
Discipline Report

Water Quality

Prepared by:
HNTB Corporation

September 7, 2013



Environmental Assessment

Magnolia Bridge Replacement
City of Seattle

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What is the Magnolia Bridge Replacement Project?

The Magnolia Bridge was constructed in 1929 and has been modified, strengthened and repaired several times. The west end of the bridge was damaged by a landslide in 1997 and was closed during repairs. Bridge columns and bracing were repaired and replaced. Construction included six additional supports and a new retaining wall north of the bridge to stabilize the bluff from further landslides. The 2001 Nisqually Earthquake also resulted in bridge closure during repairs. Nearly half of the original concrete braces on the west portion of the bridge were damaged beyond repair and were replaced with steel bracing. A partial seismic retrofit of the single-span bridge structure over 15th Avenue West was completed in 2001.

Inspections of the bridge concluded that the concrete structure is showing signs of deterioration. The concrete is cracking and spalling at many locations, apparently related to corrosion of the reinforcing steel. Currently a bridge conditions study is being completed to determine if the bridge has deteriorated further.

The Magnolia Bridge Replacement Project proposes to replace the existing Magnolia Bridge structure, approaches, and related arterial connections with facilities that maintain convenient and reliable vehicular and non-motorized access between the Magnolia community and the rest of the City of Seattle.

What's been done so far?

The Seattle Department of Transportation (SDOT) commissioned a Type, Size, and Location (TSL) study after the 4,400-foot Magnolia Bridge sustained damage in the 2001 Nisqually Earthquake. Although the bridge was repaired and is now safe for motorists to use, it would be at risk if another seismic event were to occur.

In 2002, SDOT started identifying alternatives for replacing the Magnolia Bridge. The project team identified 25 project alternatives in both existing and new locations in the Interbay neighborhood. After two rounds of technical review and an extensive public involvement process, the team selected three build alternatives and the no build alternative for further study in a National Environment Policy Act (NEPA) environmental document.

SDOT began analyzing and comparing the impacts of the three alternatives to complete its obligations under the NEPA through the development of a draft Environmental Assessment (EA) and environmental discipline reports:

- Air Quality
- Environmental Justice
- Geology and Soils
- Hazardous Materials
- Historic, Cultural and Archaeological Resources

- Land Use
- Noise
- Public Lands, Section 4(f)
- Public Services and Utilities
- Social, Economic, and Relocation
- Traffic and Transportation
- Visual Quality
- Water Quality
- Wildlife, Fisheries, and Vegetation

Based, in part, on the technical information provided in these reports and the TSL study, SDOT recommended a preferred alternative. Other factors considered included, for example, community input and cost.

What alternatives are being considered?

After two rounds of technical review and an extensive public involvement process, the team selected Alternatives A, C, and D for further study in a NEPA environmental document¹.

- Alternative A (Preferred Alternative) will replace the bridge with a similar facility just south of the existing bridge.
- Alternative C combined bridge and surface segments, arcing to the north through the Port's property.
- Alternative D maintained the same endpoints as currently exist for the Magnolia Bridge, but arched the alignment to the north.

What is the Preferred Alternative?

In March 2006, the Seattle Department of Transportation (SDOT) recommended Alternative A as the Preferred Alternative to replace the Magnolia Bridge. Alternative A replaces the existing bridge with a new structure immediately south of the existing bridge between Magnolia Bluff and Pier 90, and on the existing bridge alignment between Pier 90 and 15th Avenue West. Ramps would provide access from the bridge's mid-span to the waterfront and the Port of Seattle Terminal 91 uplands property. Connections at the east and west ends of the bridge would be similar to the existing bridge. In November 2006, SDOT selected a bridge structure type following several public outreach events and consultations with the project's Design Advisory Group² and the Seattle Design Commission³.

¹ Detailed descriptions of the three build alternatives can be found on pages 7 through 16 (pages 17 through 26 of this document) of the Social, Economic, and Relocation Discipline Report (draft revised December 2006).

² The Magnolia Bridge Design Advisory Group met from 2002 to 2008 and included representatives from: Bicycle Alliance of Washington, Magnolia Chamber of Commerce, Magnolia Community Club, Magnolia/Queen Anne District Council, Port of Seattle, Queen Anne Chamber of Commerce, Queen Anne Community Council, Seattle Marine Business Coalition and BINMIC, Uptown Alliance and Friends of Queen Anne.



Figure 1 Alternative A (Preferred Alternative)

What's new?

The project has been on hold for final design and construction since 2007. In 2013, SDOT and the Washington State Department of Transportation decided to complete the project's environmental documentation. Since 2007, several project study area conditions have changed. Three of the more significant changes are the terminations of the Seattle Monorail Project and the Port of Seattle's North Bay Master Plan process, and the pending acquisition of the Terminal 91 West Yard for expansion of Smith Cove Park and siting a King County combined sewer overflow (CSO) facility.

Seattle Monorail Project

The Seattle Monorail Project Green Line was in development during the TS&L phase of the Magnolia Bridge Replacement Project. Discipline reports prepared in 2003 through 2005 considered the effects of the monorail and bridge projects. The Green Line included an elevated monorail in the 15th Avenue West/Elliott Avenue West corridor at the east end of the Magnolia Bridge. Following a November 2005 public vote that did not approve a reduced-scale project, the project was terminated prior to any construction and all purchased property was sold.

