FINAL ENVIRONMENTAL IMPACT STATEMENT
AND FINAL SECTION 4(f) AND 6(f) EVALUATIONS
SR 520 BRIDGE REPLACEMENT AND HOV PROGRAM MAY 2011

SR 520, I-5 to Medina: Bridge Replacement and HOV Project

Water Resources Discipline Report Addendum and Errata

Washington State Department of Transportation

U.S. Department of Transportation Federal Highway Administration

SR 520, I-5 to Medina:
Bridge Replacement and HOV Project
Final Environmental Impact Statement
and Final Section 4(f) and 6(f) Evaluations

Water Resources
Discipline Report
Addendum and Errata

Prepared for

Federal Highway Administration
Washington State Department of Transportation

Consultant Team

Parametrix, Inc.
CH2M HILL
HDR Engineering, Inc.
Parsons Brinckerhoff
ICF Jones & Stokes
Confluence Environmental Company
Michael Minor and Associates
PRR, Inc.
Critigen

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Acronyms and Abbreviations

°C	degrees Celsius
°F	degrees Fahrenheit
µg/L	micrograms per liter
AKART	All Known, Available, and Reasonable Technology
BMP	best management practice
CCDP	concrete containment and disposal plan
CSS	combined sewer system
CTC	Concrete Technology Corporation
Ecology	Washington State Department of Ecology
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
Final EIS	Final Environmental Impact Statement
HOV	high-occupancy vehicle
I-5	Interstate 5
mg/L	milligrams per liter
NPDES	National Pollutant Discharge Elimination System
PGIS	pollution-generating impervious surface
SDEIS	Supplemental Draft Environmental Impact Statement
SPCC	spill prevention, control, and countermeasures (plan)
SR	State Route
TDA	threshold discharge area
TESC	temporary erosion and sediment control
TMDL	total maximum daily load
TSS	total suspended solids
WRIA	water resource inventory area
WSDOT	Washington State Department of Transportation

Introduction

What is the purpose of this addendum and errata?

This addendum and errata to the Supplemental Draft Environmental Impact Statement (SDEIS) Water Resources Discipline Report (Washington State Department of Transportation [WSDOT] 2009a) presents the environmental consequences of the Preferred Alternative in support of the Final Environmental Impact Statement (Final EIS). This addendum compares effects of the Preferred Alternative to the SDEIS design Options A, K, and L. In addition, this addendum includes additional analyses completed in response to public and agency and tribal comments on the SDEIS and the Water Resources Discipline Report.

The information contained in the 2009 discipline report is still pertinent to the Preferred Alternative and its effects, except where this addendum specifically updates it. The discussion below supplements the 2009 discipline report by clarifying the effects analyses and providing comparisons using new text, and new or updated exhibits, where appropriate. New text and exhibits updated to reflect the Preferred Alternative have been cross-referenced by page numbers and exhibit numbers to related text and exhibits contained in the 2009 discipline report. Where an addendum exhibit updates or adds new data and/or different effects to an exhibit contained in the 2009 discipline report, the exhibit name is followed by “update to Exhibit ## of 2009 discipline report” in parentheses. Errata are presented in Attachment 1, which identifies and corrects errors in the SDEIS discipline report.

Project design and construction information used in the analysis of potential effects of the Preferred Alternative on water resources is included in the Description of Alternatives Discipline Report Addendum and Errata (WSDOT 2011a), the Construction Techniques and Activities Discipline Report Addendum and Errata (WSDOT 2011b), and the Geology and Soils Discipline Report Addendum and Errata (WSDOT 2011c).

New information used in this discipline report addendum includes updated project limits and corresponding new estimates of pollutant-generating impervious surface (PGIS) for the previously determined threshold discharge areas (TDAs). This addendum also includes changes in the descriptions of stormwater treatment facilities for the Preferred Alternative, updated All Known, Available, and Reasonable Technology (AKART) and water quality studies for replacement of the floating bridge (WSDOT 2009b), and the Washington State Department of Ecology (Ecology) conditional approval of the AKART report (Fitzpatrick 2010).

What key issues were identified in the public and agency comments on the SDEIS?

Key issues identified in SDEIS comments and addressed in this addendum include:

- Requests for a more complete characterization of the water quality data available for the aquatic environments that currently receive and will continue to receive stormwater from the project vicinity in the future—the Lake Washington Ship Canal, Union Bay, and Lake Washington.
- Request for further discussion of potential effects on groundwater from increasing PGIS in the project vicinity and of techniques and approaches to be used during construction of the Preferred Alternative.
- Requests for additional information on the results of the AKART analysis and the potential effects on water quality during construction.
- Requests for more information on the size, design, and role of spill containment lagoons in the stormwater treatment process in the AKART study. Several commenters requested access to the AKART study itself, which was conditionally approved by Ecology following publication of the SDEIS.

What are the key points of this addendum?

The effects of the Preferred Alternative on water resources are generally similar to those of design Options A, K, and L described in the SDEIS. These similarities include:

- The Preferred Alternative and the design options would meet all applicable state water quantity and quality regulations.
- Stormwater would be discharged without treatment or flow control under the No Build Alternative scenarios, except for the combined sewer and Fairweather Creek basins. The combined sewer basin discharges to the combined sewer, providing some level of treatment at the King County West Point wastewater treatment plant. The SR 520 Eastside Project, a separate action from the SR 520, I-5 to Medina: Bridge Replacement and HOV Project, will construct stormwater treatment facilities for the Fairweather Creek basin, and is included in the baseline conditions of the No-Build Condition.
- Under the No-Build condition, stormwater discharge will either maintain existing conditions (once the Fairweather Creek Basin facilities are constructed) or further degrade surface water bodies. Conversely, stormwater would be treated using either basic or enhanced treatment, but flows would continue without flow control – because the receiving waters are exempt - as required by Ecology for the Preferred Alternative and SDEIS options.
- Temporary water quality effects during construction of the Preferred Alternative would be avoided or minimized by developing and implementing required erosion control plans, spill control plans, and concrete containment and disposal plans (CCDPs) and complying with the conditions of the National Pollutant Discharge Elimination System (NPDES) construction

permit. These plans and permits regulate construction activities on land and in the water to prevent or reduce water quality effects.

- Construction effects of the Preferred Alternative would be the same as those for the SDEIS options for study area water resources.
- Effects on groundwater used for drinking purposes would be negligible because there is very limited use of groundwater for drinking water in the study area, because water quality pollution control measures would be implemented during construction, and the project would have limited interaction with groundwater.
- Turbid water generated by construction dewatering would be stored to allow particles to settle, or chemical treatment could be used to reduce suspended particles before the water is discharged to the stormwater system. Alternatively, this water could be discharged to the sanitary sewer system with a permit.
- There would be no need to mitigate long-term project effects because the design of the Preferred Alternative meets all regulatory requirements for stormwater collection and treatment.

Project elements and the resultant effects of the Preferred Alternative that are different from those of the SDEIS options are shown in boldface in the key points below.

