontal shapes of Puget Sound islands extending from the water. The background view is enclosed by the Olympic Peninsula shoreline where it meets Puget Sound in a thin horizontal green band, with the Olympic Mountains rising above with their distinctive jagged profile and contrasting light and dark color depending on the season and the weather.

To the north, the piers of the central waterfront create a distinctive pattern with their strong horizontal orientation, diagonal extension from Alaskan Way into Elliott Bay, and strong repetition of form. The historic piers are colorful, and variation in detail creates diversity and visual interest. Further north, Magnolia Bluff encloses Elliott Bay and provides a strong angular background to the visually complex shoreline development.

Finally, looking from the water to the east, Colman Dock is part of the foreground to the Seattle skyline as the city rises from the edge of Elliott Bay. Depending on the location of the viewpoint, Colman Dock is in the foreground of views to Seattle’s commercial downtown, historic Pioneer Square, and stadium district. The downtown buildings in the commercial core are strongly angular and vertical, with lighter colors and reflective windows. The stadium district is characterized more by the blockier buildings of south Pioneer Square at the edge of the district, with the prominent arches of Century Link Field and Safeco Field forming the skyline.

Two projects currently in the planning stages are likely to affect the visual character of the study area when implemented: the redevelopment of Alaskan Way following demolition of the Alaskan Way Viaduct, and the Central Waterfront planning effort.

Alaskan Way is planned to be widened to six-lanes (not including turn lanes) in the area adjacent to the ferry terminal. Traffic lanes are generally planned to be located on the east side of the right-of-way in the current location of the Alaskan Way Viaduct. The reconstructed street would include new pedestrian and bicycle amenities as well as new street furnishings and plantings within the right-of-way. Relocating the traffic lanes allows the development of a wide pedestrian zone ("promenade") between Alaskan Way and the ferry terminal.

The widened Alaskan Way would be prominent in the foreground for views from the Pioneer Square and south downtown neighborhoods towards the ferry terminal. The redeveloped Alaskan Way is anticipated to include a variety of attractive streetscape elements, including special paving to delineate pedestrian areas, new light fixtures, sign standards, and other street furnishings selected for their aesthetic value, and extensive planting in the right-of-way. These design elements would be anticipated to contribute positively to the visual quality of the area near the ferry terminal.

The Central Waterfront planning effort, called "Waterfront Seattle" and anticipated to be implemented in phases over a number of years, would also affect the visual character of the study area in a positive way, with pedestrian promenades, tree plantings, and other elements. The timing and funding of these Waterfront Seattle components are uncertain, however.

4.10.3.2 Visual Quality

Visual quality is described as the aesthetic value that viewers give a particular setting. While the different landscape types that form the setting for Colman Dock are exceptionally diverse, they are also each recognized as landscapes of exceptional visual quality.

Using the descriptive measures of vividness, intactness, and unity described in the sections above, the landscape setting for the project area as a whole is highly vivid. The primary features of the visual setting, Elliott Bay, the Olympic Mountains, the Seattle skyline, and prominent waterfront structures, have an aesthetic intensity that makes an immediate and strong impression on the viewer. They are distinctive and memorable in their form, composition, and color.

The visual setting has a moderate level of intactness. In much of the area the natural and built landscape are visually complementary, with a pleasing sense of aesthetic fit between waterfront buildings in the foreground, the more distant urban development in the middle ground and background, and the exceptionally scenic landscape setting of the water and distant mountains.

Views in each of the major directions around the Seattle Ferry Terminal also have a high level of unity. Towards the west, the landforms of the West Seattle ridge line and low islands provide a sense of scale and distance against the extensive surface of Puget Sound and the Olympics. To the east, the forms of the nearby office buildings and historic warehouses have a similar visual grain and vertical form to the taller buildings in the background. The historic piers to the north of the terminal have a similar scale, use similar materials, and are unified by their overall horizontal massing and consistent arrangement against the water. Finally, the view to the south includes the prominent repeating forms of the Port of Seattle cranes, which are echoed by the skyline profiles of the Seattle stadiums. The inconsistent form and color of the waterfront structures in the area directly to the south of the terminal has the lowest unity within the overall visual setting.

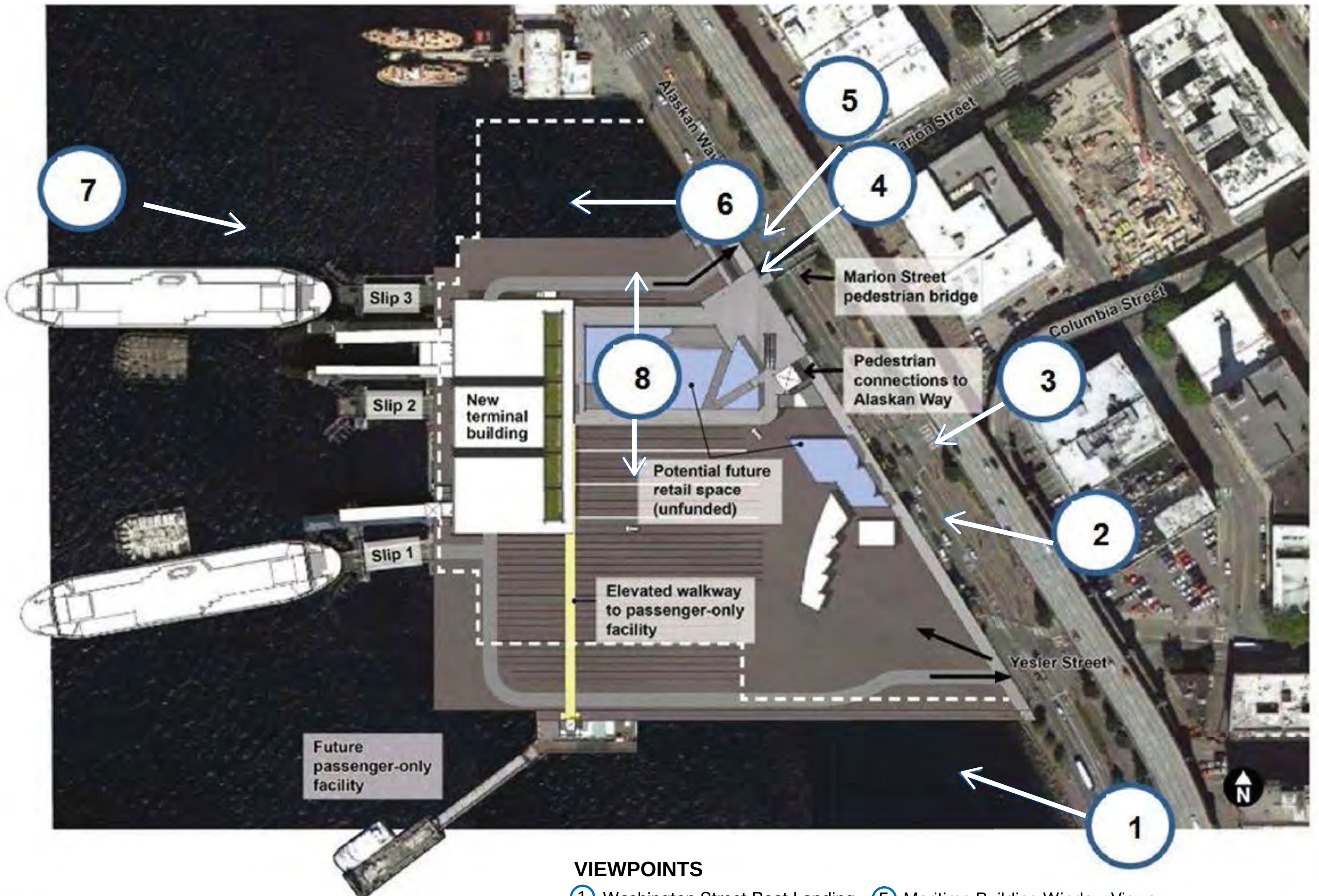
4.10.3.3 Visual Character of the Seattle Ferry Terminal

The landscape setting for the project provides a context for evaluation of the visual quality of the affected environment both for the existing terminal and the proposed project. In general, the discussion of potential effects focuses more on the area nearby the project than on areas further away from the project. For viewpoints near the project area, the terminal becomes a prominent part of the foreground for viewers who then see the larger landscape setting for the project in the middleground and background. From most viewing locations, the terminal is a small part of the overall vista. For viewers within the study area, foreground elements are much more prominent features of the visual environment, while the exceptionally scenic background is often partially screened.

In general, visual quality of the environment near the terminal is lower than the overall quality of the project setting. Each of the key attributes for describing visual quality (vividness, intactness, and unity) are expressed less strongly for the views of Colman Dock than for the broader landscape setting. The buildings and nearby shoreline of Elliott Bay are less vivid than the background views of Puget Sound and mountains or the cityscape. In the foreground the "messy" quality of waterfront facilities like the Seattle Ferry Terminal, although typical of working waterfronts, reduces the sense of intactness and fit between the built and natural environments. Similarly, the visual unity of the environment, which is created at the broader scale by repetitive shapes and complementary form and color, is much weaker at the detailed scale of individual buildings and the waterfront streetscape. Water views tend to be partially screened, with buildings prominent in the foreground and few locations that provide the breadth and continuity of the view over Puget Sound to the Olympics unless viewers are elevated, for example from a window view.

4.10.3.4 Project Viewers

The methodology for characterizing visual quality for the affected environment is based on the analysis of key viewpoints that are representative of typical viewing locations. The visual quality for viewpoints is analyzed for both existing and anticipated future conditions. Criteria for selecting viewpoints can include locations with high viewer volumes, locations where the anticipated effects may be most pronounced, places which are specifically identified or developed as public viewing areas, or similar locations. The viewpoints selected for analysis in this document are described below, and locations are mapped on Exhibit 4-27.



VIEWPOINTS

1. Washington Street Boat Landing
2. Polson Building Window View
3. Columbia Street View
4. Marion Street View
5. Maritime Building Window Views
6. Views from the Sidewalk Adjacent to Colman Dock
7. Views from the Ferries or Other Boats on Elliott Bay
8. Views from the Elevated Passenger Walkway

Washington State Ferries

Department of Transportation · United States of America

Washington State Department of Transportation

N

NOT TO SCALE

SOURCE: WSDOT, 2011

Exhibit 4-27

Viewpoint Locations

Seattle Terminal Project

Seattle, Washington

FILE NAME: Ex04-27_ViewpointLocations.ai / CREATED BY: JAC / DATE LAST UPDATED: 10/31/13

Although the proposed project would have physical effects on the environment, visual resource quality is perceived by the viewer. Evaluation of potential effects for visual quality includes consideration of the number of viewers who might be affected by a change to the visual environment, and the anticipated sensitivity of those viewers to aesthetic quality.

For this project the potential viewers are diverse. The Seattle Ferry Terminal and the Seattle waterfront in general are used for recreation, work, and residence by many people, and the quality of the visual environment is important to many activities along the waterfront. A viewer may be working at a window with a view of Elliott Bay, strolling along the waterfront as a sightseer or heading to the terminal as a ferry passenger.

While there are different types of potential viewers for the project, three primary groups were selected to represent the majority of viewers and the likely range of sensitive viewers for the project:

1. Ferry passengers and other boaters
2. Residents and workers in buildings with views to the project site
3. Pedestrian recreational visitors and tourists

Each of these viewer groups would have different views of the proposed project, and might experience impacts differently.