North Bay Master Plan

During the TS&L phase of the Magnolia Bridge project, the Port of Seattle prepared a Master Plan for 94 acres of Port-owned upland properties at Terminal 91 and five acres of adjacent, City of Seattle-owned property. The total 99-acre area was termed the "North Bay Site" (Port of Seattle 2005). The North Bay Preferred Alternative assumed 3.75 million square feet of new building space developed over 25 years in an urban industrial campus. In addition, the North Bay Preferred Alternative assumed modifications and additions to the Seattle Comprehensive Plan and

³ The Seattle Design Commission is a citizen advisory committee appointed by the Mayor and confirmed by City Council to provide feedback and recommendations on the design of capital improvements and other projects and policies that shape Seattle's public realm.

rezoning of Port-owned property. No further action on Port Commission adoption of the Master Plan has taken place since 2005 and the site remains in industrial zoning.

In 2010, the Port conducted a development options analysis of Terminal 91 (Port of Seattle 2010). The analysis focused only on uses permitted under current zoning. The analysis noted that there has been a historic demand for yard storage on the North Bay property, in the form of vehicle parking and equipment storage and concluded that this remains its current highest and best use.

Magnolia Bridge Replacement discipline report references to North Bay generally refer to the general site and not to specific future development conditions. These references are not revised in the discipline report addendum. Conditions addressed for Alternative A are the same for the Magnolia Bridge Replacement Preferred Alternative.

Smith Cove Park Expansion

In March 2013, an agreement was reached between the City of Seattle, King County and the Port of Seattle to acquire the Terminal 91 “West Yard” property for the Magnolia Combined Sewer Overflow project and as an addition to Smith Cove Park. The West Yard property is the 5.38 acres south of West Garfield Street and east of 23rd Avenue West. About 0.79 acre will be purchased by King County for an underground storage tank and an above ground building for the South Magnolia Combined Sewer Overflow (CSO) facility. Other portions in the north part of the remaining 4.60-acre site will be permanent pipeline, surface and aerial easements to King County for the operation of the CSO facility. The design of CSO facilities on the West Yard site and adjacent Terminal 91 areas have been coordinated with the City of Seattle to accommodate the future Magnolia Bridge replacement structure including the ramps to and from 23rd Avenue West.

What’s in this discipline report?

2005 Water Quality Discipline Report (Draft)

A draft Water Quality Discipline Report (draft 2005) for the Magnolia Bridge Replacement Project was prepared in 2005 during the Type, Size and Location design phase of the project. The report describes the methods and information sources used to describe surface and groundwater conditions in the project study area. This report also describes potential environmental impacts of the project and mitigation measures.

This draft discipline report has been available on the Seattle Department of Transportation web site for the Magnolia Bridge Replacement Project (<http://www.seattle.gov/transportation/magbridgereplace.htm>). The report is included in this document in its entirety.

Water Quality Discipline Report Addendum

Since completion of the original Water Quality Discipline Report (draft 2005), the Seattle Department of Transportation recommended a preferred alternative alignment and bridge types in 2006 and completed the bridge design to approximately the 30 percent level in 2007 and 2008. The Water Quality Discipline Report Addendum provides updated regulatory information and updated impact analysis for the Preferred Alternative (Alternative A – Ramps). Sources for Preferred Alternative water quality information are primarily the Magnolia Bridge Storm Drainage Report for the 30 percent design submittal (KPFF 2008) and the draft Biological Assessment (SDOT 2013a).

No further design development was done for Alternative A – Intersection, Alternative C, Alternative C – Intersection, or Alternative D – Ramps. Impact analyses have not been revised for these alternatives.

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**Discipline Report
Addendum**
Water Quality

Prepared by:
HNTB Corporation

September 7, 2013



**Seattle Department of Transportation
Agreement No. T12-64**

Environmental Assessment

Magnolia Bridge Replacement
City of Seattle

See the Table on Contents on page *iii*.

Introduction

Alternative A – Ramps evaluated in the Water Quality Discipline Report (draft 2005) was selected by the Seattle Department of Transportation (SDOT) as the Preferred Alternative in 2006. The Plans, Specifications and Estimates (PS&E) phase of the Magnolia Bridge Replacement Project advanced the Preferred Alternative design to the 30 percent level. The design was supported by a storm drainage system report (KPF 2008) and geotechnical subsurface investigations and laboratory testing documented in a Geotechnical Engineering Report (Shannon and Wilson 2008).

The PS&E phase subsurface explorations consisted of 24 borings and two test pits, all on or near the Preferred Alternative alignment. Ground water depths below ground surface were recorded for all borings and groundwater observation wells were installed in two of the borings. Soil samples were collected from all borings near the groundwater interface and tested for contamination.

Because build Alternatives C and D are no longer under consideration, the impacts and mitigation updates are limited to the Alternative A (Preferred Alternative) alignment. Alternative A had two design options: Alternative A – Intersection with an intersection on the bridge connected to a north-south roadway direct north into the Terminal 91 North Bay property; and Alternative A –Ramps with half-diamond interchange ramps at 23rd Avenue West to and from the east. The Preferred Alternative includes only 23rd Avenue West ramps to and from the east.

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Applicable Regulations and Policies

This water quality discipline report has been prepared consistent with the guidelines contained in Chapter 430 Surface Water and Chapter 433 Groundwater of the Washington State Department of Transportation (WSDOT) Environmental Procedures Manual, M31-1.

See the Water Quality Discipline Report (draft 2005) for applicable regulation and policies. Updated information for several regulations and policies is provided below.

City of Seattle

The City of Seattle Stormwater Code (Seattle Municipal Code Titles 22.800 through 22.808) adopted in 2009 mandates that water quality treatment facilities shall be installed and maintained to treat flows from pollution generating pervious and impervious surfaces of the site being developed. The project Preferred Alternative will discharge to existing drainage systems that outfall to Elliott Bay. Flow control is not required if the Director of Seattle Public Utilities (SPU) determines there is sufficient capacity to carry existing and anticipated loads from the point of connection to a designated receiving water body such as Elliott Bay. The Stormwater Code also requires the uses of Green Stormwater Infrastructure (GSI) for water quality treatment to the maximum extent feasible.