- The current extent of the project is smaller than that presented in the 2009 discipline report. With the Preferred Alternative, the University Slough basin would no longer be part of the project area.
- The configuration of the Preferred Alternative has resulted in changes to treatment facilities in TDAs 7, 9, 10, 13, and 14. The project would no longer be employing media filter vaults in any of the proposed facilities for these TDAs. An additional change is that enhanced treatment stormwater BMPs (Constructed Stormwater Wetlands) are being replaced by basic treatment stormwater BMPs (biofiltration swales) in TDAs 13 and 14. This change in treatment facility technology would not change the estimates of pollutant loading or environmental effects.
- The Preferred Alternative has resulted in changes in the amounts of existing untreated PGIS that will be treated in the future; existing untreated PGIS that will be removed and not replaced (and therefore will not contribute pollutants to future discharges from the project); and new PGIS (which will be treated in the future). These changes in PGIS result in different estimated pollutant loads for both the current condition (due to the smaller amount of existing pavement either removed or replaced) and the future project.
- The pollutant loading analysis conducted for the Preferred Alternative includes a refinement to address the effect of highways lids. The analysis of Options A, K, and L in the SDEIS did not account for any rainfall slanting onto the roadways under each highway lid. The Preferred Alternative analysis evaluated both the original assumption (referred to herein as Lid Scenario 1) and an alternative assumption (Lid Scenario 2) that rainfall could fall at a 30-degree angle and wash pollutants off a greater surface.

Overall, the SDEIS options and the Preferred Alternative would all achieve a net overall environmental improvement relative to the No Build Alternative. An overall net reduction in pollutant loadings would be realized by treating enough existing untreated PGIS to offset the increased pollutant load associated with the project's new PGIS.

What is the SR 520, I-5 to Medina: Bridge Replacement and HOV Project?

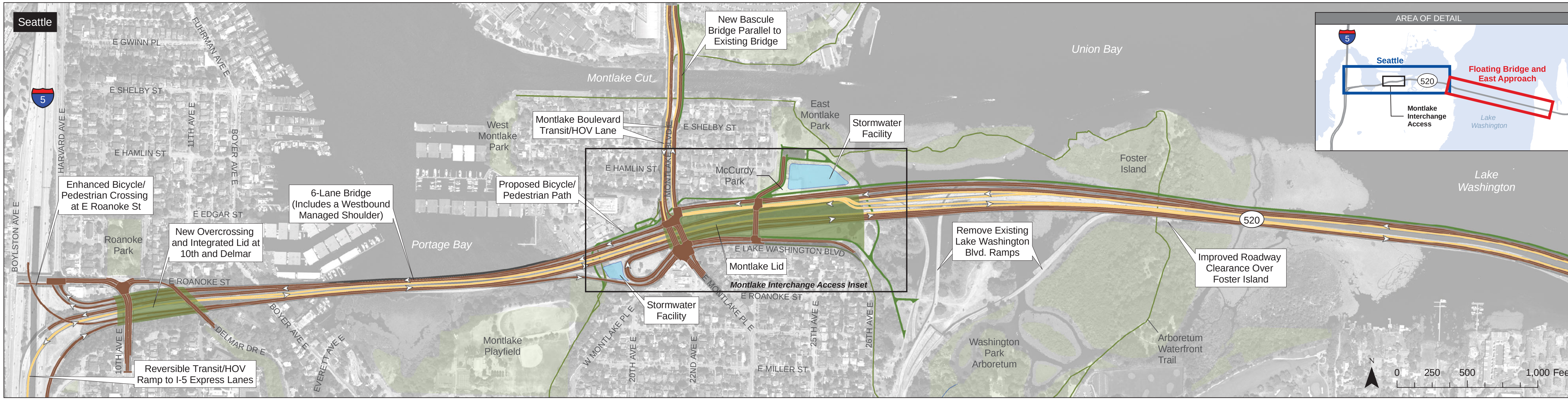
The SR 520, I-5 to Medina: Bridge Replacement and HOV Project would widen the State Route (SR) 520 corridor to six lanes from Interstate 5 (I-5) in Seattle to Evergreen Point Road in Medina, and would restripe and reconfigure the lanes in the corridor from Evergreen Point Road to 92nd Avenue Northeast in Yarrow Point. It would replace the vulnerable Evergreen Point Bridge (including the west and east approach structures) and Portage Bay Bridge, as well as the existing local street bridges across SR 520. The project would complete the regional high-occupancy vehicle (HOV) lane system across SR 520, as called for in regional and local transportation plans.

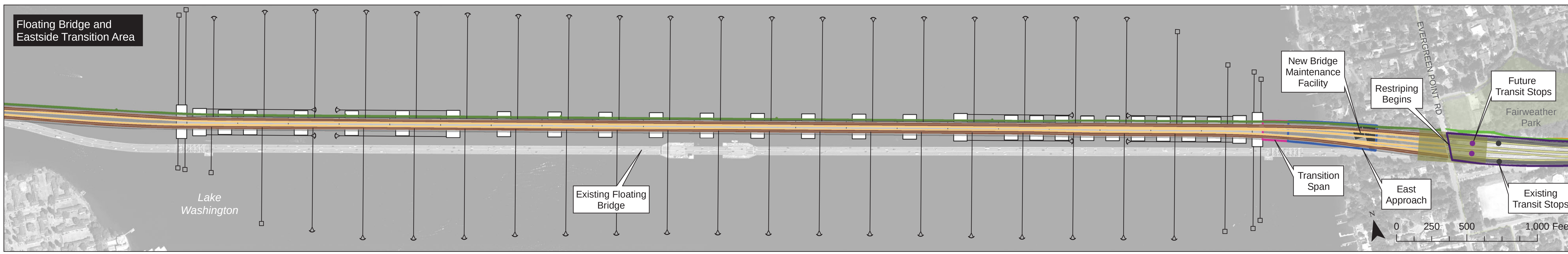
What is the Preferred Alternative?

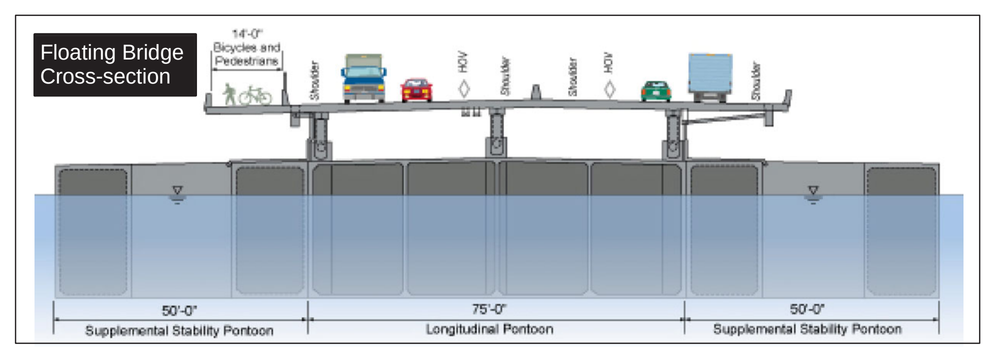
The new SR 520 corridor would be six lanes wide (two 11-foot-wide outer general-purpose lanes and one 12-foot-wide inside HOV lane in each direction), with 4-foot-wide inside shoulders and 10-foot-wide outside shoulders across the floating bridge. The typical roadway cross-section across the floating bridge would be approximately 116 feet wide, compared to the existing width of 60 feet. In response to community interests expressed during public review of the January 2010 SDEIS (WSDOT 2010a), the SR 520 corridor between I-5 and the Montlake interchange would operate as a boulevard or parkway with a posted speed limit of 45 miles per hour and median planting across the Portage Bay Bridge. To support the boulevard concept, the width of the inside shoulders in this section of SR 520 would be narrowed from 4 feet to 2 feet, and the width of the outside shoulders would be reduced from 10 feet to 8 feet. Exhibit 1 highlights the major components of the Preferred Alternative.