Ferry passengers and boaters, whether regular commuters or infrequent travelers/tourists, are highly sensitive to the views from the ferry within the study area. The aesthetics of their travel experience are important to them. This group also has a set of unique viewing locations for the project, including locations in and around the proposed terminal building, and from the water. Frequent ferry riders would experience any changes to visual quality often, and for relatively long periods of time.

Residents and workers in nearby buildings are expected to have exceptional views of the project site, waterfront, Elliott Bay, and Olympic Mountains following the removal of the Alaskan Way Viaduct. This type of window view is highly valued and appreciated. The typical viewpoint for this group is elevated, and many window views would look over the Seattle Ferry Terminal to the scenic views beyond. These viewers would be exposed to views of the project for the most time.

Pedestrian recreational visitors and tourists are expected to be sensitive to impacts to the visual environment; enjoyment of scenery is a typical activity of tourism and recreational use of the urban environment. Pedestrian views to the Seattle Ferry Terminal would be from a relatively low vantage point. The prominence of the project in views from sidewalks and other pedestrian destinations in the study area would vary depending on location. Views from sidewalks adjacent to the site would change more than views from more distant sidewalks or nearby parks.

4.10.3.5 Viewpoint Locations

Viewpoints from within the affected environment were selected to provide typical examples of views from different directions and from different viewer elevations. From the street level, viewpoints were selected to the south and north of the Seattle Ferry Terminal, and from sidewalks along streets with views towards the water. Each of these sidewalk locations is frequented by both residents and tourists who would be anticipated to be sensitive to visual quality. Viewpoints were also selected to represent window views from buildings that would have clear vistas over the project site after the viaduct has been removed. The final two viewpoints include a view from a ferry on Elliott Bay, and a viewpoint from the internal passenger walkway inside the terminal. The Seattle Ferry Terminal viewpoint is most frequently visited by ferry passengers, but is also a public open space that can be visited by anyone without paying a ferry fare. The description of the viewpoints, viewer groups, viewer sensitivity and visual quality is provided in Exhibit 4-28.

4.10.3.6 Other City of Seattle Protected SEPA Views

The City of Seattle recognizes views as a SEPA resource, and has developed an inventory of protected SEPA views from public viewpoints. One of these viewpoints is the Washington Street Boat Landing, described in Exhibit 4-28. Other identified viewpoints are discussed below.

Admiral Viewpoint, West Seattle

The Admiral viewpoint is located in Belvedere Park on SW Admiral Way in West Seattle. The park has open views over the Duwamish industrial area to the Seattle skyline. The Seattle Ferry Terminal is visible as a minor element in the view; however, because of the distance from the viewpoint changes to the terminal would not be easily perceptible, and would not alter the quality of the view.

Waterfront Park, Seattle

Waterfront Park is located on Seattle's Central waterfront, approximately one-quarter mile north of the terminal. A small portion of Colman dock is visible from the park; however, the majority of the facility is screened by intervening piers.

4.10.4 Construction Impacts

4.10.4.1 No Build Alternative

The No Build Alternative would include minor construction activities as part of the ongoing maintenance and operations of the ferry terminal. Depending on the repair work being completed, there would be temporary impacts to visual quality during each construction event, possibly including the presence of barge-mounted construction equipment. Impacts to visual quality would likely be minor for each of these repair activities, and would be for a relatively short duration.

4.10.4.2 Build Alternative

Construction activities typically detract from visual quality. Construction at the Seattle Ferry Terminal would be prominent from each of the viewpoints selected for analysis. Construction of the project is anticipated to be completed in four different phases. While the specific location of construction activities would change throughout the construction period, the intensity of the impacts is likely to be similar.

Exhibit 4-28 Viewpoint Data

Viewpoint	Location	View	Viewers	Viewer Sensitivity	Visual Quality
Viewpoint 1- Washington Street Boat Landing	City landmark south of Seattle Ferry Terminal	The historic entry pergola frames views of Elliott Bay and the Olympic Mountains.	Visitors to the landmark	Sensitive to changes	High
Viewpoint 2 – Polson Building Window view	South of Seattle Ferry Terminal	Currently, views are blocked by the Alaskan Way Viaduct (2013). Once removed, views would be of the waterfront, Elliott Bay, and the Olympic Mountains.	Employees at businesses	Sensitive to changes	Moderate
Viewpoint 3 – Columbia Street view	Runs northwest-southeast through the south downtown neighborhood, ending at Alaskan Way	Views of the waterfront are framed by relatively tall buildings on both sides. Currently (2013), a ramp to the Alaskan Way Viaduct obscures views from the street to the waterfront; however, once removed, views would be more open.	Regular street users and tourists using the route to connect to Pioneer Square and the waterfront	High number of viewers, many with moderate to high sensitivity	Low to moderate
Viewpoint 4 – Marion Street view	Runs parallel to Columbia Street, intersecting with Alaskan Way one block to the north	Views of the project and the waterfront are limited by buildings on both sides of the street. The Alaskan Way Viaduct is a dominant feature. Once removed, views would be more open.	High number of viewers	High number of viewers, many with moderate to high sensitivity	Moderate
Viewpoint 5 – Maritime Building Window view	5-story office building located on the north side of Marion Street	Views of the project are blocked by the Alaskan Way Viaduct. When removed, views would be more open.	Employees at businesses	Sensitive to changes	Moderate to high
Viewpoint 6 – Views from the sidewalk adjacent to the Seattle Ferry Terminal	Sidewalk connecting the active central waterfront area to Pioneer Square	Views are of the terminal and surrounding urban neighborhoods.	Tourists or locals specifically choosing the waterfront as a recreational destination	Although sensitive to visual quality, viewers move through the area rather than lingering	Low to moderate
Viewpoint 7 – Views from ferries or other boats on Elliott Bay	The water side, typically approaching the terminal from the north	Views are of the ferry terminal in the foreground and Smith Tower in the background.	Ferry passengers including regular commuters, infrequent travelers, and tourists	Sensitive	High
Viewpoint 8 – Views from the elevated passenger walkway	North and south side of walkways	The terminal building creates a visual block for viewers on either the north or south side passenger walkways.	Ferry passengers including regular commuters, infrequent travelers, and tourists	Sensitive	Moderate

Large construction equipment, including barge-mounted cranes, drill rigs, and pile drivers, would be in use for each of the construction phases. This machinery would typically be taller than the eventual terminal facilities; however, they would also be narrow and constructed from a steel framework that would not significantly block views. Barge-mounted cranes and drill rigs would extend into views of Puget Sound and the Olympic Mountains from each of the key viewpoints.

Construction staging includes the storage and preparation of construction materials and debris. Construction staging locations have not been identified for the proposed Build Alternative; however, staging would likely take place near the ferry terminal. Staging locations may include barges or overwater areas on the ferry terminal trestles. Construction staging areas typically detract from visual quality, and would reduce the overall visual quality of the project area. Temporary construction barriers are typically installed for construction activities of this scale to protect passersby and to screen views of construction activities. Safety barriers are generally constructed at the sidewalk edge and are six to eight feet tall. Construction barriers would screen views to some of the less visually attractive aspects of the construction process; however, they could also block desirable views from the sidewalk.

4.10.5 Long-Term Impacts

For each of the key viewpoints potential effects to visual quality are evaluated based on the scale and type (or character) of anticipated changes to the existing visual character and quality. Changes in scale and massing determine the potential effect the alternative would have. Changes in character describe potential effects to the facility itself as an element of the existing views, describing how the Build Alternative differs from the No Build Alternative in terms of aesthetic fit within the setting of the viewshed. Taken together, these potential changes are identified in terms of how they enhance or detract from the qualities of vividness, intactness, and unity in the project area. Exhibit 4-29 shows images of the preliminary terminal design with the proposed changes in layout. These images are for illustrative purposes only; the final terminal design may differ from that shown here.

4.10.5.1 No Build Alternative

The No Build Alternative is anticipated to have little or no effects to the visual environment. Any necessary repair or maintenance work would not likely result in changes to the scale or character of the ferry terminal facilities.

4.10.5.2 Build Alternative

Viewpoint 1 – Washington Street Boat Landing

The proposed project would have minor effects on views from the Washington Street Boat Landing. The new ferry terminal building would be visible from the viewpoint and change the character of the view, partially blocking the open view. The extended pier deck would be prominent in the view, and would likely partially obscure ferries docked in Slip 1. The passenger-only facility would partially block the view to Puget Sound and the Olympic Mountains.

Washington State Ferries

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

Washington State Department of Transportation

SOURCE: NBBJ

Exhibit 4-29

Terminal Building Simulation

Seattle Terminal Project

Seattle, Washington

FILE NAME:Ex04-29_TerminalBuildingSimulation.ai / CREATED BY: JAC / DATE LAST UPDATED: 02/03/14

The Seattle Ferry Terminal facility detracts from the otherwise consistent view of the visual environment. The proposed new facility would improve the fit between the built and natural environments from this viewpoint, providing more architectural definition to the structures, and also providing significant glass elements and a visually open structural design. Colors and materials proposed for the new facility have an industrial, maritime character that would fit better into the visual environment, and likely improve the character of the view.

Viewpoint 2 – Polson Building Window View

The Build Alternative would likely partially screen some attractive visual features from this viewpoint, including views to Puget Sound, ferries docked at Slip 1, and the Olympic mountains in the background. The proposed retail structures would increase the total building mass compared to the existing conditions. As a prominent foreground element, the redesigned ferry facility is anticipated to be more visually compatible with its waterfront setting, with extensive use of glass for transparency and attractive roof treatments for viewers looking down from above. The architectural quality of the new terminal building would likely enhance the overall visual quality of the terminal itself from this viewpoint.

Viewpoint 3 – Columbia Street View

The visual environment from this viewpoint would continue to be predominantly built elements, with very little contribution from Elliott Bay, the West Seattle ridge, or distant views of the Olympic Mountains. The design quality of the proposed ferry terminal is anticipated to be improved compared to the existing structures at the terminal facility. The size and massing of the streetfront retail buildings are anticipated to reduce to the overall visual quality from this viewpoint, increasing the perception of building mass, and decreasing the perception of the sky.

Viewpoint 4 – Marion Street View

Under the Build Alternative, the existing freestanding food service building and the northern vehicle storage area would be removed, improving views of Elliott Bay and the Olympic Mountains. Looking south, new ferry terminal facilities would be prominent; the proposed north stair tower, elevator building, south stairway, and escalator would create distinct vertical elements compared to the sidewalk. Visual quality from this viewpoint would likely increase with new views of the water and background features created where views were previously of the trestle and vehicle holding area. The size of the new ferry terminal building would be similar to the No Build Alternative; however the visual character of the buildings would be improved, making the ferry terminal fit better into the surrounding landscape.

Viewpoint 5 – Maritime Building Window Views

Most of the Build Alternative elements would be clearly visible from the Maritime Building. The proposed terminal building and elevated pedestrian walkway would stand out. Under the Build Alternative, the vehicle holding area would be replaced with open water, improving visual quality from this viewpoint. The new terminal building would be less prominent than the existing building, and the elevated pedestrian walkway would be more prominent than the current walkway. The elevated walkway is anticipated to be an improvement in visual quality in comparison to the rooftop of the existing terminal building. Future retail structures would be visually prominent from this viewpoint; they would likely detract from visual quality, increasing the overall building mass and with their rooftops prominent in the scene.