The City of Seattle 1988 CSO Control Plan outlined a program to reduce Combined Sewer Overflows (CSOs) for seven priority basins, including Elliott Bay.

SPU is preparing a “Protecting Seattle’s Waterways Plan” and accompanying Environmental Impact Statement. The plan is scheduled for draft release in 2014 and adoption in 2015 (SPU 2013b). The plan will reduce the amount of raw sewage and polluted stormwater flowing into Seattle’s creeks, lakes, rivers and Elliott Bay and will meet Seattle’s obligation to prepare a Long-Term Control Plan, a required element of EPA’s Combined Sewer Overflow Control Policy.

Surface Water Methods

See the Water Quality Discipline Report (draft 2005) for surface water methods. Additional methodology for the Preferred Alternative is available in the Magnolia Bridge Storm Drainage Report for the 30 percent design submittal (KPF 2008) and in the Biological Assessment (SDOT 2013a). The bridge replacement will also be required to comply with the Green Stormwater Infrastructure requirements that apply to roadway projects (SPU 2013c).

Groundwater Methods

See the Water Quality Discipline Report (draft 2005) for groundwater system information. Additional groundwater information for the Preferred Alternative is

available in the Magnolia Bridge Storm Drainage Report for the 30 percent design submittal (KPF 2008) and in the Magnolia Bridge Geotechnical Engineering Report (Shannon and Wilson, Inc. 2008).

Affected Environment

This section describes the affected environment of the study area as it relates to Water Quality considerations. Information in this section has been compiled consistent with the guidelines contained in Chapter 430 Surface Water and Chapter 433 Groundwater of the EPM

Historic Environment

See the Water Quality Discipline Report (draft 2005) for the historic environment discussion.

Existing Built Environment

See the Water Quality Discipline Report (draft 2005) for the existing built environment conditions for:

- Topography
- Climate
- Drainage basins and watersheds

Surface Water Resources

Water bodies within or adjacent to the project site are Smith Cove, the Smith Cove Waterway, Lake Jacobs (an industrial pond located on Terminal 91), Elliott Bay and Puget Sound. There are no streams or wetlands identified within the study limits.

Elliott Bay Water Quality

Since the Water Quality Discipline Report (draft 2005) was prepared, Ecology has issued and EPA has approved a “use-based” system for applying the water quality criteria (Ecology 2012). Marine waters are defined by WAC 173-201A-612.

Addendum Table 1 shows “Elliot Bay” water quality standards apply to Elliott Bay east of a line from Pier 91 to Duwamish Head. West of that line, Puget Sound standards apply. Puget Sound and Elliott Bay have “extraordinary” and “excellent” aquatic life use standards, respectively.

**Addendum Table 1
Project Area Marine Water Quality Standards**

Marine Waterbody	Aquatic Life Uses				Shellfish Harvest	Recreational Uses		Miscellaneous Uses				
	Extraordinary	Excellent	Good	Fair		Primary Contact	Secondary Contact	Wildlife Habitat	Harvesting	Com/Navig	Baoting	Aesthetics
Elliott Bay east of a line between Pier 91 and Duwamish Head		✓			✓	✓		✓	✓	✓	✓	✓
Puget Sound	✓				✓	✓		✓	✓	✓	✓	✓

Source: Ecology 2012.

The Water Quality Discipline Report (draft 2005) reported 2001 water quality monitoring results for the two King County ambient monitoring stations, KSYV02 (Magnolia) and LTAB01 (Inner Elliott Bay) closest to the project site. The data for these stations represent the most applicable, available sampling data in regards to the project site.

Concentrations of fecal coliform bacteria at the Magnolia station exceeded the State percent criteria of 43 col/100ml in samples from 2003 through 2005. On the basis of the 2004 and 2005 data, the location was assessed as a Category 5 water body impairment in the EPA-approved 303(d) list in December 2012. Category 5 water bodies are polluted waters that require approval of a total maximum daily load (TMDL) or other water quality improvement (WQI).

Elliott Bay Sediment Quality

The three nearshore sediment sampling stations shown in Water Quality Discipline Report (draft 2005) Table 1 were sampled in 2007 as part of an Elliott Bay sediment quality assessment (Ecology 2009). Addendum Table 2 shows the 2007 survey results for the three stations. Station #115 near Pier 90 had a “Degraded” sediment quality classification in 1998 and in 2007 was classified as “Intermediate/Degraded.” Station #178 was “Intermediate/High” in 1998 and was “High” in 2007. Stations #180 was “Intermediate/Degraded” in 1998 and was “High” in 2007. These changes are in line with the survey’s finding of bay-wide slight improvement in sediments quality.

Addendum Table 2
Sediment Quality Results Summary in the Elliot Bay Smith Cove Area

Station	Location (Stratum Type)	Chemicals exceeding SQSs	Chemicals exceeding CSLs
115	Elliott Bay, east side of Pier 90 (Harbor)	(Benzo(a)pyrene, Benzo(g,h,i)perylene, Indeno(1,2,3-c,d)pyrene	none
180	Elliott Bay, Piers 89-90 (Harbor)		No WA standards exceeded
178	Elliott Bay, south of Elliott Bay Marina (Urban)		No WA standards exceeded

Source: Ecology 2009, Table 1

Aquatic Endangered Species Act (ESA) Status

Refer to the Wildlife, Fisheries, and Vegetation Discipline Report (SDOT 2013g) and the Biological Assessment (SDOT 2013a) for discussions of project area ESA issues.