The Preferred Alternative would include the following elements:

- An enhanced bicycle/pedestrian crossing adjacent to the East Roanoke Street bridge over I-5
- Reversible transit/HOV ramp to the I-5 express lanes, southbound in the morning and northbound in the evening
- New overcrossings and an integrated lid at 10th Avenue East and Delmar Drive East
- A six-lane Portage Bay Bridge with a 14-foot-wide westbound managed shoulder that would be used as an auxiliary lane during peak commute hours
- An improved urban interchange at Montlake Boulevard integrated with a 1,400-foot-long lid configured for transit, pedestrian, and community connectivity







I-5 to Medina Project Elements

- Column
- Anchor and Cable
- Existing Regional Bicycle/Pedestrian Path
- General-Purpose Lane
- HOV, Direct Access, and/or Transit-Only Lane
- Westbound Managed Shoulder
- Proposed Bicycle/Pedestrian Path
- East Approach
- Transition Span
- Restriping Area
- Stormwater Treatment Facility
- Lid
- Pontoon

Medina to SR 202 Project Elements

- General-Purpose Lane
- HOV Lane
- Bike Path
- Points Loop Trail
- Medina to SR 202 Project Lid

Source: King County (2006) Aerial Photo, King County (2008) GIS Data (Stream), CH2M HILL (2008) GIS Data (Park). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 1. **Preferred Alternative Project Elements**

I-5 to Medina: Bridge Replacement and HOV Project

- A new bascule bridge across the Montlake Cut that provides additional capacity for transit/HOV, bicycles, and pedestrians
- Improved bridge clearance over Foster Island and the Arboretum Waterfront Trail
- A new west approach bridge configured to be compatible with future high-capacity transit (including light rail)
- A new floating bridge with two general purpose lanes, and one HOV lane in each direction
- A new 14-foot-wide bicycle/pedestrian path with scenic pull-outs along the north side of the new Evergreen Point Bridge (west approach, floating span, and east approach), connecting regional trails on both sides of Lake Washington
- A new bridge maintenance facility and dock located underneath the east approach of the Evergreen Point Bridge
- Re-striped and reconfigured roadway between the east approach and 92nd Avenue NE, tying in to improvements made by the SR 520, Medina to SR 202: Eastside Transit and HOV Project
- Design features that would also provide noise reduction including reduced speed limit on Portage Bay Bridge, 4-foot concrete traffic barriers, and noise absorptive materials applied to the inside of the 4-foot traffic barriers and lid portals. Quieter concrete pavement would also be used for the new SR 520 main line, and noise walls where recommended by the noise analysis and approved by affected property owners would be included in the design
- Basic and enhanced stormwater treatment facilities

Exhibit 2 summarizes the Preferred Alternative design compared to the existing corridor elements, and compares the Preferred Alternative to design Options A, K, and L as described in the SDEIS. For a more detailed description of the Preferred Alternative, see the Description of Alternatives Discipline Report Addendum (WSDOT 2011a).

Exhibit 2. Preferred Alternative and Comparison to SDEIS Options

Geographic Area	Preferred Alternative	Comparison to SDEIS Options A, K, and L
I-5/Roanoke Area	The SR 520 and I-5 interchange ramps would be reconstructed with generally the same ramp configuration as the ramps for the existing interchange. A new reversible transit/HOV ramp would connect with the I-5 express lanes.	Similar to all options presented in the SDEIS. Instead of a lid over I-5 at Roanoke Street, the Preferred Alternative would include an enhanced bicycle/pedestrian path adjacent to the existing Roanoke Street Bridge.
Portage Bay Area	The Portage Bay Bridge would be replaced with a wider and, in some locations, higher structure with six travel lanes and a 14-foot-wide westbound managed shoulder.	Similar in width to Options K and L, similar in operation to Option A. Shoulders are narrower than described in SDEIS (2-foot-wide inside shoulders, 8-foot-wide outside shoulder on eastbound lanes), posted speed would be reduced to 45 mph, and median plantings would be provided to create a boulevard-like design.

Exhibit 2. Preferred Alternative and Comparison to SDEIS Options

Geographic Area	Preferred Alternative	Comparison to SDEIS Options A, K, and L
Montlake Area	The Montlake interchange would remain in a similar location as today. A new bascule bridge would be constructed over the Montlake Cut. A 1,400-foot-long lid would be constructed between Montlake Boulevard and the Lake Washington shoreline. The bridge would include direct-access ramps to and from the Eastside. Access would be provided to Lake Washington Boulevard via a new intersection at 24th Avenue East.	Interchange location similar to Option A. Lid would be approximately 75 feet longer than previously described for Option A, and would be a complete lid over top of the SR 520 main line, which would require ventilation and other fire, life, and safety systems. Transit connections would be provided on the lid to facilitate access between neighborhoods and the Eastside. Montlake Boulevard would be restriped for two general purpose lanes and one HOV lane in each direction between SR 520 and the Montlake Cut.
West Approach Area	The west approach bridge would be replaced with wider and higher structures, maintaining a constant profile rising from the shoreline at Montlake out to the west transition span. Bridge structures would be compatible with potential future light rail through the corridor.	Bridge profile most similar to Option L, and slightly steeper; structure types similar to Options A and L. The gap between the eastbound and westbound structures would be wider than previously described to accommodate light rail in the future.
Floating Bridge Area	A new floating span would be located approximately 190 feet north of the existing bridge at the west end and 160 feet north of the existing bridge at the east end. The floating bridge would be approximately 20 feet above the water surface at the midspan (about 10 to 12 feet higher than the existing bridge deck).	Similar to design described in the SDEIS. The bridge would be approximately 10 feet lower than described in the SDEIS, and most of the roadway deck support would be constructed of steel trusses instead of concrete columns.
Eastside Transition Area	A new east approach to the floating bridge, and a new SR 520 roadway would be constructed between the floating bridge and Evergreen Point Road.	Same as described in the SDEIS.

When will the project be built?

Construction for the SR 520, I-5 to Medina project is planned to begin in 2012, after project permits and approvals are received. To maintain traffic flow in the corridor, the project would be built in stages. Major construction in the corridor is expected to be complete in 2018. The most vulnerable structures (the Evergreen Point Bridge including the west and east approaches, and Portage Bay Bridge) would be built in the first stages of construction, followed by the less vulnerable components (Montlake and I-5 interchanges). Exhibit 3 provides an overview of the anticipated construction stages and durations identified for the SR 520, I-5 to Medina project.

A Phased Implementation scenario was discussed in the SDEIS as a possible delivery strategy to complete the SR 520, I-5 to Medina project in phases over an extended period. FHWA and WSDOT continue to evaluate the possibility of phased construction of the corridor should full project funding not be available by 2012. Current committed funding is sufficient to construct the floating portion of the Evergreen Point Bridge, as well as the new east approach and a connection to the existing west approach. The Final EIS discusses the potential for the floating bridge and these east and west "landings" to be built as the first phase of the SR 520, I-5 to Medina project. This differs from the SDEIS Phased Implementation scenario, which included the west approach and the Portage Bay Bridge in the first construction phase. Chapters 5.15 and 6.16 of the Final EIS summarize the effects for this construction phase. Therefore, this discipline report addendum addresses only the effects anticipated as a result of the updated construction schedule.