Viewpoint 6 – Views from the sidewalk adjacent to the Seattle Ferry Terminal
Visual quality at the northern end of the sidewalk adjacent to the terminal would be substantially improved with the Build Alternative. Viewers in this location would have improved views of Elliott Bay and the Olympic Mountains, and good views of the ferries at Slip 3 and the City of Seattle fireboats docked to the north. Visual quality in the central portion of this sidewalk section would be similar to existing conditions, with visual quality generally defined by the built features of the ferry terminal along the sidewalk edge. The design quality of new ferry terminal structures, primarily the new elevator building, stairway, escalator facilities, and retail buildings, would have a strong influence on visual quality. The sidewalk at the southern end of the terminal would have a lower visual quality than existing conditions, with more open water covered by vehicle holding and circulation areas, and the proposed passenger-only facilities prominent.

Viewpoint 7 – Views from Ferries or other boats on Elliott Bay
The proposed terminal building would be prominent to viewers on the ferries. Most other design elements would be screened by the terminal building or other structures. The building would be a wide horizontal element in a view otherwise made up of smaller-scale and more vertically oriented structures. From this viewpoint, the overall size of the building may not fit as well into the setting; however, the transparency and layout of the final design may reduce this effect. The new building also has the potential to improve the overall visual quality of the facilities at the terminal. Open water created by the removal of the north vehicle storage area would be prominent in views from the ferries, along with the City of Seattle fireboats docked to the north, improving visual quality as ferries approach or depart.

Viewpoint 8 – Views from the elevated passenger walkway
The character of the elevated walkway would change dramatically into an open plaza area with the Build Alternative with some views to the north and south, but partially blocked by the portions of the building designated for future retail. The proposed new ferry terminal would be prominent in the view to the west, blocking views of the water; however, the views of the Port of Seattle, stadium district, downtown Seattle, and historic piers would be improved as a result of rotating the orientation of the building 90 degrees.

Other City of Seattle Protected SEPA Views

Admiral Viewpoint, West Seattle
Under the Build Alternative, changes to the Seattle Ferry Terminal would be visible as a minor element in the view; however, the distance from the viewpoint would make these changes barely perceptible and would not alter the quality of the view.

Waterfront Park, Seattle

Under the Build Alternative, a portion of the northern end of the proposed terminal building would be visible from the park. Changes to the Seattle Ferry Terminal would not be prominent, and would not change the quality of the view from the park.

City of Seattle Shoreline Regulations

Visual resources are one of the elements addressed in the City of Seattle's Shoreline Master Program (SMP) and its implementing regulations. Specifically, the regulations address access to water views from the adjacent public right-of-way, physical access to the water's edge, and views of the water from within the development. The project is intended to meet or exceed these requirements. For additional information, see also Section 4.10 Land Use.

The ferry terminal incorporates several design elements to meet the City's requirements for public access to views. Unobstructed views of the water from the public right-of-way would be provided at the north and south ends of the ferry terminal, where viewers can see Elliott Bay, Puget Sound, and the Olympic Mountains. Inside the ferry terminal property, the design provides public areas located on the elevated walkway between the terminal building and the passenger-only facility. This area would provide exceptional views over Puget Sound and a unique perspective of ferries docking at Slip 1. Additionally, most of the elevated passenger walkway would provide excellent views to the north of the historic central waterfront piers, Seattle Great Wheel, and Space Needle, and to the south of the Port of Seattle cranes, stadium district, and West Seattle. All of these areas would be accessible without fares.

Alternative Comparison

The amount of overwater cover would be similar for both alternatives; however, the location would be different. Under the Build Alternative a new area of open water would be provided on the north end of the ferry terminal between the terminal facilities and the existing City of Seattle fire station. Under the No Build Alternative, a section of open water on the south side of the ferry terminal between the terminal and the Washington Street Boat Landing would remain open. The shape of the proposed dock with the Build Alternative provides more linear feet of open water along Alaskan Way. The Build Alternative would provide improved visual quality on the north side of the ferry terminal, and would be only slightly reduced on the south side.

The overall building layout of the Build Alternative would likely result in a minor decrease in visual quality. The perception of expanded building massing would be clear, especially from elevated viewpoints, and would somewhat reduce visual access to Puget Sound, West Seattle, and the Olympic Mountains in the background. The design reduces the visual access to the water from the sidewalk, creating a more continuous building face from approximately Marion Street to Yesler Way. The increased building face along the sidewalk also has the benefit of screening vehicles in the holding areas.

Under the Build Alternative, the visual quality of the ferry terminal would be expected to improve, both by increasing the visual quality of the facility itself, and by improving its fit with the surrounding landscape.

4.10.6 Mitigation

During construction of the Seattle Ferry Terminal Project, WSDOT would implement measures to minimize impacts on views in the area, including the following:

- Visual resources would be considered during the process to locate staging areas, and screening will be considered. Currently, staging areas would be located on the dock, but would likely be in different locations during each phase.
- Visual resources would be considered during development of a construction screening plan, and strategies to maintain access to views would be incorporated in the location and maintenance of screening.
- Construction screening may also include attractive design elements, including artwork and windows to attractive views to help reduce its visual impact.

4.11 Air Quality

Air quality is typically evaluated, either qualitatively or quantitatively, as part of the NEPA review process for large projects that receive federal funding or approvals. The level and type of the air quality analysis is scaled to the relative potential direct and indirect effects of the project on air quality.

In addition to meeting the general NEPA review requirements, projects that are funded, approved, or licensed by federal agencies, may need to meet air quality conformity requirements. Conformity refers to the need for federal actions to be in conformance with State Implementation Plans (SIPs) to attain or maintain compliance with National Ambient Air Quality Standards as required under the federal Clean Air Act (CAA).

A project level conformity determination is not required for this project. According to 40 CFR 93.126, Table 2, the project is exempt from project level conformity, as it falls under the exemption for Reconstruction or Renovation of Transit Buildings and Structures. These types of projects are considered air quality neutral by U.S. EPA.

As a "regionally significant" project, the proposed project is included in the current regional transportation plan (RTP), and in *Central Puget Sound Regional 2007-2010 Transportation Improvement Program* (TIP), which lists all current transportation projects (PSRC 2009a). The RTP and the TIP meet the conformity requirements identified by federal and state regulations for carbon monoxide (CO). The air quality effects of the project are thus addressed qualitatively in this analysis.

Information in this section is summarized from the *Air Quality Discipline Report* (WSF, 2013a).

4.11.1 Air Quality Study Area

Air quality effects for this analysis were considered at a regional scale, which includes the Central Puget Sound carbon monoxide maintenance area (described in Section 4.11.3.1 below).

4.11.2 Methodology

A qualified WSDOT air quality specialist reviewed applicable air quality policies and regulations, and assessed the potential effects of the project's construction on air quality. Because the project is a reconstruction of an existing transit facility, and would not increase traffic or vehicle holding capacity on the trestle, and because the project is considered to be air quality neutral by the EPA, the operational air quality effects were assumed to be insignificant.

Both the federal Clean Air Act (42 USC §§ 7401 et seq. 1970) and the Washington State Clean Air Act (RCW 70.94) currently regulate air quality.

The EPA has identified several air pollutants as being of concern nationwide. These pollutants are known as "criteria pollutants." The sources of these pollutants, their effects on human health and the nation's welfare, and their final

"Criteria pollutants" are six common air pollutants that are monitored and regulated by EPA. EPA has set permissible levels for these pollutants based on criteria for human health and the environment. The criteria pollutants include:

- nitrogen dioxide
- ozone
- carbon monoxide
- sulfur dioxide
- particulate matter
- lead

deposition in the atmosphere vary considerably. Under the Clean Air Act, EPA has established National Ambient Air Quality Standards (NAAQS) that specify maximum allowable concentrations for these criteria pollutants, which projects are required to conform to, and not exceed.

The project followed the *WSDOT Guidance for Project-Level Greenhouse Gas and Climate Change Evaluations* and received technical support from the WSDOT Environmental Services Office.

4.11.3 Affected Environment

4.11.3.1 Air Quality

Over the past 20 years, air quality in the region has improved, even with a growth in population and vehicle miles traveled. However, over the past several years, levels of emissions of fine particulates and ozone have been on the rise, and new concerns such as air toxics, visibility and climate change have grown.

Emissions of carbon monoxide, sulfur oxides, and lead are below levels of concern in our region, and have been for many years. The region was once in nonattainment for carbon monoxide, but has been maintaining the standard since the early 1990s. Levels of carbon monoxide in the region have been on a downward trend for the last 20 years. The decline of CO is due primarily to improvements made to emission controls on motor vehicles, the vehicle Inspection and Maintenance (I&M) program administered by Ecology, and the retirement of older, more polluting vehicles.

Emissions of ozone and fine particulates have been a concern in recent years. In fact, since more stringent standards for both pollutants have been set by the EPA, the region could be designated in "non-attainment" of the ozone and fine particulate standards.

Ecology issues a daily Air Quality Index (AQI) using forecast meteorology and real-time pollutant monitoring. Since adoption of the AQI in the Puget Sound region, there have been several instances of air quality advisories in the "moderate" and "unhealthy to sensitive populations" categories.

4.11.3.2 Climate Change and Greenhouse Gas Emissions

Vehicles emit a variety of gases during their operation; some of these are greenhouse gases (GHGs). The GHGs associated with transportation are water vapor, carbon dioxide (CO_2), methane (also known as "marsh gas"), and nitrous oxide (used in dentists' offices as "laughing gas"). Any process that burns fossil fuel releases CO_2 into the air. Carbon dioxide makes up the bulk of the emissions from transportation.

Vehicles are a significant source of greenhouse gas emissions and contribute to global warming primarily through the burning of gasoline and diesel fuels. National estimates show that the transportation sector (including on-road vehicles, construction activities, airplanes, and boats) accounts for almost 30 percent of total domestic CO_2 emissions. However, in Washington State, transportation accounts for nearly half of GHG emissions because the state relies heavily on hydropower for electricity generation, unlike other states that rely on fossil fuels such as coal, petroleum, and natural gas to generate electricity. The next largest contributors to total GHG emissions in Washington are fossil fuel combustion in the residential, commercial, and industrial sectors at 20 percent, and in electricity consumption, also 20 percent.

4.11.4 Construction Impacts

4.11.4.1 No Build Alternative

With the No Build Alternative, some temporary air quality effects could be experienced by people near the ferry terminal. Existing facilities would be maintained, including emergency repair and replacement of structures and structural systems as needed. There would be minor air quality effects associated with these maintenance projects. However, air quality effects from construction for the No Build Alternative would be less than the effects from the Build Alternative because the scale of construction would be much smaller.

4.11.4.2 Build Alternative

Construction activities typically can generate particulate matter, primarily from fugitive dust and exhaust, and small amounts of other pollutants. These emissions are often associated with earthwork and demolition activities. If uncontrolled, particulate matter would also be generated by construction trucks entering roadways, depositing dust and mud on paved streets.

Heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO and nitrogen oxide in exhaust emissions. If construction traffic were to reduce the speed of other vehicles in the area, emissions from traffic would increase slightly while those vehicles are delayed. These emissions would be temporary (i.e., would occur during the 72-month construction period) and limited to the immediate area surrounding the construction site. In addition, temporary odors may be detected by people near asphalt paving operations. These odors would decrease with increased distance from the source.

Emissions of GHGs would be generated by the project, primarily from fuel used by construction equipment and construction worker vehicles. Construction of the project is currently planned to last from 2015 to 2021. The project traffic plan includes strategic construction timing to continue moving traffic through the area and to reduce backups to the extent possible. WSDOT will seek to set up active construction areas, staging areas, and material transfer sites in a way that reduces standing wait times for equipment. WSDOT will work with the contractors to promote ridesharing and other commute trip reduction efforts for employees working on the project.