Public Water Supply and Wastewater Systems

The King County South Magnolia Combined Sewer Overflow (CSO) Project will control CSOs into Elliott Bay from Magnolia. Part of the facility is a 1.5 million gallon capacity underground storage tank that will be located south of the existing Magnolia Bridge on Terminal 91 West Yard property east of 23rd Avenue South. Flows will enter the tank from a new gravity sewer line in the West Galer Street right of way and in permanent easements in City of Seattle park property and private property. Flow out of the tank will connect to the South Magnolia Interceptor line by a pipeline in permanent easements in City of Seattle and Port of Seattle property. See the Social, Economic, and Relocation Discipline Report (SDOT 2013e) and the Public Lands, Section 4(f) Discipline Report (SDOT 2013c) for a discussion of the Seattle Parks and Recreation purchase or the West Yard property.

Refer to the Public Services and Utilities Discipline Report (SDOT 2013d) for additional water and wastewater information and issues within the study area.

Groundwater

Geotechnical borings were made in 2007 and 2008 during the 30 percent design phase for the Preferred Alternative. Soil samples were collected from all 24 borings at groundwater depths and tested for contamination. Three of the borings had levels of contaminants above Model Toxics Control Acted (MCTA) Method A cleanup criteria for unrestricted land use. See specific details regarding individual contaminants, their sources, and respective concentrations in the Hazardous Materials Discipline Report (SDOT 2013b).

Studies and Coordination

Studies

The Soils and Geology Discipline Report (SDOT 2013f) contains geotechnical boring and ground water monitoring well data from the Geotechnical Engineering Report (Shannon and Wilson, Inc. 2008) that supplements the figures located in Appendix A of the Water Quality Discipline Report (draft 2005).

The Magnolia Bridge Replacement Storm Drainage Report (KPFF 2008) contains the water quality treatment requirement and 30 percent design for the Preferred Alternative. The Biological Assessment (SDOT 2013a) provides estimates of pollutant load removal of the Preferred Alternative stormwater treatment system.

Data Sources

Data sources are described in the Water Quality Discipline Report (draft 2005). Data sources used for the Water Quality Discipline Report addendum are listed in the References section.

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Assessments of potential impacts were conducted consistent with the guidelines contained in Chapters 431 and 433 of the WSDOT Environmental Procedures Manual.

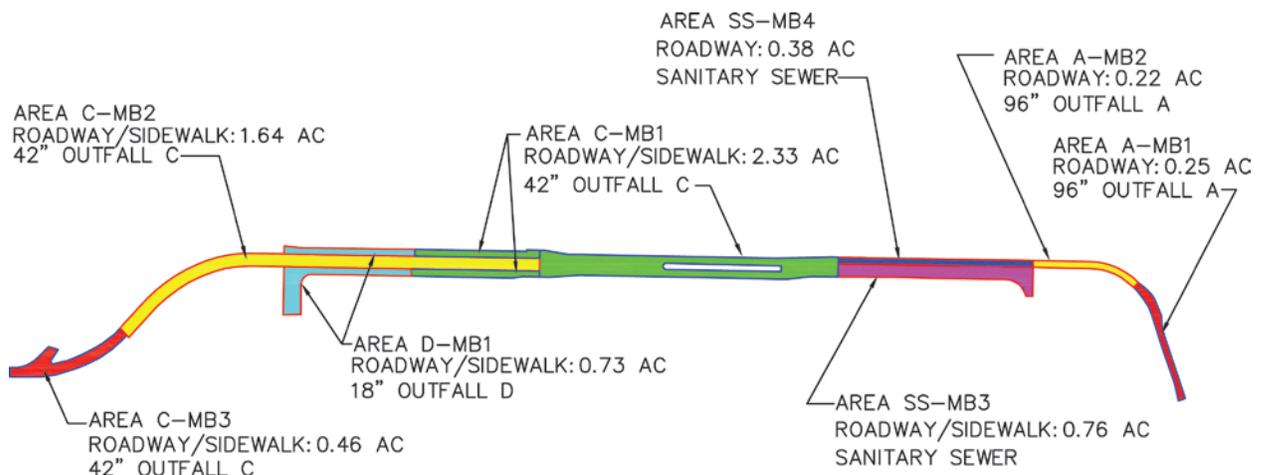
Surface Water Impacts

Operational Impacts

No-Build Alternative

The Storm Drainage Report (KPF 2008) completed for the Magnolia Bridge Replacement Project 30 percent design phase calculated the drainage areas of the existing bridge. Addendum Figure 1 shows the location of these areas and the Water Quality Discipline Report (draft 2005) Figure 14 shows the outfall connections. Outfall A is a Seattle Public Utility (SPU) 96-inch pipe discharging to the Smith Cove Waterway near West Garfield Street and Alaskan Way West. Outfall C is a Port of Seattle 42-inch storm drain discharging to Smith Cove between Pier 91 and the West Yard property. Outfall D is an 18-inch SPU storm drain in the 23rd Avenue West right of way. It discharges to Smith Cove at the 23rd Avenue West street end. The section of the bridge between 15th Avenue West and the BNSR Railway drains to a sanitary sewer in 15th Avenue West. Addendum Table 3 shows the distribution of the total 6.77-acre bridge drainage area to four outfalls and one sanitary sewer.

There is no separation of runoff from roadways which are pollution-generating impervious surfaces (PGIS) and non-PGIS areas such as sidewalks. There is no treatment to remove pollutants from the runoff of the 5.63 acres draining to the four outfalls. Runoff of the 1.14 acres draining to the sanitary sewer is treated at the King County Metro West Point Wastewater Treatment Plant.