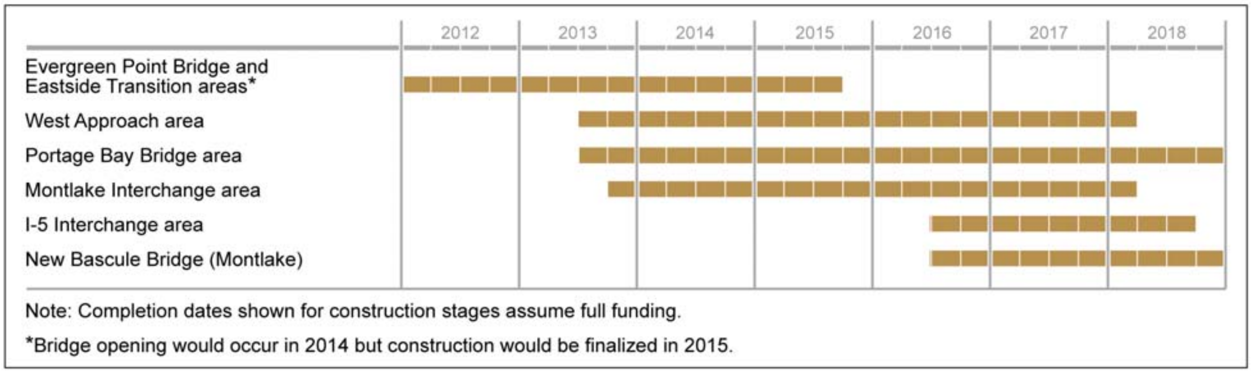


Exhibit 3. Preferred Alternative Construction Stages and Durations

Are pontoons being constructed as part of this project?

WSDOT has completed planning and permitting for a new facility that will build and store the 33 pontoons needed to replace the existing capacity of the floating portion of the Evergreen Point Bridge in the event of a catastrophic failure. If the bridge does not fail before its planned replacement, WSDOT would use the 33 pontoons constructed and stored as part of the SR 520 Pontoon Construction Project in the SR 520, I-5 to Medina project. An additional 44 pontoons would be needed to complete the new 6-lane floating bridge planned for the SR 520, I-5 to Medina project. The additional pontoons would be constructed at Concrete Technology Corporation (CTC) in the Port of Tacoma, and, if available, at the new pontoon construction facility located on the shores of Grays Harbor in Aberdeen, Washington. Final construction locations will be identified at the discretion of the contractor. For additional information about project construction schedules and pontoon construction, launch, and transport, please see the Construction Techniques and Activities Discipline Report Addendum and Errata (WSDOT 2011b).

Affected Environment

What changes have occurred to the affected environment since the SDEIS?

The water resources of the affected environment were described on pages 19 to 64 of the 2009 discipline report. With the adoption of the Preferred Alternative, specific features of the

Lake Washington area are no longer a part of the affected environment. In addition, the comments received on the 2009 discipline report requested additional information on the surface water quality of the Lake Washington Ship Canal and Lake Washington. The following section describes changes in the study area and summarizes additional information reviewed concerning surface water quality in the project vicinity.

Changes to the Study Area

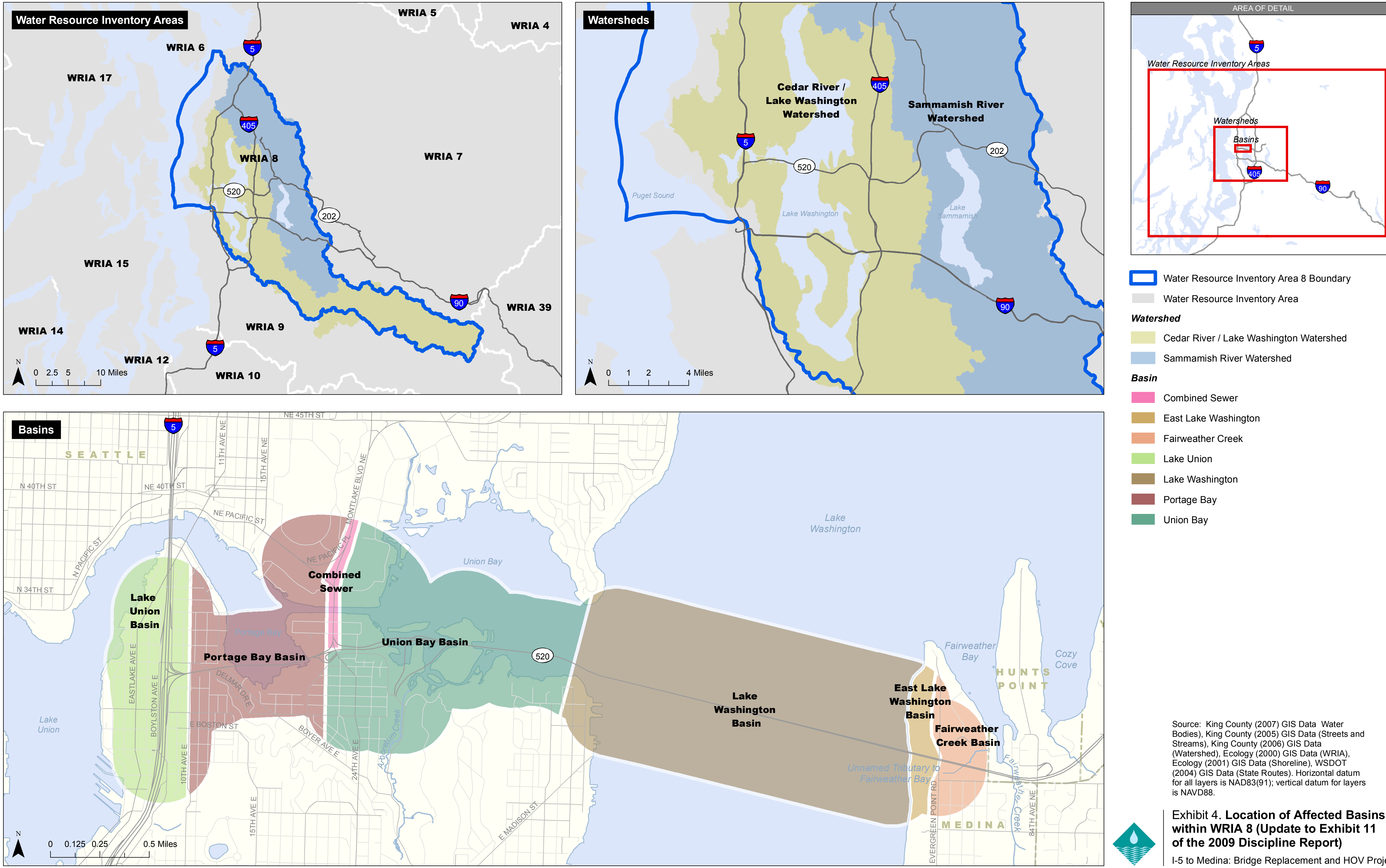
The Preferred Alternative design has reduced the overall footprint of the project and removed the University Slough basin from the water resources that would be directly affected by construction and operation of the SR 520, I-5 to Medina project. This revision resulted because the Preferred Alternative includes no changes to the amount of impervious surface north of the intersection of NE Pacific Street and Montlake Boulevard NE. The specific sections and exhibits that have been modified to reflect this change in the study area are:

- The section of the 2009 discipline report discussing the effect of urban development on stormwater runoff (page 20) and surface water bodies in the project vicinity (page 24) reference Exhibit 11 (page 25) and Exhibit 14 (page 29), each of which showed the University Slough basin as part of the affected basins within water resource inventory area (WRIA) 8. The affected basins of WRIA 8 have been updated and are now presented in Exhibit 4 of this addendum.
- The section of the 2009 discipline report entitled "Groundwater Resources Located in the Project Area" (page 32) similarly represented the project as extending farther north than the NE Pacific Street/Montlake Boulevard NE interchange.