4.11.5 Long-Term Impacts

Improvements to the transportation system that are independent of this project would reduce emissions from vehicles and improve air quality in the study area. Programs and trends such as the Puget Sound area's inspection and maintenance (I&M) program, stricter vehicle emission standards for new cars, and gradual replacement of older, more polluting vehicles with newer, cleaner cars, are expected to continue to reduce vehicle emissions. In addition, voluntary programs are expected to contribute to emissions reductions. For example, Washington State Ferries is a participant in the Puget Sound Clean Air Agency's Diesel Solutions Program and has switched its fleet to ultra low-sulfur diesel and biodiesel.

4.11.5.1 No Build Alternative

There would be no long term air quality effects associated with the No Build Alternative.

4.11.5.2 Build Alternative

Air Quality

The traffic volumes in the project vicinity and intersection movements would remain the same with or without the project. For this reason, there would be no long term air quality effects associated with the Build Alternative.

Conformity Statement

A project level conformity determination is not required for this project. The project is exempt from project level conformity analysis (40 CFR 93.126, Table 2); it falls under the exemption for Reconstruction or Renovation of Transit Buildings and Structures. These types of projects are considered air quality neutral by the U.S. EPA.

As a "regionally significant" project, it is included in the current regional transportation plan (RTP), and in the *Central Puget Sound Regional 2007-2010 Transportation Improvement Program* (TIP), which lists all current transportation projects (PSRC 2009b). The RTP and the TIP meet the conformity requirements identified by federal and state regulations for CO.

Climate Change and Greenhouse Gas Emissions

During design, the project team considered the potential impacts of climate change and the potential for climate-related changes in the surrounding natural environment. The current projected median change in Puget Sound sea level is 13 inches by the year 2100, with a range of 6 inches to 50 inches (Mote et al., 2008). Other recent studies suggest that sea level may rise from 2 to 4 feet by the year 2100.

With help from Puget Sound Regional Council (PSRC), WSDOT developed maps showing a two-foot and a four-foot rise in sea level in the project area, and evaluated the potential for proposed design measures to withstand this projected sea-level rise and increased storm intensity. The project design would accommodate the projected median sea-level rise over its 75 year design life. Other adaptive measures also may be needed to address sea-level rise. Other forecasted climate variables such as temperature and precipitation are within the wide range of climate conditions currently experienced in the project area.

As required by RCW 39.35, WSDOT would design the occupied space in the terminal building to meet the US Green Building Council Leadership in Environmental Design (LEED) silver standard. LEED-certified buildings are more efficient than conventional buildings and incorporate a number of conservation measures.

Because the project does not increase capacity at the terminal, traffic generated by the Seattle Ferry Terminal would be the same with or without the project. Operation of the project would not contribute to climate change effects.

4.11.6 Mitigation

Construction would take place over water and away from the adjacent streets. Nevertheless, construction planning would coordinate deliveries from the surface streets with other ongoing construction projects to minimize roadway congestion. Construction plans would be designed to conserve energy and reduce air emissions, by limiting idling equipment, encouraging construction workers to carpool, and locating staging areas near work sites. The mitigation measures to control air emissions during construction would include, but not be limited to:

- Promptly clean up spills of transported material on public roads.
- Schedule hauling and other work tasks to minimize congestion of existing vehicle traffic.
- Locate construction equipment and truck staging areas away from residences as practical, and in consideration of potential effects on other resources.
- Provide wheel washers to remove particulate matter that would otherwise be carried offsite by construction vehicles.
- Cover dirt, gravel, and debris piles, as needed, to reduce dust and wind-blown debris.
- Minimize on-site odors by covering loads of hot asphalt.
- Maintain construction equipment in good mechanical condition to help minimize exhaust emissions.
- Minimize greenhouse gas emissions by reducing the traffic backups and delays, using detours or nighttime construction.
- Establish equipment staging areas and material transfer sites so as to reduce the amount of time the engines of heavy equipment are running while waiting, thus reducing fuel usage and emissions.
- Reduce electricity use in the construction office by using compact fluorescent bulbs, powering off computers every day, and replacing heating and cooling units with more efficient ones.
- Recycle or salvage non-hazardous construction and demolition debris.

The operation of the Build Alternative would not generate additional traffic, and loading/unloading of vessels would be more efficient with the reconfiguration of the trestle. Therefore, the project would not result any significant air quality impacts in the study area. Consequently, no operational mitigation measures are needed.

4.12 Navigable Waterways

The waters of Puget Sound and Elliott Bay are heavily used by commercial ships, recreational boats, ferries, and various other vessels. Navigable waterways are considered in the Environmental Assessment (EA) to ensure that the project is meeting the U.S. Coast Guard regulations and to assess potential direct and indirect effects and mitigation.

Information in this section is summarized from the *Navigable Waterways Technical Memorandum* (WSF, 2013h).

4.12.1 Navigable Waterways Study Area

The study area for the navigable waterways analysis encompasses the project area and its nearby waterways. Navigable waterways in the study area are part of Puget Sound and include Elliott Bay, Sinclair Inlet, and Eagle Harbor, where the Bremerton and Bainbridge Island ferries travel. These ferry routes cross Puget Sound vessel traffic lanes. NOAA's nautical charts were used to view the shipping channels and general anchorage areas (NOAA 2012a and 2012b). These maps can be viewed in detail on NOAA's website at: http://www.charts.noaa.gov/OnLineViewer/PacificCoastViewerTable.shtml.

4.12.2 Methodology

The U.S. Coast Guard directs and enforces vessel movement (rules of the road) in Puget Sound and Elliott Bay. The regulations and policies that guide the navigable waterways analysis are:

- U.S. Department of Homeland Security, U.S. Coast Guard Navigational Rules - International-Inland COMDTINST M16672.2D
- U.S. Coast Guard Regulations for Navigation
  - 33 CFR 83 Inland Navigation Rules and their respective technical annexes (33 CFR 84-90)
  - 33 CFR 162 - Inland Waterways Navigation Regulations
  - 33 CFR 165 - Regulated Navigation, Safety, and Security Zones
- The Rivers and Harbors Act of 1899 - (33 USC 401 et seq.) Requires the Secretary of the Army to issue permits for projects that affect navigable waterways, e.g., bridges, dams, or other structures.
- Section 404 of the Clean Water Act
- Fish and Wildlife Coordination Act - (16 USC 661 et seq.) Requires consultation with the U.S. Fish and Wildlife Service and the appropriate state wildlife agency when a project would impound, divert, channelize, or otherwise control or modify the waters of any stream or other body of water.
- Section 402 of the Clean Water Act, National Pollutant Discharge Elimination System

These regulations and policies apply to the project because Colman Dock is located in Elliott Bay and WSF operates ferries on Elliott Bay, a navigable waterway (33 CFR 329.4).

4.12.3 Affected Environment

The Puget Sound waterway is heavily used by commercial ships, recreational boats, Seattle Fire Department fireboats, U.S. Coast Guard vessels, tribal fishing vessels, and ferries.

4.12.3.1 Ferries

From Colman Dock, WSF vessels currently make 15 daily round trips to Bremerton and 23 daily round trips to Bainbridge Island (WSDOT 2012a).

From Pier 50, POF service to West Seattle and Vashon Island is provided by the King County Water Taxi. During the fall and winter, the water taxi to West Seattle currently operates 13 round trips on regular weekdays and does not operate on the weekends. During the spring and summer, the water taxi operates 18 round trips on regular weekdays and 12 round trips on regular weekend days. In addition to the regular daily service, 3 weekend or 4 weekday round trips are added when there is a Seattle Mariners or Sounders game. The water taxi to Vashon Island operates 6 round trips on regular weekdays (King County 2012).

When WSF vessels are docked at the terminal, other vessels are not allowed within 150 feet of Colman Dock, with the exception of the King County POF.

4.12.3.2 City of Seattle

Seattle Fire Department Station No. 5 is located immediately north of Colman Dock. Two fireboats operate out of this location.

The City of Seattle's Police Department also operates a Harbor Patrol Unit with seven boats based on Lake Union. The Harbor Patrol responds to emergency calls on the water along the City's shoreline.

4.12.3.3 U.S. Coast Guard

South of Colman Dock, the U.S. Coast Guard operates several patrol boats and other vessels from their base on Pier 36.

4.12.3.4 Tribal Fishing

Elliott Bay is designated as Salmon Management Area 10A by the Washington State Department of Fish and Wildlife and is co-managed by the Muckleshoot and Suquamish Tribes. These tribes have federally adjudicated treaty rights to fish, hunt, and gather in Elliott Bay.

4.12.3.5 Commercial and Cruise Ships

The majority of commercial shipping vessels and large cruise ships dock at Port of Seattle facilities including Terminals 5, 18 (Harbor Island), 30, 46, and 91, and Pier 66. Smaller cruise ships such as the Victoria Clipper docks at Pier 69, and the Argosy Cruise ships operate from Piers 55 and 56.

In 2011, 1,521 vessels stopped at Port of Seattle terminals. Cruise ships accounted for 196 of these calls and docked at Terminal 91 or Pier 66. Container ships made 816 calls and docked primarily at Terminals 5, 18 (Harbor Island), 30, or 46. The Port of Seattle terminals had the sixth highest activity among U.S.

ports in 2011 in terms of cargo capacity (for twenty-foot equivalent units, a standard-size cargo container) (Port of Seattle 2011).

Argosy Cruises operates tour and event cruises and typically moors four boats at Piers 55 and 56. Many of these cruises pass by Colman Dock. During the winter season there are typically two cruises on weekdays, four on Saturdays, and three on Sundays. In the spring and fall there are about seven cruises each weekday and nine on Saturdays and Sundays. During the busy summer season there can be up to 15 cruises per day (Seattle 2012a).

4.12.3.6 Recreational Boats

Numerous recreational boaters in Puget Sound pass through Elliott Bay. Although recreational boating occurs all year round, the amount of recreational boat traffic is higher during the spring, summer, and early fall. The Port of Seattle operates two marinas in Elliott Bay: Harbor Island Marina and Bell Harbor Marina at Pier 66. Recreational boaters are required to follow the regulations and instructions of the U.S. Coast Guard (U.S. Coast Guard 2012a and 2012b) and the Seattle Police Department (Seattle 2012c).

For safety and security, recreational boats are not permitted to dock at Piers 50 and 52.

4.12.4 Construction Impacts

4.12.4.1 No Build Alternative

The No Build Alternative would continue to operate on the existing dock structure. The decaying timber portions of the terminal would be replaced as necessary so the facility can continue to operate. Weight restrictions would place Slip 3 at risk of closure. Structural deficiencies in other portions of the terminal could also face emergency maintenance, weight restrictions and possible closure.

If required for construction under the maintenance program, construction staging would be from a barge anchored to Colman Dock, similar to the Build Alternative. All construction activities would take place on Colman Dock or an adjacent barge within WSDOT right-of-way and would not disrupt navigable waterways.

4.12.4.2 Build Alternative

The Washington State Patrol Homeland Security Division provides security on ferries and at the terminals. No permanent effects on security operations are expected. However, while the project is under construction, measures would be in place for construction workers and materials traveling between the dock and construction barges to ensure security on WSF vessels and Colman Dock. The construction barges would be located adjacent to or within 500 feet of Colman Dock.

No significant interference with navigation in the navigable waterways in Elliott Bay is expected as the construction barges and equipment would be anchored in WSDOT right-of-way, and WSDOT would coordinate with the U.S. Coast Guard throughout all construction phases. WSDOT would also coordinate with the Seattle Fire Station No. 5 to make sure construction activities do not interfere with movement of the fireboat moored just north of Colman Dock.