Source: KPF 2008. Figure 4.

**Addendum Figure 1
Existing Bridge Drainage Areas**

Addendum Table 3 Existing Bridge Outfall Drainage Areas

Facility (owner)	Drained Area (acres)
Outfall A (SPU)	0.47
Sanitary sewer (SPU)	1.14
Outfall C (Port of Seattle)	4.43
Outfall D (SPU)	0.73
Total	6.77

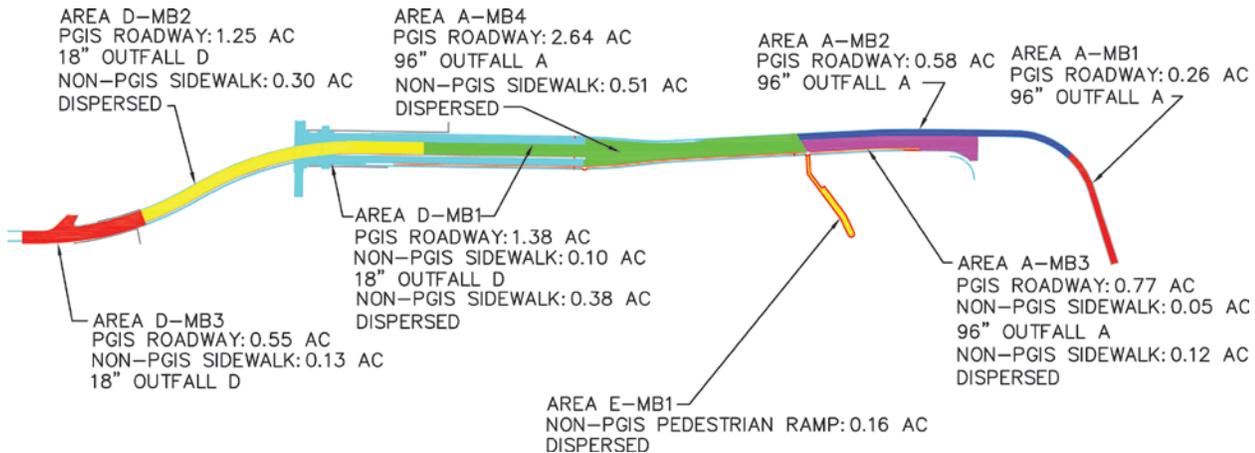
Source: KPFF 2008. Table 2.

Alternative A (Preferred Alternative)

The stormwater drainage system for the Preferred Alternative would separate runoff from PGIS areas requiring treatment from the non-PGIS areas not requiring treatment. The non-PGIS areas are sidewalks and pedestrian ramps. Runoff from these areas would be dispersed untreated. Addendum Figure 2 shows the drainage areas for the Preferred Alternative. Drainage would be directed to the two SPU outfalls, A and D. No runoff would be directed to Port of Seattle Outfall C or to the 15th Avenue West sewer.

The total drained area of the Preferred Alternative would be about 9.18 acres of which 7.43 acres would be PGIS area requiring runoff treatment. Addendum Table 4 shows the distribution of drainage areas to outfalls and the dispersion of non-PGIS runoff to the surface.

The preferred alternative PGIS area of 7.43 acres is about 2.2 acres greater than the PGIS of the existing bridge shown in Water Quality Discipline Report (draft 2005) Table 3.



Source: KPFF 2008. Figure 4.

**Addendum Figure 2
Preferred Alternative Drainage Areas**

**Addendum Table 4
Preferred Alternative Drainage Areas**

Facility (owner)	Area in Acres		
	PGIS	Non-PGIS	Total
Outfall A (SPU)	4.25	0.05	4.30
Outfall D (SPU)	3.18	0.23	3.41
Sub-total	7.43	0.28	7.71
Dispersed to surface		1.47	1.47
Total	7.43	1.75	9.18

Source: KPFF 2008. Tables 3A and 3B.

See the Water Quality Discipline Report (draft 2005) for the PGIS areas of Alternatives C and D.

Pollutant Loading Estimate

Pollutant loads for the Preferred Alternative are described in the stormwater treatment section of the Biological Assessment (SDOT 2013a). All pollution generating impervious surface (PGIS) would drain to a designated receiving water, Elliott Bay, and would have basic treatment provided by canister filter media. The high-use roadway in the West Garfield Street and 15th Avenue West intersection area would have oil control treatment. The project would not discharge to a drainage system tributary to a fish-bearing stream or lake and will not require enhanced treatment.

The project would result in a net reduction in pollutant concentration for all pollutants of concern. Addendum Table 5 shows the results of the pollutant load model and Addendum Table 6 shows pollutant concentrations.

**Addendum Table 5
Existing and Preferred Alternative Pollutant Loads
(pounds per year)**

Pollutant	Existing	Preferred Alternative	Net Change in Pollutant Load
Total Suspended Solids (TSS)	2,931	347	-2,584
Total Zinc	5.9	2.2	-3.7
Dissolved Zinc	2.2	1.5	-0.7
Total Copper	1.1	0.5	-0.6
Dissolved Copper	0.30	0.27	-0.03

Source: SDOT 2013a, Table 3.

**Addendum Table 6
Existing and Preferred Alternative Pollutant Concentrations**

Pollutant	Existing	Preferred Alternative	Net Change in Pollutant Concentration
Total Suspended Solids (TSS) (mg/L)	79.2	6.4	-72.8
Total Zinc (µg/L)	152.6	40	-112.6
Dissolved Zinc (µg/L)	56.4	27	-29.4
Total Copper (µg/L)	27.2	7	-20.2
Dissolved Copper (ug/L)	7.2	5	-2.2

mg milligram
µg microgram
L liter

Source: SDOT 2013a, Table 4.