Further Data on Surface Water Quality in the Study Area

Reviewers of the 2009 discipline report commented on the need to more fully present the current surface water quality of the receiving environments in the project vicinity. Two data sources were particularly noted in these comments—the Major Lakes Monitoring program conducted by King County Department of Natural Resources and Parks and Washington State's Water Quality Assessment (the most recent report having been prepared and published by Ecology in 2008). King County's program collects and publishes data on the basic water quality of Lake Washington and Lake Sammamish, such as dissolved oxygen, pH, temperature, nitrogen, and phosphorus. This information can be accessed from the Major Lakes Monitoring Web page of the King County Web site (http://green.kingcounty.gov/lakes/Map.aspx) (King County 2010). As part of its reporting requirements under the Clean Water Act, Ecology publishes Washington's Water Quality Assessment, which lists the status of water quality for a particular location in one of five categories recommended by the U.S. Environmental Protection Agency (EPA).

Data from three King County monitoring stations—0852, 0540, and 0536 (Exhibit 5a)—at 1 meter below the water surface are summarized in Exhibits 5b, 5c, 5d, and 5e. These stations are located in Lake Washington south of the existing Evergreen Point Bridge and west of Madison Park (Station 0852), in the west end of the Montlake Cut (Station 0540), and in the Portage Bay reach just west of the I-5 bridge (Station 0536). The number of data points available for each water quality parameter varied because not every parameter was sampled during each sampling of lake water.



Source: King County (2007) GIS Data Water Bodies), King County (2005) GIS Data (Streets and Streams), King County (2006) GIS Data (Watershed), Ecology (2000) GIS Data (WRIA), Ecology (2001) GIS Data (Shoreline), WSDOT (2004) GIS Data (State Routes). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 4. **Location of Affected Basins within WRIA 8 (Update to Exhibit 11 of the 2009 Discipline Report)**

I-5 to Medina: Bridge Replacement and HOV Project

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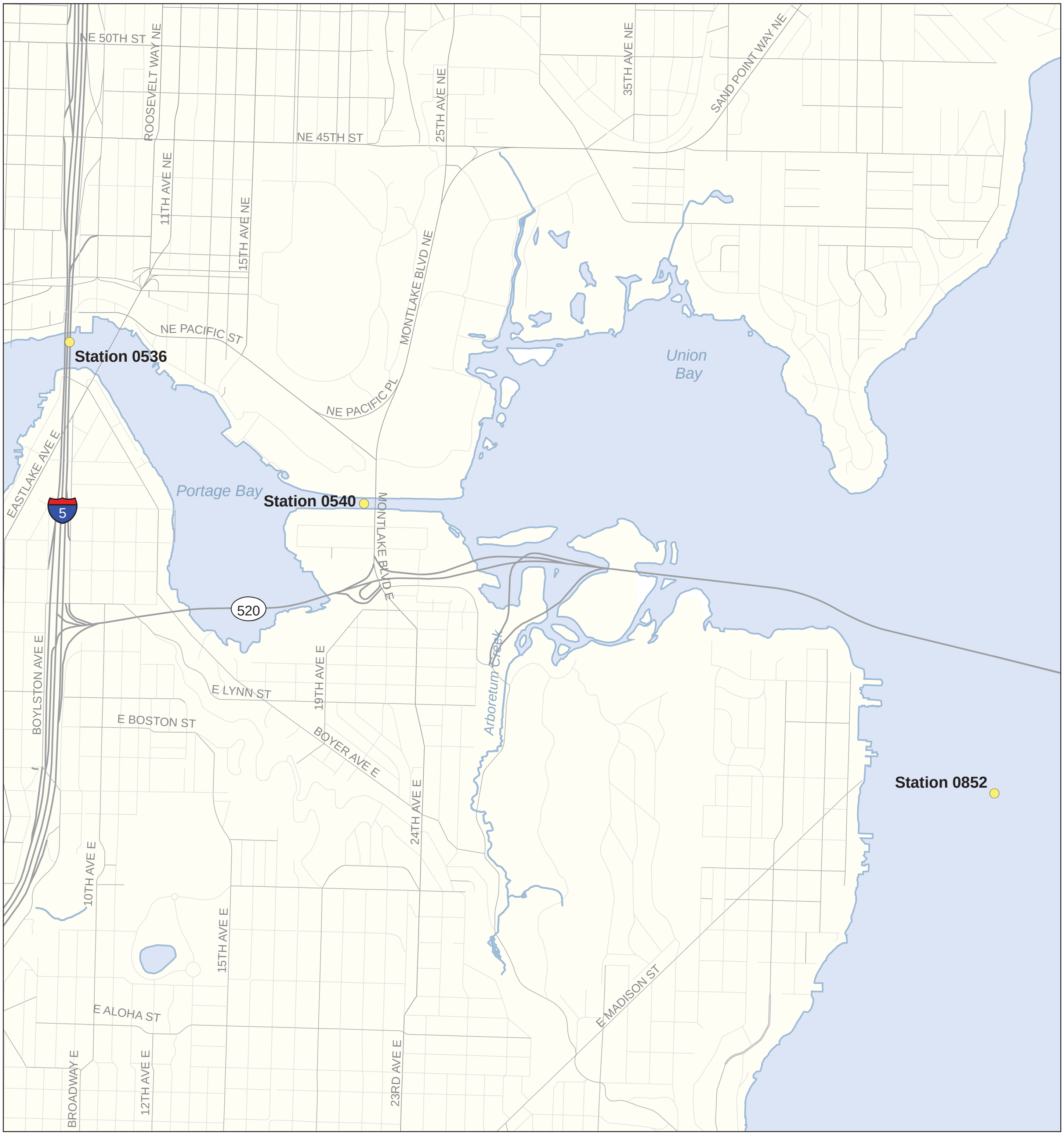

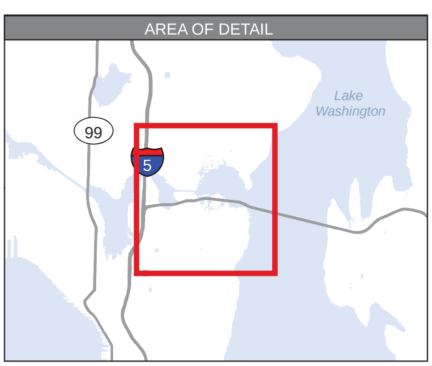

King County Water Quality Sampling Station

Source: King County (2005) GIS Data (Streams and Streets), King County (2007) GIS Data (Water Bodies). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