Construction would require occasional movement of barges to and from the site. WSDOT would also coordinate with the Suquamish and Muckleshoot Indian Tribes for these activities.

Project construction is being planned in four phases that would occur over approximately 6 years (69-72 months) beginning in mid-2015. Throughout construction, at least one barge would be present in the waters adjacent to Colman Dock. Up to three barges would be present when the timber trestle is demolished in Phase 4. The locations and movements of the barges would not be known until the construction contractor is selected.

WSDOT plans to phase construction to keep ferries operating on their normal schedule as much as possible. Throughout the construction period, only two of the three slips would be operational at a time. The slip assignments would shift as the construction activities progress. The change in slip assignments would not affect navigation channels in Elliott Bay or in Puget Sound. There is the potential for ferry loading to take longer during peak travel times (such as holidays) when the holding lanes are restricted on Colman Dock, which could have the indirect effect of causing schedule delays. An occasional delay would not be expected to affect other vessels navigating through Elliott Bay or Puget Sound.

Phase 1

Phase 1 is scheduled to begin in 2015 and would last approximately 12 months. Work to install new piles and construct the southern section of the new trestle, and King County's new POF and walkway, would occur from the existing trestle as well as from a barge approximately 80 by 200 feet (16,000 square feet) in size. The barge would be anchored on the southwest corner or on the south side of Colman Dock to support the crane, pile drivers, and other necessary equipment for this portion of the project.

The existing timber POF pier and walkway, including supporting concrete piles, would also be relocated approximately 365 feet further west along the south edge of Colman Dock during Phase 1. The new POF location would not change the route that the boats take once they leave Pier 50. The facility is within the inner harbor line and would not affect navigation.

Up to two barges would also be located adjacent to Slip 3 to replace the dolphins and construct the new transfer span and OHL. These construction activities would not affect navigation of other vessels in Elliott Bay.

Phase 2

Phase 2 would take approximately 22 months. A portion of the south trestle and piles underneath the terminal building would be removed. The removed section of trestle would be replaced with a concrete trestle supported by steel piles filled with reinforced concrete. A new steel pile foundation would be installed for the southern third of the new terminal building which would be constructed with an elevated walkway connecting to the POF platform. A barge would be anchored between Slips 1 and 2 to support the construction equipment needed and would not block the use of Slip 2. These construction activities are not expected to affect navigation of other vessels in Elliott Bay.

Phase 3

Phase 3 would last 21 to 24 months. The entire terminal building and a strip of the north (timber) trestle approximately 100 feet wide immediately north of the existing concrete trestle would be demolished and replaced with a new concrete trestle supported by concrete-filled steel piles. The center third of the terminal building would be reconstructed, and the Slip 2 vehicle and OHL spans would be reinstalled. A barge would be anchored between Slips 1 and 2 and would not block the use of Slip 1. These construction activities would not affect navigation of other vessels in Elliott Bay.

Phase 4

Phase 4 would last 22 to 25 months. The first 8 to 11 months of this phase would overlap with Phase 3. In Phase 4 the remaining portion of the north (timber) trestle would be demolished, and 7,400 tons of piles and 3,500 cubic yards of fill material behind the bulkhead that supports the northern trestle would be removed. The remainder of the new trestle would be reconstructed using steel piles filled with reinforced concrete. The northern third of the new terminal building would be constructed, and temporary pedestrian bridges would be replaced with permanent structures. Two barges would be located adjacent to the north end of Colman Dock. In addition, a third anchored barge may be located nearby within WSDOT right-of-way. These construction activities would not affect navigation of other vessels in Elliott Bay. This phase of construction would occur immediately south of Fire Station No. 5. Barges and construction equipment would not interfere with the station's land or water access, and WSDOT or its contractor would keep the station informed of construction activities.

4.12.5 Long-Term Impacts

4.12.5.1 No Build Alternative

If the project is not constructed, vehicle storage capacity could be reduced on the existing dock over time because of safety concerns. Weight restrictions and possible closure of portions of the trestle could be imposed because of structural deficiencies. Eventually, service disruptions would be possible. However, service disruptions would be unlikely to impact navigable waterways in Elliott Bay.

4.12.5.2 Build Alternative

The Seattle Ferry Terminal Project proposes to preserve transportation functions at Colman Dock without any changes to existing ferry routes in Elliott Bay. Since the project is replacing the existing dock structure near the shoreline and is not increasing ferry service (vessel traffic), no permanent impacts to navigation channels or other waterside access points would be anticipated. Replacement of the POF facility approximately 365 feet west from the existing dock location would not affect main navigational channels.

4.12.6 Mitigation

4.12.6.1 Construction

WSDOT would coordinate with the U.S. Coast Guard, City of Seattle Fire Department, and affected tribes as needed.

Construction mitigation measures would be developed in accordance with all appropriate U.S. Coast Guard and WSDOT regulations, and are anticipated to include:

- Coordinate with the appropriate U.S. Coast Guard authorities and City of Seattle Fire Department (Station No.5) as construction plans and scheduling develop.
- Allow construction barges to be moored only within WSDOT right–of-way.
- Follow Seattle Water and Boating Regulations for operating work vessels or barges along the downtown Seattle waterfront, including coordination with the Port of Seattle and other vessel operators as needed.
- Coordinate closely with other construction projects in the vicinity.

As part of government-to-government consultation with the Muckleshoot and Suquamish Tribes, WSDOT would develop a Communication Protocol to facilitate coordination with the tribes during tribal fishing harvest seasons. The Communication Protocol would be in place for the duration of project construction.

The Washington State Patrol's Vessel and Terminal Security personnel would be kept informed of construction staging, and procedures would be developed for construction worker access to Colman Dock.

WSF terminal operations staff have a communications process with Fire Station No. 5 and would use that notification system during construction. There is also an internal WSF communication system that would alert staff to make outreach efforts when required.

WSDOT would coordinate with King County to ensure that changes to pedestrian access during reconstruction of the POF facilities are communicated to King County Water Taxi riders.

> Who are the Vessel and Terminal Security troopers?
>
> The Washington State Patrol's Vessel and Terminal Security troopers and explosives detection canine teams provide public safety, explosives detection, traffic control, and public assistance for WSF vessels and Colman Dock.

4.12.6.2 Operation

No mitigation measures for long term effects to navigable waterways would be anticipated because this is a preservation project. Ferries would continue to dock in the same locations as they currently do at Colman Dock. The POF would also continue to dock in nearly the same location.

4.13 Socioeconomics and Environmental Justice

As a recipient of federal financial assistance for the Seattle Ferry Terminal Project, WSDOT must ensure non-discrimination on the basis of race, color, or national origin in all of its programs and activities. Title VI of the 1964 Civil Rights Act also requires consideration of a project's effects on people with limited-English proficiency (LEP), to avoid discrimination on the basis of national origin. Presidential Executive Order 13166 requires improved access to federally funded activities for LEP persons, while Executive Order 12898 (1994) requires federal agencies to analyze their actions and environmental impacts on minority and low-income populations.

In assessing whether a project is consistent with federal policy for environmental justice, WSDOT explicitly considers human health and environmental effects related to transportation projects that may have a disproportionately high and adverse effect on minority and low-income populations, and it assures that members of these populations have meaningful opportunities for public involvement during project planning and development.

Information in this section is summarized from the *Environmental Justice Technical Memorandum* (WSF, 2013d).

4.13.1 Socioeconomics and Environmental Justice Study Area

Exhibit 4-29 shows the study area for the assessment of potential environmental justice impacts. The area includes Colman Dock east to First Avenue, bounded by the intersection of First Avenue and Spring Street in the north and the intersection of First Avenue S. and King Street in the south. The study area includes two broad City of Seattle land use designations, Downtown and Industrial, and three urban village designations, Commercial Core Urban Center Pioneer Square Urban Center and the northwest tip of the Greater Duwamish Manufacturing/Industrial Center.

4.13.2 Methodology

The approach for analyzing potential environmental justice impacts included public outreach; outreach to tribal governments; review of other discipline reports and technical memoranda prepared for the Seattle Ferry Terminal Project, the Alaskan Way Viaduct Replacement Project, and the Elliott Bay Seawall Replacement Project; and demographic analysis, primarily using U.S. Census Bureau data. The analysis sought to identify any disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.

Outreach to social service providers for low income and homeless populations and to a low income apartment building in the study area occurred on three occasions. In preparation for EA scoping (January 2012), the Bread of Life Mission, Compass Housing Alliance, Real Change, The Seattle/King County Coalition for the Homeless, Washington Adult Day Services, and the OK Hotel Apartments were contacted by phone and email with an invitation for individual project briefings. At the end of the scoping period (November 2012), the same entities were notified by email about the results of the scoping process and replacement of the King County POF facility as part of the project. In September 2013, these organizations were contacted by phone and email to provide notice about upcoming onboard outreach events and to extend another invitation for an individual project briefing. On all occasions, the invitation was not taken, but the project messages were conveyed.

4.13.3 Affected Environment

4.13.3.1 Demographics

Exhibit 4-30 summarizes population data for the census blocks that fall partially within the study area, as well as for Seattle as a whole. About 69% of the study area population is non-Hispanic white, while about 68% of the city is non-Hispanic white. Minority population percentages in the census blocks within the study area are very similar to those of the city as a whole.

Exhibit 4-31 also indicates the population percentages below the federal poverty level for the study area census blocks (33%) and for the city as a whole (13%).

Exhibit 4-32 shows populations that may have limited proficiency in the English language. Approximately 10 percent of Seattle residents are linguistically isolated; that is, they indicated in their responses to the 2010 census survey that they speak English "not well" or "not at all." Within one-quarter mile of the project site, the LEP percentage is about 3 percent.