See the Water Quality Discipline Report (draft 2005) for pollutant loading of Alternatives C and D.

Existing Outfall Capacity

Addendum Table 7 shows outfall discharge rates and capacity for existing conditions and with the Preferred Alternative. The flows represent a storm event with a 25-year recurrence interval and 3.2 inches of precipitation in a 24-hour period. The outfall capacity was calculated during the 30 percent design phase in 2008 based on mean higher high water (MHHW) tidal levels in Elliott Bay. The Seattle Stormwater Manual (SPU 2009b) recommends adjusting tidal levels upward to account for estimated sea level rise. See the “Tidal Influence/Sea Level Rise” discussion in the Mitigation section.

**Addendum Table 7
Outfall Capacity Comparison (25-year, 24-hour event)**

Facility (size)	Discharge Rates (Cubic Feet per Second)		
	Existing	With Preferred Alternative	Pipe Capacity
Outfall A (96")	212.0	215.5	644.9
Outfall D (18")	2.0	4.7	6.5

Source: KPFF 2008. Table 5.

See the Water Quality Discipline Report (draft 2005) for the peak stormwater runoff rates of Alternatives C and D.

Shoreline Impacts

Water Quality Discipline Report (draft 2005) Figure 18 depicts the location of the Build Alternatives in relation to Smith Cove and Smith Cove Waterway. The 200-foot (as measured from ordinary high-water) Shoreline District boundary is included for reference.

Alternative A (Preferred Alternative)

A 17,800-square-foot portion of the nearshore/intertidal habitat in Smith Cove west of Pier 91 is blocked off to light penetration by the existing wharf and facing timbers. While fish may be able to get under the wharf when the area is inundated, the habitat below the wharf is degraded by long-term shading and is of low productivity.

Long-term effects to critical habitat would result from the removal of 140 square feet of intertidal habitat to accommodate the bridge foundations, and restoration of 17,800 square feet (0.4 acre) of nearshore habitat from removal of the wharf pilings and increased light penetration.

Alternatives C and D

See the Water Quality Discipline Report (draft 2005) for Alternatives C and D shoreline impacts.

Secondary and Cumulative Impacts

See the Water Quality Discipline Report (draft 2005) for discussion of secondary and cumulative water quality impacts.

Groundwater

Operational Impacts

See the Water Quality Discipline Report (draft 2005) for discussion of groundwater operational impacts.

Secondary and Cumulative Impacts

See the Water Quality Discipline Report (draft 2005) for discussion of secondary and cumulative impacts.

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Surface Water

The Preferred Alternative would require the stormwater to be conveyed and treated for water quality in accordance with the Seattle Stormwater Code (SMC Titles 22.800 through 22.808).

Stormwater Management Requirements

The Preferred Alternative was designed to about 30 percent completion in 2007 and 2008 under the City of Seattle and Ecology regulation and requirements in effect at that time. Further design of project stormwater management would be required to comply with the regulations in effect at the time design continues. The 2009 City of Seattle Stormwater Code requires the use of green stormwater infrastructure to the maximum extent feasible to meet water quality treatment requirements.

Minimum Requirements

Several of the Seattle Stormwater Code minimum requirements applicable to the Preferred Alternative are:

- Treatment Minimum Requirement #1 (WQ#1) – Basic Treatment. Install and maintain a basic water quality treatment facility.
- Treatment Minimum Requirement #2 (WQ#2) – Oil Control. Install and maintain an oil control treatment facility for high-use sites. The intersection of West Garfield Street and 15th Avenue West meets the traffic volume criteria for a high use site.
- Minimum Requirement for Maintaining Natural Drainage Patterns (SMC 22.805.020.A). Runoff leaves the existing project site area via man-made conveyance systems to two City outfalls. Runoff to these systems and outfalls will need to be preserved.
- Minimum Requirement Discharge Point (SMC 22.805.020.B). The discharge points for drainage water from the project have sufficient capacity.
- Minimum Requirements for Construction Site Stormwater Pollution Prevention Control (SMC 22.805.020.D). The 18 construction site stormwater pollution prevention control elements will be addressed in the Construction Stormwater Control Plan and appropriate Best Management Practices (BMPs) selected. The 18 elements are:
 1. Mark Clearing Limits and Sensitive Areas
 2. Retain Top Layer
 3. Establish Construction Access
 4. Protect Downstream Properties and Receiving Waters

5. Prevent Erosion and Sediment Transport from the Site
 6. Prevent Erosion and Sediment Transport from the Site by Vehicles
 7. Stabilize Soils
 8. Protect Slopes
 9. Protect Storm Drains
 10. Stabilize Channels and Outlets
 11. Control Pollutants
 12. Control Dewatering
 13. Maintain BMPs
 14. Inspect BMPs
 15. Execute Construction Stormwater Control Plan
 16. Minimize Open Trenches
 17. Phase the Project
 18. Install Permanent Flow Control and Water Quality Facilities.
- Minimum Requirement to Amend Soils (SMC 22.805.020.E). Prior to completion of the project all new, replaced, and disturbed topsoil shall be amended with organic matter. This will primarily be limited to project right of way adjacent to park and private property west of Terminal 91. Other project segments are on or over existing pavement.
 - Implement Green Stormwater Infrastructure (SMC 22.805.020.F). Flow control is not required for the project. GSI water treatment measures may have applicability west of Terminal 91.
 - Protect Shorelines (SMC 22.805.020.I) – The project will use existing outfalls in the shoreline district. This will avoid loss of shoreline function. Removal of the existing wharf west of Pier 91 will decrease shoreline habitat shading.
 - Ensure Sufficient Capacity (SMC 22.805.020.J). Public drainage system capacities have been modeled for the 25-year, 24-hour storm event.