N

0 500 1,000 2,000 Feet

Exhibit 5a. **Map of King County Water Quality Sampling Stations**

I-5 to Medina: Bridge Replacement and HOV Project

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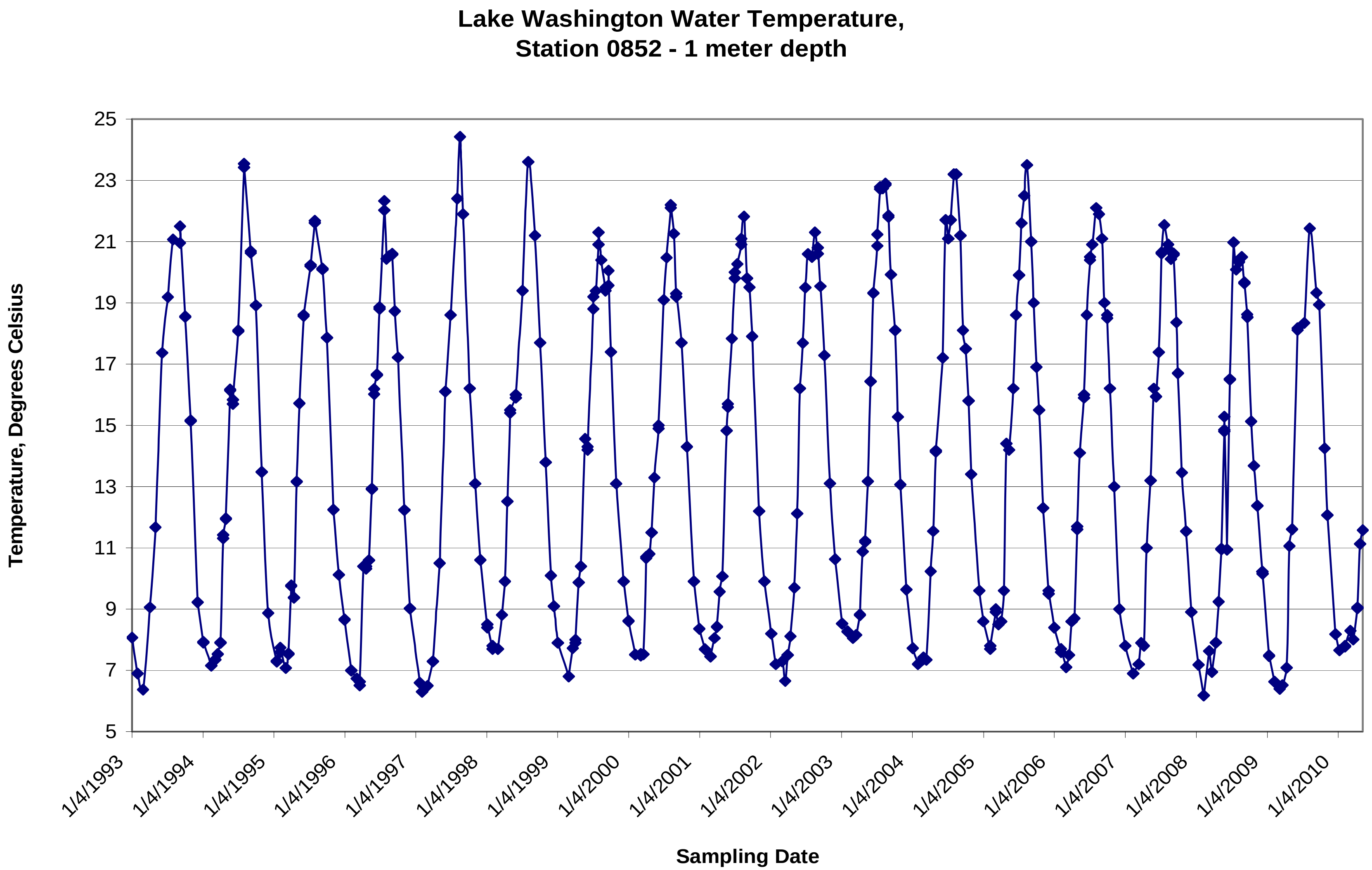


Exhibit 5b. Water Temperatures Sampled at 1 Meter below the Water Surface at Lake Washington Monitoring Station 0852

Note: Reproduced from data obtained from the King County Major Lakes Monitoring Web page.

Exhibit 5c. Conventional Water Quality Data from Lake Washington Station 0852 at 1 Meter below the Water Surface

Statistical Representation	Dissolved Oxygen, Field (mg/L)	Temperature, Field (° Celsius)	pH, Field (pH units)	Ortho-phosphate Phosphorus (mg/L)	Total Phosphorus (mg/L)	Ammonia Nitrogen (mg/L)	Nitrite + Nitrate Nitrogen (mg/L)	Total Nitrogen (mg/L)
Number of Data Points	413	419	491	255	381	275	156	278
Minimum	7.30	6.18	6.39	0.00	0.0050	0.0070	0.02	0.16
Maximum	13.76	23.60	9.18	0.03	0.1370	0.2490	0.35	0.58
Average	10.15	13.78	7.46	0.01	0.0212	0.0237	0.14	0.35
State Standard	8.0	17.5	6.5 – 8.5	-	0.02	0.68 (min)a	-	-
Compliance requirement	Not to go below state standard	Not to exceed state standard	Not to go above or below state standard		Not to exceed state standard	Not to exceed standard		

Note: Summarized from data downloaded from King County Major Lakes Monitoring Web page (http://green.kingcounty.gov/lakes/Map.aspx).

[a] The acute ammonia standard is dependent on pH and therefore represents the lowest value calculated for the range of pH values observed over this period for Station 0852.

Exhibit 5d. Conventional Water Quality Data from Montlake Cut Station 0540 at 1 Meter below the Water Surface

Statistical Representation	Dissolved Oxygen, Field (mg/L)	Temperature, Field (° Celsius)	pH, Field (pH units)	Ortho-phosphate Phosphorus (mg/L)	Total Phosphorus (mg/L)	Ammonia Nitrogen (mg/L)	Nitrite + Nitrate Nitrogen (mg/L)	Total Nitrogen (mg/L)
Number of Data Points	220	450	222	303	453	381	381	166
Minimum	5.2	3.8	7.0	0.001	0.001	0.001	0.001	0.14
Maximum	13.5	23.4	9.0	0.061	0.110	0.442	0.860	0.53
Average	10.0	13.6	7.8	0.006	0.016	0.018	0.118	0.30
State Standard	8.0	17.5	6.5 – 8.5	-	0.02	0.68 (min)	-	-
Compliance requirement	Not to go below state standard	Not to exceed state standard	Not to go above or below state standard		Not to exceed standard	Not to exceed state standard		

Note: Summarized from data downloaded from King County Major Lakes Monitoring Web page (http://green.kingcounty.gov/lakes/Map.aspx).