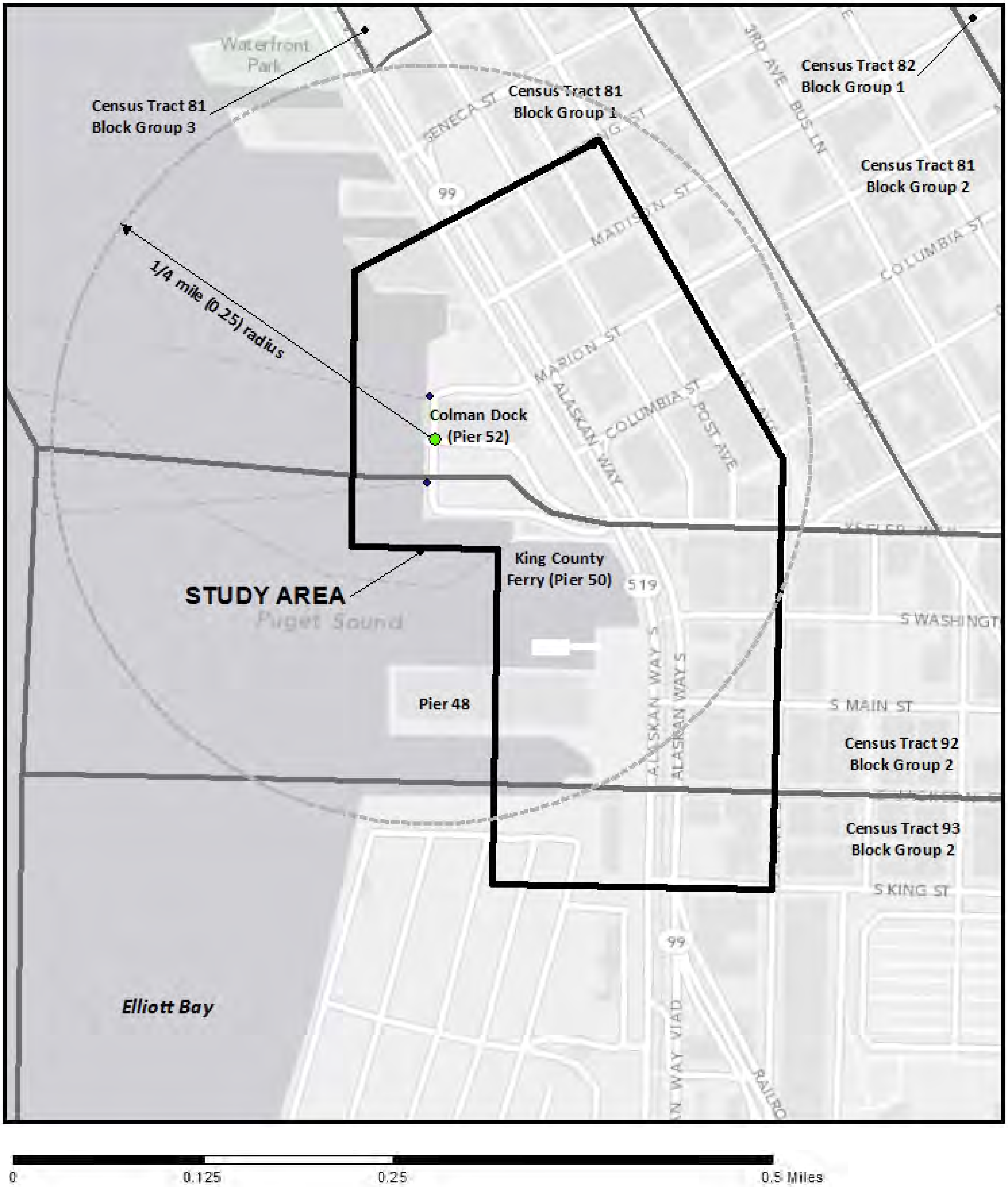
WSF and WSDOT refer to the U.S. Department of Justice guidelines in deciding when to translate documents into other languages. The Department of Justice recommends that if at least five percent or 1,000 persons in a given geographic area speak a language other than English, project materials should be translated into that language. The percentage of linguistically isolated populations within the study area is 3 percent; therefore, project outreach materials will only be translated upon request.

4.13.3.2 Places of Importance to Low-income or Minority Populations

King County Metro, Sound Transit, and Community Transit provide transit service in the study area. WSF provides connections to Bainbridge Island and Bremerton as a public transit service and as a facility in the state highway system. The King County Ferry District currently operates passenger-only ferry service between Pier 50 and West Seattle, and between Pier 50 and Vashon Island. Transit routes are accessed at the transit stops located along Alaskan Way at Marion and Madison Streets, and on First Avenue.

A free downtown circular bus operated by Solid Ground stops at First Avenue and Marion Street Monday through Friday at 30 minute intervals between 7:00 AM and 4:00 PM. This bus provides rides for people living on low incomes and those who access health and human services in the downtown area.

Transit riders in King County are more likely than non-riders to be low-income or minority (King County Metro, 2011). According to the 2011 King County Metro Rider Survey, which collects data on transit use in King County, regular riders are more likely to be minorities than infrequent and non-riders. Of the regular riders who participated in the survey, 25 percent have household incomes below $35,000, compared with only 10 percent of non-riders. This survey did not collect information about whether respondents have incomes at or below the poverty level. Similar data for Community Transit riders was not available at the time of this analysis.



Washington State Ferries

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

N

Washington State Department of Transportation

SOURCE: WSDOT

Exhibit 4-30

Socioeconomics and Environmental Justice Study Area

Seattle Terminal Project

Seattle, Washington

FILE NAME:Ex30_SocioecomicsEnvironmentalJusticeStudyArea.ai / CRE ATED BY: JAC/ DATE LAST UPDATED: 02/03/14

Exhibit 4-31 Summary of Population Characteristics in the Study Area, 2010

Census Group	Total Pop.	HH*	White Alone	Non-White Alone**	Est. Pop. Below Poverty***	%***
Tract 81 Block Group 1	1,478	1,018	78%	18%	1643	39%
Tract 92 Block Group 2	1,499	730	58%	36%	1004	46%
Tract 93 Block Group 2	389	135	69%	27%	362	19%
Study Area Total	**3,366**	**1,883**	**68%**	**27%**	**1,366**	**33%**
Seattle	**608,660**	**283,510**	**69%**	**25%**	**73,338**	**13%**

Source: U.S. Census 2010, P8, P20
* HH = Household
** Non-White Alone includes all of those that selected a different single race from the list of races ("Black only", or "Asian only", etc.).
*** Data represents 2006-2010 census tract level. Census block group level data not available. ACS Seattle total population was 584,685 (B17001)

Exhibit 4-32 Limited English Proficiency Populations in the Study Area and City of Seattle, 2007-2010

	Population 5 Years and Older	LEP populations	
		Total	Percent of total
Study Area 0.25 mile	729	24	3%
City of Seattle	587,767	61,226	10%

Source: U.S. Census 2010, American Community Service 2007-2011
Notes: The 0.25-mile area spans census tracts 81-block group 1; 92-block group 2; and 93-block group 2.

4.13.4 Construction Impacts

4.13.4.1 No Build Alternative

Under the No Build Alternative, there would be no construction-related effects on low-income or minority populations in the study area because the current level of service would be retained. Low-income or minority residents would not be adversely affected by noise, vibration, poor water quality, or increased traffic congestion. Temporary disruptions of ferry service associated with maintenance of a deteriorating facility would contribute to the degradation of reliable transit connections for low income or minority populations.

4.13.4.2 Build Alternative

No disproportionately adverse effects on social resources that are of particular importance to minority or low-income populations are anticipated. Construction activities would not change the existing community character, nor would they result in physical impediments that would make it more difficult for people to reach community services. Project construction would not result in the relocation of any community resources. There would be no construction related effects on the religious institutions or government facilities located in the study area.

Other construction-related effects are not expected to disproportionately affect low-income or minority populations. Project construction would temporarily increase congestion and noise, and change access for the businesses and residents in the area. With the use of BMPs and other coordination and communication measures, low-income and minority populations residing in the census block groups of the study area would not be disproportionately affected.

Current contract terms for both the King County POF and the terminal concession vendors acknowledge the currently proposed project at Colman Dock: negotiations included disclosure of the Seattle Ferry Terminal Project as currently proposed. The terms also document a commitment for the state to reduce minimal disruption or reimburse the vendor the amount of unamortized investment of capital improvements at lease termination. The King County POF lease would end during 2019. The concession contracts for onshore food and beverages vendors who lease space in the current terminal building end in 2014. Both lease terms allow for two extensions with 180-day notice, and allow WSDOT to terminate the lease with an 18-month notice. To the extent practicable, vendor contracts in the terminal would be extended until construction forces closure. Some vendors may continue service during construction by kiosk/cart.

In response to scoping comments and through coordination with King County, the POF facility would continue to operate from Pier 50 through a lease arrangement with WSDOT. During construction Phase 1, the facility would be moved slightly west of the current location, and eventually to the southwestern edge of new concrete trestle. The temporary construction closure would require the POF facility to close for two periods of 2-5 days each.

Since both the King County POF services and the terminal vendors are lease tenants occupying WSF/WSDOT property and the lease terms clearly indicated that the contracts would end with the proposed project, they are not considered “displaced” for the purposes of state and federal relocation laws. No business would be displaced because of the project. Project construction would not disproportionately affect minority and low income populations.

4.13.5 Long-Term Impacts

4.13.5.1 No Build Alternative

Under the No Build Alternative, no improvements would be constructed. Operation of the Seattle Ferry Terminal and King County’s POF facility would continue as under existing conditions without reconfiguration of vehicle holding lanes. If structural deficiencies cause a portion of the dock to be unusable or a slip to be closed, service could be disrupted. Temporary disruptions of ferry service associated with maintenance of a deteriorating facility would contribute to the degradation of reliable transit connections for low income or minority populations.

4.13.5.2 Build Alternative

Since the proposed project intent is to preserve the existing WSF terminal level of service without expansion of capacity or operations, there are insubstantial long-term effects of operations under the Build Alternative. There would be no changes to routes or sailing schedules.

No effects on low-income or minority populations living in the study area are anticipated following construction, because there would be no changes to the ferry service, and site improvements are limited to increased customer safety, access, and circulation.

4.13.6 Mitigation

Construction would affect WSF and King County POF users, workers, residents, recreation users and tourists in neighborhoods surrounding the construction area. WSDOT would implement as necessary the following measures to avoid or minimize effects on all people and businesses within the study area, including low-income or minority populations:

- Continue to work with business owners to transition from the existing terminal through lease terms, and provide mobile or reduced scale, temporary retail opportunities using kiosks/carts on site during construction and in the new terminal until the future spaces are developed.
- Continue to provide adequate public notice of construction activities, business closures, alternate routes, and detour routes and proactively work to reach low-income or minority populations through the use of print and electronic publications that serve low-income or minority populations.
- Offer briefings on project construction to social service agencies that work with low-income or minority populations in neighborhoods of the study area to ensure that information is reaching all ferry users, adjacent businesses, residents, workers, and tourists/visitors.
- Mitigation measures are being developed through consultation with consulting tribes and others to address impacts on resources important to Native Americans. Potential interference with tribal treaty rights is being addressed through government-to-government agreements.
- Implement construction mitigation measures identified elsewhere in this EA.

No permanent mitigation measures for low-income or minority populations would be needed because the project is not anticipated to have any long-term environmental impacts.

Chapter 5 Cumulative Impacts

A cumulative impact is the impact on the environment that "results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7). The analysis and disclosure of cumulative impacts provides the decision-maker and the public with the context in which the action's direct effects are occurring, and shows the environmental implications of the interactions of known and expected management activities. Cumulative impacts are discussed below in proportion to their significance. The assessment of cumulative impacts provided below considers past, present, and reasonably foreseeable future actions in the waterfront, downtown, and Pioneer Square areas that have affected or may affect the environment. It concludes that the project, in combination with these other past, present, and reasonably foreseeable future actions, will not contribute to adverse cumulative effects.

When construction is complete, which is anticipated to be in 2021, the long-term operations and service levels at the Seattle Ferry Terminal will be similar to today's conditions. The terminal will accommodate the same number of sailings as it does today, with the same number of slips, the same vehicle holding capacity, the same number of peak-hour vehicles entering and exiting the site at the same driveway locations. The site will be upgraded seismically with replacement of deteriorated structures, and the reconfiguration of Colman Dock will result in reduced pedestrian-vehicle conflicts, improving safety conditions. A more efficient layout will result in faster loading and unloading, allowing WSDOT to maintain existing sailing schedules and minimize delays. Other long-term effects are anticipated to be positive, including removal of contaminated fill, capping of existing contaminated sediment, and removal of creosote-treated timber piles and support structures. No long-term adverse effects have been identified from project operations.