The minimum requirements will be implemented in conformance with 2009 Seattle Stormwater Code.

Tidal Influence/Sea Level Rise

The project runoff will discharge to two public drainage outfalls to Elliott Bay (Smith Cove Waterway and Smith Cove). Capacities of the existing outfalls were modeled for the Storm Drainage Report for the 30 percent design in 2008 (KPF 2008). Further design of the drainage system will consider risks of sea level rise. The 2009 Stormwater Manual (SPU 2009b) describes a medium probability of a 13-

inch sea level rise by 2100 and a low probability, but high impact estimate of a 50-inch rise by 2100. The manual recommends analyzing risk by modeling the effects of adjusting the tidal record upwards by 1 to 4 feet.

Operational Mitigation

No-Build Alternative

The Water Quality Discipline Report (draft 2005) described the existing bridge as having no runoff treatment. The 2008 storm drainage report (KPF 2008) found runoff from about 17 percent of the bridge area is treated at the West Point Treatment Plant before discharge to Puget Sound. Runoff to the systems draining directly to Elliott Bay from 83 percent of the bridge area is not treated. As such, sediments and other typical roadway contaminants enter Elliott Bay completely unmitigated.

Alternatives A (Preferred Alternative)

The Seattle Stormwater Code (SMC 22.800 through 22.808) would be followed for design, operation and maintenance of the stormwater conveyance and treatment system. The following Best Management Practices (BMP) would be applicable to the project:

- BMP 2: Perform Routine Maintenance for Drainage System
- BMP 5: Spill Prevention and Cleanup
- BMP 6: Provide Oversight and Training for Staff
- BMP 20 Landscaping and lawn and vegetation management
- BMP 21 Painting, finishing, and coating of vehicles, boats, buildings, and equipment
- BMP 40: Deicing and Anti-icing Operations for Airports and Streets
- BMP 43 Maintenance of public and private utility corridors and facilities
- BMP 44 Maintenance of roadside ditches (if included in the constructed project)

Water treatment BMPs suitable for the project are limited by the developed, paved condition of the most of the project site which is in industrial and commercial use, and the contaminated soil and groundwater in the area. The selected treatment BMPs for the Preferred Alternative 30 percent design (KPF 2008) are filter vaults for roadway runoff basic treatment and a coalescing plate oil-water separator for the required oil control of runoff from the high use intersection of West Garfield Street at 15th Avenue West.

Alternatives C and D

See the Water Quality Discipline Report (draft 2005) for Alternatives C and D operation mitigation. Requirements of the current Seattle Stormwater Code would also apply to these alternatives.

Shoreline Mitigation

Alternative A (Preferred Alternative)

The Preferred Alternative would increase over-water coverage. Shading effects associated with the Preferred Alternative would be mitigated by the increased height of the bridge structure relative to the existing structure. Removal of the wood wharf between Pier 91 and the West Yard property would open up shoreline habitat that is currently shaded both by the wharf decking and timbers along the southern wharf face.



**Addendum Figure 3
Existing wharf south face**

See the Biological Assessment (SDOT 2013a) for discussion of impact avoidance and minimization measures, and BMPs for in-water and shoreline area construction.

Groundwater

Operational Mitigation

No-Build Alternative

No operational impacts to groundwater were identified for the No-Build Alternative and no operational mitigation is required.

Alternatives A (Preferred Alternative), C and D

See the Water Quality Discipline Report (draft 2005) for groundwater impact operational mitigation of the build alternatives.

Surface Water

Impacts

No-Build Alternative

See the Water Quality Discipline Report (draft 2005) for No Build Alternative construction impacts.

Alternative A (Preferred Alternative)

The Biological Assessment (SDOT 2013a) identified construction impacts for the Preferred Alternative. Construction activities involving in-water work are:

- Placement and removal of up to 115 temporary piles for work bridges and platforms
- Removal of approximately 200 existing wood piles and a wood wall covering an area of approximately 400 square feet
- Placement and removal of up to 11 falsework support bents below mean higher high water (MHHW) 5 temporary piles for work bridges and platforms
- Construction of two single drilled shaft foundations for the eastbound on-ramp bridge
- Construction of one multiple drilled shaft foundation for the mainline bridge

The multiple- shaft foundation work area will be isolated by a temporary sheet-pile cofferdam.

About 16,000 square feet (0.37 acre) of shoreline on the northern end of Smith Cove will be temporarily impacted by shading from the work bridge that will be in place for one year or more. The remaining shallow-water area in the cove and adjacent to the marina is very large in relation to the work bridge area.

There will be short-term degradation to water quality in the form of turbidity. Temporary turbidity will result from in-water pile removal. Piles will be pulled as part of the wharf demolition and again when the temporary work bridge and falsework supports are dismantled after bridge construction.

See the Water Quality Discipline Report (draft 2005) for other Alternative A construction impacts.

Alternatives C and D

See the Water Quality Discipline Report (draft 2005) for Alternatives C and D construction impacts.

Mitigation

See the Biological Assessment (SDOT 2013a) for the sequence of construction activities and description of required in-water and shoreline impact avoidance and mitigation measures.