Exhibit 5e. Conventional Water Quality Data from Portage Bay Reach Station 0536 at 1 Meter below the Water Surface

Statistical Representation	Dissolved Oxygen, Field (mg/L)	Temperature, Field (° Celsius)	pH, Field (pH units)	Ortho-phosphate Phosphorus (mg/L)	Total Phosphorus (mg/L)	Ammonia Nitrogen (mg/L)	Nitrite + Nitrate Nitrogen (mg/L)	Total Nitrogen (mg/L)
Number of Data Points	244	266	244	207	276	205	207	187
Minimum	5.2	5.4	6.6	0.000	0.005	0.007	0.006	0.16
Maximum	13.9	23.6	9.7	0.019	0.077	0.160	0.331	0.58
Average	9.9	14.3	7.7	0.005	0.016	0.018	0.112	0.31
State Standard	8.0	17.5	6.5 – 8.5	-	0.02	0.68 (min)	-	-
Compliance requirement	Not to go below state standard	Not to exceed state standard	Not to go above or below state standard		Not to exceed state standard	Not to exceed state standard		

Note: Summarized from data downloaded from King County Major Lakes Monitoring Web page (http://green.kingcounty.gov/lakes/Map.aspx).

Where applicable, the Washington state standard is included in Exhibit 5c for comparative purposes. Dissolved oxygen, temperature, and pH standards were selected because these water quality parameters are important for fish health and behavior. These sampling stations were selected because they are near a primary salmonid migration corridor in the Lake Washington Ship Canal and Lake Washington. Additional information is provided in the Ecosystems Discipline Report Addendum and Errata (WSDOT 2010b).

At all three monitoring stations, dissolved oxygen, phosphorus, temperature, and pH failed to meet state water quality standards some of the time over the multi-year monitoring period (between 17 and 35 years of monitoring, depending on the station). While this result indicates that the overall water quality of Lake Washington is impaired to some extent, the proposed project is not likely to contribute to these pollutant exceedances because highway runoff is not a source of biochemical oxygen demand (the term for substances that decrease dissolved oxygen), phosphorus, or pH.

Similarly, highway runoff is unlikely to detectably increase surface water temperatures in Portage Bay, the Montlake Cut, or Lake Washington. The temperature of future treated stormwater to be discharged to the receiving environments would be a function of (1) air temperature, (2) the impervious surface on which it falls, and (3) the conditions, design, and composition of the treatment facility and conveyance system through which future stormwater will flow prior to discharge. Most of the stormwater will be generated during times when air and pavement temperatures are at or below 17.5 degrees Celsius (°C) (63.5 degrees Fahrenheit [°F]) because over 70 percent of storms occur between October and March. When rainfall occurs during months when air or pavement temperatures are above 17.5 C, stormwater either will flow through a treatment facility or will be discharged into a spill containment lagoon where it will mix with cooler water before entering the deeper waters of Lake Washington.

Lake Washington Monitoring Station 0852 Water Quality

Measured ammonia-nitrogen levels at Station 0852 in Lake Washington (Exhibit 5c) were below the state standard[1], while dissolved oxygen, total phosphorus, water temperature, and pH values were out of compliance with their respective standards at least part of the time over the 17 years of data summarized in Exhibit 5c. Dissolved oxygen at 1 meter below the water surface was below the minimum state standard[1] in only 2 of out of the 413 measurements reported by King County. The maximum allowable limits for total phosphorus, temperature, and pH were exceeded annually, with pH exceedances the least frequent (9 percent of all measurements) and phosphorus the most frequent (42 percent of all measurements at 1 meter below the water surface).

The long-term record (1964 to 1998) of inter-annual temperature changes in Lake Washington has been analyzed by Arhonditsis et al. (2004), who found that the lake has been experiencing a warming trend for this 34-year period, leading to an increase of 1.5°C weighted over the lake surface (0 to 10 meters below the water surface). This trend was most pronounced from April to September,

[1] State standards for these water quality constituents vary based on the presence or absence of salmon and what life stages and activities are present in the affected water body. The standards used in this evaluation were established for salmonid spawning, rearing, and migration

in contrast with the smallest and nonsignificant changes from November to February (Arhonditsis et al. 2004). It is unclear if this increasing trend continued after 1998. However, Exhibit 5b shows that the water quality temperature standard of 17.5 °C has been exceeded at a depth of 1 meter below the water surface each year since 1998.

Montlake Cut Monitoring Station 0540 Water Quality

Measured ammonia-nitrogen levels in the Montlake Cut were in compliance with the state standard[1], while dissolved oxygen, total phosphorus, water temperature, and pH values failed to comply with their respective standards at least part of the time over the 35 years of data summarized in Exhibit 5d. Dissolved oxygen at 1 meter below the water surface was below the minimum standard for salmonid spawning, rearing, and migration in 5 out of the 220 measurements reported by King County (2 percent of the time). Exceedances for total phosphorus, temperature, and pH occurred annually, with the pH exceedances the least frequent (6 percent of all measurements) and temperature the most frequent (29 percent of all measurements at 1 meter below the water surface).

Portage Bay Reach Monitoring Station 0536 Water Quality

Measured ammonia-nitrogen and total phosphorus levels in the Portage Bay reach just west of the I-5 bridge were below their respective standards established for salmonid spawning, rearing, and migration, while dissolved oxygen, water temperature, and pH values exceeded their respective standards at least part of the time over the 33 years of data (between June 18, 1975, and January 15, 2008) summarized in this report (Exhibit 5e). Dissolved oxygen at 1 meter below the water surface was below the minimum standard for salmonid spawning, rearing, and migration 1 out of the 244 measurements reported by King County (0.4 percent of the time). Maximum standards for temperature and pH were exceeded annually, with pH exceedances the least frequent (8 percent of all measurements) and temperature the most frequent (36 percent of all measurements at 1 meter below the water surface).

Groundwater Resources in the East Approach Area

On and just offshore of the eastern shore of Lake Washington near the east approach and the bridge maintenance facility, geotechnical investigations conducted in 2010 have recorded groundwater upwelling. The amount of upwelling is strong enough to necessitate dewatering during construction and operation of the bridge maintenance facility (see the Geology and Soils Discipline Report Addendum and Errata, WSDOT 2011c). This specific groundwater resource is not currently being used as a drinking water supply.

Impaired Water Bodies in the Study Area

Ecology rates the degree of water quality impairment in Washington state waters by assigning rating categories that summarize the relationship between measured concentrations and state standards. The categories relevant to this assessment are: 1 (meets tested standards for clean water), 2 (waters of concern), and 5 (polluted waters that require a total maximum daily load[2] [TMDL] and placed on Ecology's 303(d) list). The 2008 Water Quality Assessment (Ecology 2008) identifies six areas within the Lake Washington Ship Canal, Portage Bay, Union Bay, and Lake Washington for which data have been evaluated and assigned a water quality assessment category of either 2 or 5 (Exhibits 6 and 7)[3]. These chemical parameters vary in concentration across the study area, where in some cases they meet the tested criteria and in other cases they exceed relevant standards, leading to a determination of impairment. Only lead, listed as a category 5 pollutant in the Lake Washington Ship Canal, is related to the potential environmental effects assessed in the 2009 discipline report. The other category 5 pollutants in these waters are not present in roadway stormwater runoff (e.g., phosphorus). Zinc, a common constituent present in stormwater runoff, was listed as a category 2 pollutant in the Lake Washington Ship Canal (some evidence of concern, but not enough to require production of a water quality improvement project).