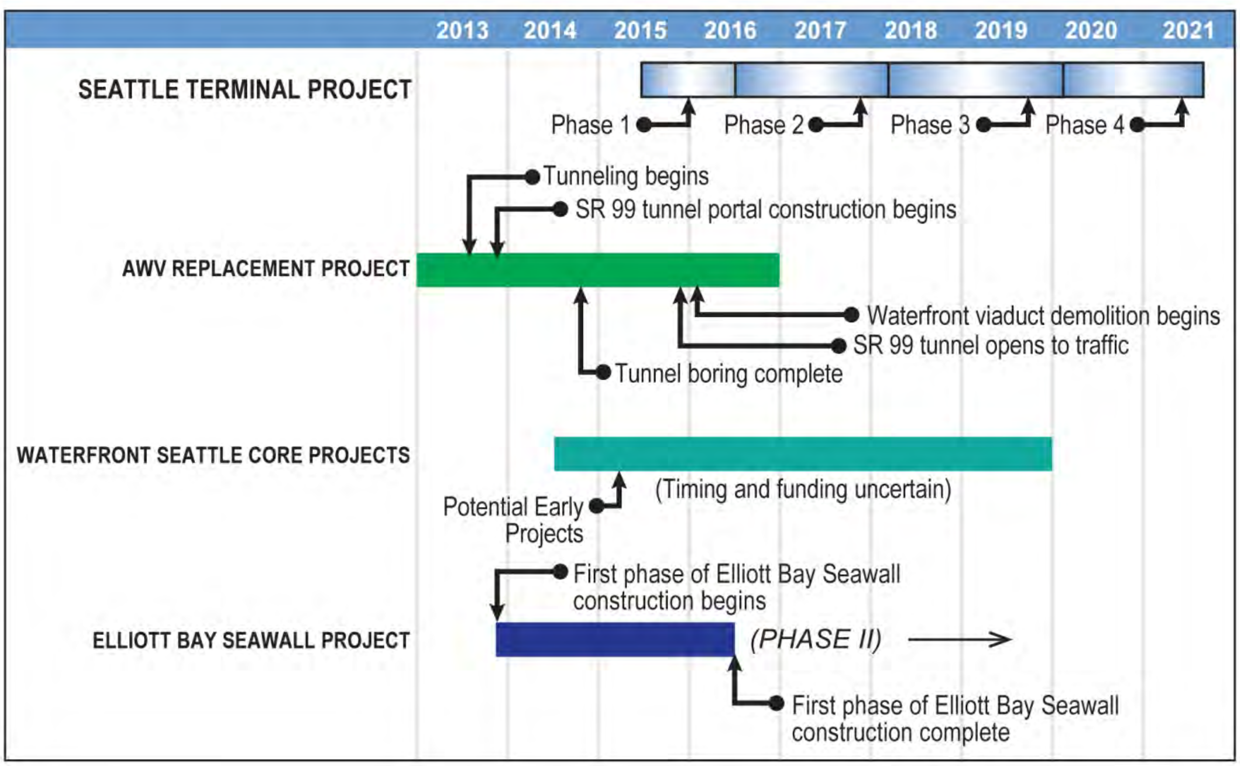
Noticeable adverse cumulative impacts of the project's six -year construction period would be most likely to occur when combined with the effects of other nearby projects that either require in-water work or disrupt the local transportation network. The project is most likely to contribute to adverse short-term cumulative effects related to ecosystems, noise and vibration, water resources, hazardous materials, historic/cultural/archaeological resources, and transportation. These topics and others are addressed below in more detail.

Several other projects are expected to be under construction downtown at about the same time as the Seattle Ferry Terminal Project. WSDOT and SDOT have been monitoring these projects' construction schedules and coordinating efforts to avoid major construction conflicts and to minimize effects to surrounding traffic and land uses. Construction dates are subject to change, but notable projects that are likely to occur close to or simultaneously with the Seattle Ferry Terminal Project include:

- Alaskan Way Viaduct Replacement Project (2011-2016)—This project is scheduled to be completed in late 2016, with the new bored tunnel open to traffic and the existing Alaskan Way Viaduct demolished and removed.
- Elliott Bay Seawall Project, Phase 1 (2013-2016)—Replacement of the central portion of the seawall (Virginia Street to S. Washington Street) near Colman Dock is scheduled to be completed in mid-2016. Replacement of the seawall north of Virginia Street would occur later; this second phase is not scheduled, but the project's EIS notes that it would not occur before 2016.
- Central Waterfront CSO Reduction Project (estimated 2016-2018) —This upgrade of Seattle's combined sewer overflow (CSO) system along Alaskan Way is expected to be closely coordinated with the Elliott Bay Seawall Project's construction.
- Central Waterfront Project (also called Waterfront Seattle; estimated to start in 2016) – This City of Seattle project is in the planning phase. It includes a new pedestrian promenade, two-way cycle track, and new/rebuilt Alaskan Way that accommodates all modes of travel. It also includes two rebuilt public piers, new parks and paths, and new pedestrian connections between the city and waterfront.

Exhibit 5-1 shows the anticipated construction schedules for the Alaskan Way Viaduct Replacement Project, the Elliott Bay Seawall Project, and the Central Waterfront Project, along with the four phases of construction for the Seattle Multimodal Project at Colman Dock.

Exhibit 5-1 Overlapping Construction Schedules (as of December 2013)



This analysis also considered several other smaller planned transportation projects. They include:

- Elliott/Western Connector—This City of Seattle project would connect Pike Street to Battery Street with a grade-separated crossing of the BNSF Railway mainline tracks. The project includes bicycle and pedestrian facilities. The Lenora Street pedestrian bridge would connect to an at-grade pedestrian crossing of this new connector arterial.
- Mercer West Project—This City of Seattle project extends from Fifth Avenue N. to Elliott Avenue. Mercer Street will be restriped and signalized between Fifth Avenue N. and Second Avenue W. to create a two-way street with two lanes in each direction and left-turn pockets. The project will also restripe and re-signalize intersections to convert Roy Street to two-way operations from Fifth Avenue N. to Queen Anne Avenue N. This project is scheduled to be completed in late 2016, concurrent with opening of the new bored tunnel.
- First Avenue Streetcar—This City of Seattle project will run along First Avenue between S. Jackson Street and Republican Street and will extend via Stewart Street to the South Lake Union streetcar line. It will also connect to the First Hill street car line. Once complete, the system will be operated by King County Metro. Construction for this project began in April 2013 and is planned to be completed in late 2014.
- Projects Included in Transit Agency Six-Year Plans—Other regional capital projects include park-and-ride expansions, direct access facilities, in-line transit stop facilities, high-occupancy vehicle lane construction, and other operational roadway improvements.
- King County Metro RapidRide Corridors—These are high-frequency service and bus priority improvements to highly traveled routes within King County Metro's service area. Four of six planned routes are operating, with two more planned to open in 2014.

This cumulative effects analysis used Puget Sound Regional Council (PSRC) travel demand model assumptions, which are based on PSRC's Metropolitan Transportation Plan's regional growth and land use assumptions and regional transit and highway roadway improvements (PSRC, 2001). These data were most recently updated in 2006.

5.1 Ecosystems

Past development activity has fundamentally altered the shoreline of downtown Seattle. Historically characterized by a series of gravel and sand beaches, shallow shorelines, and vegetated wetlands bordered by steep bluffs, the downtown shoreline has been filled, dredged, graded, and altered by rip rap and concrete seawall, roads, rail lines, and utilities. Very limited natural habitat is left along the central waterfront's shoreline.

The Seattle Ferry Terminal Project and the first phase of the Elliott Bay Seawall Project will each require in-water construction along the downtown waterfront. Phase 1 of the Seawall Project would last from 2013 through 2015, overlapping with the Seattle Ferry Terminal Project's construction in the latter half of 2015. The Colman Dock in-water construction would be completed in 2021.

Not including mitigation, the duration of the two projects' combined in-water construction (portions of eight consecutive years) could cause cumulative adverse impacts. The design features included in each project and the mitigation incorporated into the construction planning, however, should prevent such adverse impacts.

Mitigation for impacts to fish and wildlife includes limiting in-water work windows to periods approved by Washington Department of Fish and Wildlife (WDFW). Each project would monitor for the presence of protected species during construction, and take appropriate action when these species are observed to prevent or minimize adverse effects. Numerous best management practices would minimize the chance of adverse impacts occurring from construction activities.

The Elliott Bay Seawall Project includes design features that would have benefits to ecosystems over the long term. It would be rebuilt approximately 15 feet landward of its current location. A cantilevered sidewalk made of a light-penetrating surface (LPS) would be constructed over the water. The purpose of moving the seawall back and installing LPS is to reduce shading, thereby increasing the overall health and density of benthic habitat and organisms, as well as providing a corridor along the seawall for juvenile salmonids that migrate along the shoreline. The Seawall Project would also construct a habitat beach just south of the Seattle Ferry Terminal. More information about the Seawall Project can be found in the *Elliott Bay Seawall Project Final EIS* (City of Seattle, 2013a) and the *Draft Supplemental EIS* (City of Seattle, 2013b).

Another planned project that is expected to provide long-term ecosystem benefits is an improvement to the waterfront's wastewater infrastructure. The City of Seattle plans to upgrade the combined sewer overflow (CSO) system underneath Alaskan Way that transports sewage and stormwater to the wastewater treatment facility at West Point in Discovery Park, north of the project area. Currently the pipe that carries wastewater is undersized and overflows into Elliott Bay during large rainstorms. Upgrading the sewer system would involve installing a storage pipe to reduce the frequency of overflow events, improving water quality in the bay. Seattle's 2010 CSO Reduction Plan Amendment (SPU, 2010) indicates that construction of the Central Waterfront CSO reduction project would continue to be coordinated with construction of the Elliott Bay Seawall Project.

In summary, nearshore habitat quality is expected to improve as a result of the following:

- a new migratory corridor for juvenile salmon (Elliott Bay Seawall);
- reduced in-water sources of contamination (e.g., pilings) (removal of 7,400 tons of creosote-treated pilings at Colman Dock);
- CSO controls (Seattle CSO Project);
- new stormwater treatment at Colman Dock (WSDOT);
- the removal of 150 linear feet of overwater coverage along the shoreline (WSDOT); and
- a clean sand cap covering any remaining contaminated sediment beneath Colman Dock (WSDOT).

5.2 Noise and Vibration

The in-water construction of both the Seattle Ferry Terminal Project and the Elliott Bay Seawall Project includes sediment disturbance and noisy activities such as pile driving that can adversely affect marine life. As described in Section 5.1 Ecosystems, mitigation measures such as limiting in-water activities to periods approved by WDFW, monitoring for the presence of protected species and taking appropriate actions when present would minimize potential impacts. In addition, WSDOT may also use bubble curtains where appropriate when pile driving to further reduce impacts. Thus, with appropriate BMPs, cumulative in-water noise and vibration effects associated with construction would be anticipated to be neutral.

With respect to in-air noise, the modeling and analysis presented in Section 4.3 considers noise from existing noise sources and all traffic increases forecasted to occur within the study area through 2020. The estimates for future years include traffic noise from future development proposals such as the removal and replacement of the Alaskan Way Viaduct, and from both residential and commercial development along the downtown waterfront area. In other words, the analysis already reflects the cumulative effects of the foreseeable growth and anticipates no adverse effects.

Vibratory pile installation and removal associated with the Elliott Bay Seawall Project and the Seattle Ferry Terminal Project could impact sensitive utilities and historic structures. Both projects would monitor vibrations and implement appropriate protective measures if needed to minimize the potential for adverse impacts. The Alaskan Way Viaduct Replacement Project also could cause vibratory impacts to sensitive structures during construction and demolition and will implement similar vibratory monitoring and protective measures. The monitoring and associated protective measures would minimize the potential for any project to have adverse impacts; consequently, no cumulative effects associated with vibration during construction or demolition would be anticipated.