The Seattle Stormwater Code requires projects have construction site stormwater pollution prevention control (SMC 22.805.020.D). The 18 required elements are described on page 115. The Seattle Stormwater Manual Volume 2 Construction Stormwater Control Technical Requirement Manual (SPU 2009a) would be followed to implement BMPs applicable to the Preferred Alternative construction activities. A Large Project Construction Stormwater Control Plan would describe the selected BMPs to be implemented. During construction, the Large Project Construction Stormwater Control Plan would be modified whenever there is a change in design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on code compliance or the discharge of pollutants.

Groundwater

Impacts

No-Build Alternative

See the Water Quality Discipline Report (draft 2005) for the No Build Alternative groundwater impacts.

Alternatives A (Preferred Alternative), C, and D

See the Water Quality Discipline Report (draft 2005) for groundwater impacts.

Mitigation

See the Water Quality Discipline Report (draft 2005) for groundwater impact mitigation.

Summary of Findings

Impacts

Operational Impacts

Surface Water

Addendum Table 8 contains the revisions to Water Quality Discipline Report (draft 2005) Table 7 Summary of Impacts for Alternative A, the Preferred Alternative, as a result of 30 percent design and preparation of the Stormwater Design Report (KPF 2008). These revisions are the net increase in PGIS, the bridge area over water, and the note on all build alternatives draining to a designated receiving water.

**Addendum Table 8
Summary of Impacts**

Impact Classification	Impact	Alternative			
		No Build	A (Preferred)	C	D
Operational	Surface Water Quality – Pollutant Loading Directly Correlates with <u>Net Increase in Study Area PGIS</u>	Baseline = 0	+2.2 acres	+0.2 acre	-0.3 acre
	Surface Water Runoff Quantity	N/A – Project drains to a designated receiving water (Elliot Bay) through a system with sufficient capacity			
	Maintenance	Common to All Alternatives			
	Possible Migration of Subsurface Contaminants in Utility Trenches	No Impact	Common to All Build Alternatives		
Shoreline	Bridge Footprint Area Within 200' of OHW	2.6 acre	3.4 acre	0.2 acre	0 acre
	Bridge Footprint Area Directly Over Water	0.3 acre	0.7 acre	0 acre	0 acre
	Water & Sediment Flow Around In-Water Footings	Bridge has in-water footings	Requires a greater number of in-water footings than No-Build	No In-water footings	No In-water footings
	Direct Discharge of Pollutants	Possible impact	Greater probability than No-Build	No Impact	No Impact
Secondary & Cumulative	No Impacts Identified				
Construction	Leakage of Petroleum Products from Construction Equipment	Possible, due to seismic retrofit	Common to All Build Alternatives		
	Accidental Spills	No impact	Common to All Build Alternatives		

Impact Classification	Impact	Alternative			
		No Build	A (Preferred)	C	D
	Mobilization of Dust, Debris, Contaminants	No impact	Common to All Build Alternatives		
	Erosion & Sedimentation due to Earthwork	No impact	Common to All Build Alternatives		
	Footing Excavation and/or dewatering may expose subsurface contaminants	No impact	Common to All Build Alternatives		
	Staging Area Contamination	Possible, due to seismic retrofit	Common to All Build Alternatives		
	Increased Traffic to Other Routes (Detours)	Possible, due to seismic retrofit	Common to All Build Alternatives		
	Construction Near to or Within Sensitive Areas	No impact	Steep slopes within 200' of OHW	Steep slopes within 200' of OHW	Steep slopes
	Introducing contaminants to subsurface waters	Possible, due to seismic retrofit	Common to All Build Alternatives		
	Induction or restriction of groundwater seepage in upland aquifer system	No impact	Common to All Build Alternatives		

Mitigation Measures

All of the anticipated Preferred Alternative impacts to water quality may be mitigated. Further, mitigation will be required as a result of the environmental and permitting processes associated with any of the Build Alternatives. As such, it is anticipated that there will be a net improvement to water quality as a result of implementation of any of the Build Alternatives relative to the existing conditions.

Operational Mitigation

Surface Water

The Preferred Alternative would be required to meet Seattle Stormwater Code requirements for runoff treatment. Runoff from pollution-generating surfaces would require basic treatment. Runoff from the high use roadway in the West Garfield Street and 15th Avenue West signalized intersection area would require oil control treatment.

Runoff from more than 80 percent of the area of the existing bridge is discharged untreated through three outfalls to Smith Cove and Smith Cove Waterway. All runoff from Preferred Alternative pollution-generating surfaces would be discharged through two existing outfalls to Smith Cove and Smith Cove Waterway.

The Preferred Alternative would be subject to maintenance BMPs such as bridge roadway sweeping, and cleaning of bridge catch basins and stormwater conveyance system structures. Regular maintenance of the basic treatment and oil control

facilities would be carried out to maintain the required performance for removal of contaminated sediments and oil from runoff prior to discharge to surface waters.

Shoreline Mitigation

Preferred Alternative shoreline impacts to water quality would be mitigated. Shading effects would be mitigated by the increased bridge height. Removal of the wood wharf between Pier 91 and the West Yard property would open up shoreline habitat and increase light penetration to an area currently shaded by the wharf.

See the Biological Assessment (SDOT 2913a) for a discussion of impact avoidance and minimization measures, and BMPs for in-water and shoreline area construction.

Construction Mitigation

Surface Water

The Seattle Stormwater Code requires projects have construction site stormwater pollution prevention control. The Seattle Stormwater Manual would be followed to implement BMPs applicable to the Preferred Alternative construction activities. A Large Project Construction Stormwater Control Plan would describe the selected BMPs to be implemented. During construction, the Large Project Construction Stormwater Control Plan would be modified whenever there is a change in design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on code compliance or the discharge of pollutants.

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