With respect to construction noise, all of the proposed projects must obtain permits from the City of Seattle that place conditions and restrictions on the construction noise they can generate. While there may be occasional periods in which cumulative construction noise is annoying to people nearby, the mitigation measures required by the permits (and generally described in Section 4.3 above) would minimize both the number and duration of those periods.

5.3 Water Resources

Past development along the Seattle waterfront has impacted water resources by physically altering the shoreline and substrate as well as by causing runoff from the urbanized upland. The Seattle Ferry Terminal Project and the other nearby construction projects could cumulatively create adverse water quality impacts including construction-related turbidity and in-water noise. Mitigation would include:

- limiting the timing of in-water work to periods approved by WDFW;
- monitoring for the presence of protected species and responding appropriately when observed;
- using bubble curtains to muffle pile driving noise; and
- implementing an Ecology-approved construction SWPPP and other BMPs to minimize turbidity and reduced water quality.

The Elliott Bay Seawall Replacement Project and the Central Waterfront CSO Reduction Project are expected to improve the current water quality of Elliott Bay by stabilizing fill behind the seawall, reducing the possibility of sediment loading into Elliott Bay, and upgrading stormwater outfalls to prevent possible erosive action adjacent to the wall. While the cumulative effects on water resources may be slightly increased during construction activities, permanent adverse impacts to the receiving water resources would not be expected, and the cumulative effects of the two projects would result in an improvement to water quality. Thus the overall cumulative effects would be positive.

5.4 Hazardous Materials

The Seattle Ferry Terminal Project and the Elliott Bay Seawall Project would both disturb contaminated sediment during in-water work and would generate waste from the removal of contaminated wood, sediment, soil, and asbestos. These materials would require disposal. The Seattle Ferry Terminal Project will also cap exposed contaminated sediment. Localized, negative, short-term cumulative effects would be associated with each of these construction activities due to the potential for limited releases of contaminated materials to the environment. However, over the long run, these actions would cumulatively have a positive effect on the environment.

Projects that generate waste containing contaminated wood, sediment, and soil occur on a regular basis. The contaminated waste produced by the four major projects in the study area (Seattle Ferry Terminal Project, the Elliott Bay Seawall Project, the Central Waterfront Project, and the Alaskan Way Viaduct Replacement Project) would be spread over years of construction, and even when added to waste generated from other projects throughout Seattle, would not adversely affect disposal facility capacities. Short-term coordination between adjacent projects would be conducted, as required, to address staging of waste materials before transport, based on the limited available upland space. Barges used for storage and transport of waste material would help alleviate space constraints.

As described in other sections of this chapter, the various projects would be expected to cumulatively reduce the amount of hazardous materials in the environment.

5.5 Geology and Soils

Upon completion, each of four major planned projects in the study area would be expected to reduce the risk of adverse impacts from seismic hazards (structural damage, catastrophic failure) by incorporating current design standards and technology into project elements, or by removing existing hazardous features. For example, the Elliott Bay Seawall Replacement project will replace the existing deteriorated seawall with a new structure designed to better resist or accommodate seismically–induced loadings, and would reduce the liquefaction risk of fill material behind the seawall using soil improvement methods. The Alaskan Way Viaduct Replacement Project will remove the existing viaduct structure, which is at substantial risk of collapsing during a moderate to large earthquake.

Replacing existing, deteriorating structures with new construction meeting current seismic design standards and construction technology would result in beneficial cumulative effects by reducing risks associated with geology and soils.

5.6 Historic, Cultural, and Archaeological Resources

Previous urban development in the vicinity of the Seattle Terminal has substantially changed the setting of the Washington Street Boat Landing, Fire Station No. 5, the Pioneer Square Preservation District, the Elliott Bay Seawall, and other nearby historic, cultural, and archaeological resources. Other ongoing and reasonably foreseeable future projects, in addition to the Seattle Ferry Terminal Project, will continue to modify the setting of these previously identified resources. Changes in the immediate setting will include the removal of the Alaskan Way Viaduct, a redesigned Alaskan Way, and a reconfigured Colman Dock and terminal building. The seawall itself will be replaced and moved landward, with a cantilevered pedestrian walkway over the water, and new parks and open space are planned. In a broad sense, however, the general setting would remain that of a highly urbanized modern waterfront city.

Cumulative construction impacts from the several projects would include noise, vibration, dust, and traffic disruption from the concurrent efforts of SDOT and WSDOT over a period of eight years. These cumulative impacts would not be anticipated to affect the eligibility criteria for the area's historic, cultural, or archaeological resources. Thus, cumulative effects on historic, cultural and archaeological resources would be neutral.

5.7 Transportation

Overlapping construction of the four major projects could cause temporary adverse cumulative effects on transportation in the central waterfront area. These could occur if schedules change substantially and/or if coordination of the construction activities is less effective than predicted. Traffic congestion and disruptions would affect all drivers, including transit and freight, as well as bicyclists and pedestrians.

Construction of the Elliott Bay Seawall is anticipated to be completed before WSDOT demolishes the Alaskan Way Viaduct in 2016. However, it would occur concurrently with construction of the bored tunnel and traffic disruptions along Alaskan Way between S. Washington Street and Pike Street are likely. As design and construction planning of the Seattle Ferry Terminal Project move forward, cooperation between project partners and other agencies will be essential to coordinate construction schedules effectively and minimize possible disruptions resulting from overlapping activities.

Although there are no reasonably foreseeable projects proposed to increase roadway capacity, cumulative effects on transportation over the long term would be anticipated to be neutral, and possibly beneficial, as the transportation networks operate more safely and efficiently.

5.8 Land Use

As described in Section 5.7, temporary cumulative negative effects on transportation could occur. This could affect access to and operation of land uses during construction.

The Seattle Ferry Terminal Project would not contribute to cumulative adverse land use impacts. It would not displace existing buildings or require the acquisition of new property; thus it would not contribute to potential impacts of this type resulting from other projects. The four major projects would cumulatively result in beneficial effects such as more public open space, a more active waterfront, and a vibrant mix of uses consistent with city and regional plans.

5.9 Visual Quality

All four major projects would result in changes to visual resources during their construction and over the long term. Construction activities include fencing, staging and storage areas, disturbed sites, and a variety of ancillary visual elements. In general, the overlapping construction schedules would result in more intense impacts over a shorter period of time than would otherwise occur.

Long-term effects are anticipated following the completion of the Alaskan Way Viaduct demolition, the reconstruction of Alaskan Way, improvements associated with the Seattle Central Waterfront Project and the Seattle Ferry Terminal Project. The Seattle Central Waterfront Project is intended to reconstruct and revitalize the Seattle waterfront. It includes several elements that would affect the visual character of the area surrounding the ferry terminal, including changes to several of the views used for analysis of potential impacts. A pedestrian promenade with tree plantings has been proposed along Alaskan Way. Pedestrians on the sidewalk would experience a more enclosed visual environment, with longer-distance views to the stadium district or downtown buildings screened by trees, and more emphasis on the foreground views to street-front retail and the new ferry terminal. Based on the higher quality views anticipated in the long term, cumulative effects on visual quality would be expected to be positive.

5.10 Air Quality

5.10.1 Air Quality

Localized, short-term cumulative air quality impacts could result from concurrent construction of multiple projects, especially if construction detours and material haul routes are not well coordinated. The best management practices required by various permits, and generally described in Section 4.11, would minimize these impacts.

Over the long term, the Seattle Ferry Terminal Project would not contribute to any adverse cumulative air quality impacts, because operations would be the same with or without the project. Moreover, as described in Section 5.7, the transportation network is expected to operate more efficiently over the long term, which would result in beneficial cumulative effects on air quality.

5.10.2 Greenhouse Gas and Climate Change

WSDOT designed the new terminal building to last 50 years and the new trestle superstructure and substructure to last 75 years. Features are incorporated that would provide greater resilience and function with the potential effects brought on by climate change. Rising sea-levels and the potential for changes in wave action were considered by the project team. Other forecasted climate variables such as temperature and precipitation are within the wide range of climate conditions currently experienced in the project area. The new hydraulically operated vehicle and passenger overhead loading span would be designed to withstand the sea level rise. Project-level actions that can help reduce greenhouse gas emissions include: Reducing stop and go conditions; expanding transit and non-motorized options for travelers; and increasing the reliability of transit and HOV travel times. The improved multi-modal services provided at the new terminal will help reduce overall GHG emissions. These choices would reduce overall GHG emissions.

Emissions of GHGs would be generated by the project, primarily from fuel used in construction equipment and construction worker vehicles. Construction of the project is currently planned to last from 2015 to 2021. The project traffic plan includes strategic construction timing to continue moving traffic through the area and reduce backups to the extent possible. There would be an approximate six-month overlap in construction of the Seattle Ferry Terminal Project and the Elliott Bay Seawall Project. WSDOT will seek to set up active construction areas, staging areas, and material transfer sites in a way that reduces standing wait times for equipment. WSDOT will work with the contractors to promote ridesharing and other commute trip reduction efforts for employees working on the project.

5.11 Navigable Waterways

While Colman Dock is being replaced, close coordination with the other waterfront-area projects would be needed to ensure that construction activities would not conflict and to minimize the cumulative adverse impacts of the construction on the navigation channels.

Replacement of the seawall in the area near Colman Dock is expected to occur from late 2015 through early 2016. The Elliott Bay Seawall Project may use barges or other types of vessels to bring materials to the work site, haul away excavated materials and spoils, and serve as work platforms for some in-water activities such as the proposed habitat beach. Their operations would be sited and timed to avoid vessel traffic lanes and minimize effects on WSDOT and passenger-only ferry service to the greatest extent possible (Seattle 2012).

Coordination would also be needed with the Alaskan Way Viaduct Replacement Project. Spoils from tunnel boring are anticipated to be removed by barge from Terminal 46, south of Colman Dock, through late 2014.

The Waterfront Seattle project is in the early stages of design. Construction activities could start as soon as 2016. If the construction period overlaps with the Seattle Ferry Terminal Project, and especially if the project proposes to use barges to transport construction materials or as staging areas, the projects would need to coordinate closely.

With effective coordination, short-term cumulative effects are not anticipated. All other reasonably foreseeable projects described in the EA occur on land and would not affect navigation.

In the long term, no adverse cumulative effects to navigable waterways would be expected.

5.12 Environmental Justice

Close coordination would be needed during construction of the Seattle Ferry Terminal Project with the other major projects to ensure construction activities would not conflict.

The following reasonably foreseeable cumulative effects on low-income, minority, and LEP populations are anticipated during construction:

- Construction-related traffic congestion for the combined projects could contribute to a cumulative adverse effect on travel times. This would affect all WSDOT and passenger-only users, including low-income, minority, and LEP populations.
- The duration and extent of in-water work during construction would temporarily increase the marine habitat exposure to elevated noise and turbidity levels, and to contaminated sediments within the Colman Dock vicinity. While this could temporarily decrease water quality and affect fish health within the usual and accustomed tribal fishing areas, these effects would not be significant with the use of best management practices described in Section 5.3.
- Combined with marine habitat features and construction related clean-up efforts associated with other reasonably foreseeable projects in the region, the project would create a positive cumulative effect for residents in the project area, including low-income, minority, and LEP populations. It would also benefit usual and accustomed tribal fishing areas.

With coordination, no disproportionate cumulative effects to low-income, minority, LEP populations, or to the Suquamish Tribe and the Muckleshoot Indian Tribe usual and accustomed fishing areas in combination with other current or reasonably foreseeable projects would be expected. There are no known projects that would impair or substantially cause disproportionate effects to environmental justice populations in the vicinity of Colman Dock.

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