Stormwater Management in the Study Area

The section of the 2009 discipline report entitled "Stormwater Management in the Project Area" (page 40) has been modified in this addendum in two ways:

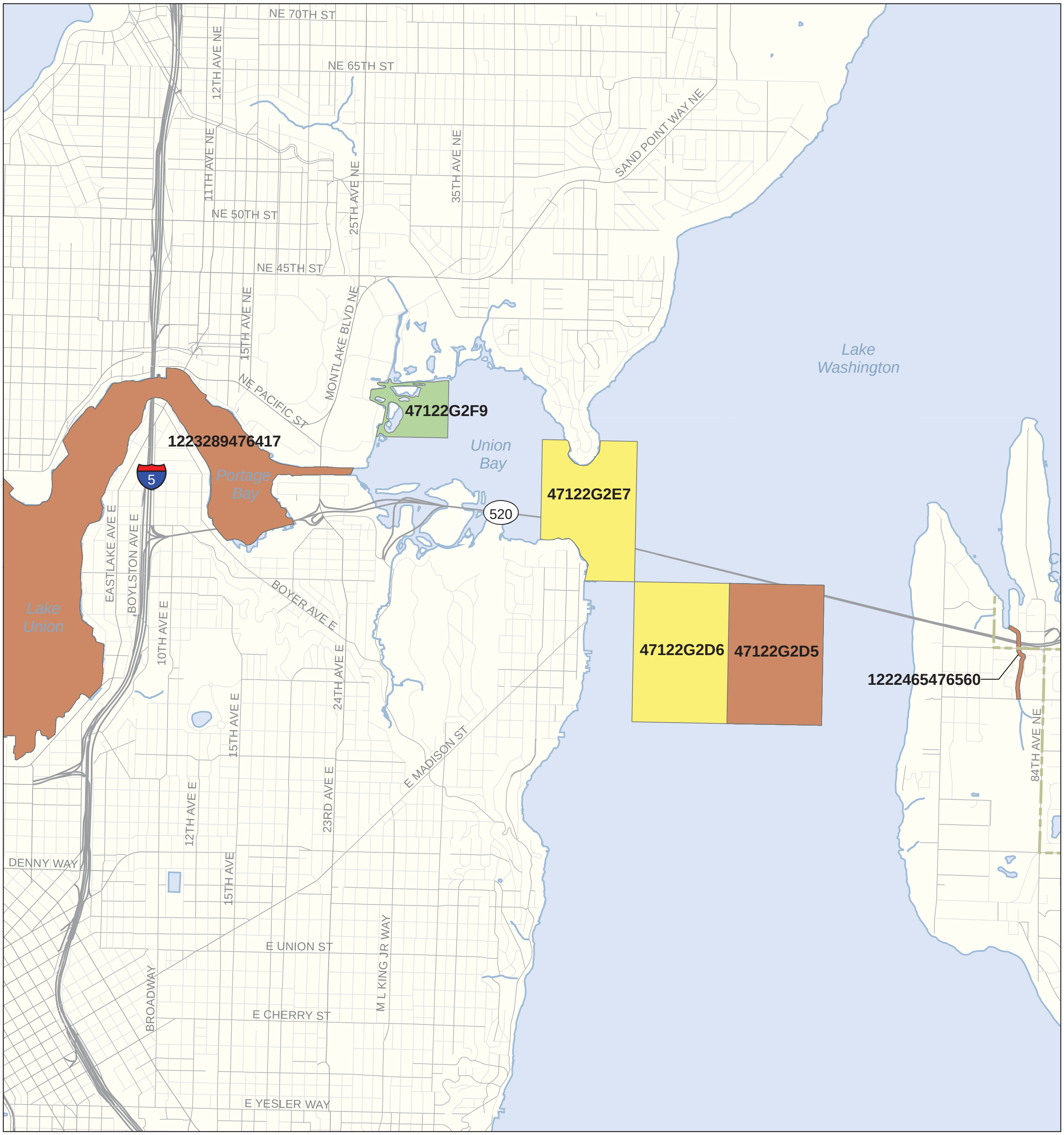
- The University Slough basin has been removed from the affected study area.
- A complete set of stormwater outfalls conveying runoff from the SR 520 roadway (as presented in Exhibit 17 of the 2009 discipline report), as well as stormwater discharge points from city streets, have been added to the remaining basins to more fully describe the existing stormwater discharges to the adjacent receiving environments.

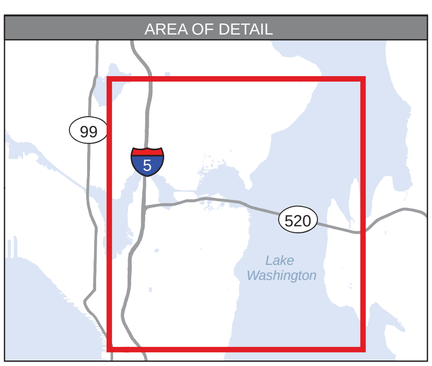
Exhibit 8 provides an updated depiction of existing stormwater treatment facilities.

The following sections describe the additional features provided for the management of stormwater runoff in the Seattle, Lake Washington, and eastside portions of the study area.

[2] A TMDL is a water quality improvement project process established by Section 303(d) of the Clean Water Act to establish limits on pollutants that can be discharged to the waterbody and still allow state standards to be met.

[3] Lack of a rating reflects lack of data for a particular area and does not imply that the unrated water resources are either non-impaired or impaired.





Impaired Water Resource Area

- Category 2 - Waters of Concern
- Category 4c - Impaired by a non-pollutant (invasive aquatic species)
- Category 5 - Polluted waters that require a TMDL

Source: Ecology 2010, King County (2005) GIS Data (Streams and Streets), King County (2007) GIS Data (Water Bodies). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

N

0 1,000 2,000 4,000 Feet

Exhibit 6. **Impaired Water Resources in the Study Area based on Ecology 2008 Water Quality Assessment**

I-5 to Medina: Bridge Replacement and HOV Project

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Exhibit 7. Impaired and Non-impaired Water Resources in the Study Area from Ecology's 2008 Water Quality Assessment

Listing Category	Parameter	Medium
Ecology Map Area 1223289476417 – Lake Union/Lake Washington Ship Canal		
1	Total Phosphorus	Water
1	Total Phosphorus	Water
1	Total Phosphorus	Water
1	Endosulfan I	Water
2	Dissolved Oxygen	Water
2	Temperature	Water
2	pH	Water
2	4,4'-DDD	Water
2	4,4'-DDE	Water
2	Zinc	Water
4C	Invasive Exotic Species	Habitat
5	Total Phosphorus	Water
5	Lead	Water
5	Fecal Coliform	Water
5	Aldrin	Water
Ecology Map Area 47122G2E7 – Lake Washington		
2	Ammonia-Nitrogen	Water
Ecology Map Area 47122G2D6 – Lake Washington		
1	Ammonia-Nitrogen	Water
1	Total Phosphorus	Water
2	PCB	Water
Ecology Map Area 47122G2D5 – Lake Washington		
1	Heptachlor	Tissue
1	Hexachlorobenzene	Tissue
1	Mercury	Tissue
1	4,4'-DDT	Tissue
1	Alpha-BHC	Tissue
1	Beta-BHC	Tissue
1	Gamma-BHC (Lindane)	Tissue
2	2,3,7,8-TCDD TEQ	Tissue

Exhibit 7. Impaired and Non-impaired Water Resources in the Study Area from Ecology's 2008 Water Quality Assessment

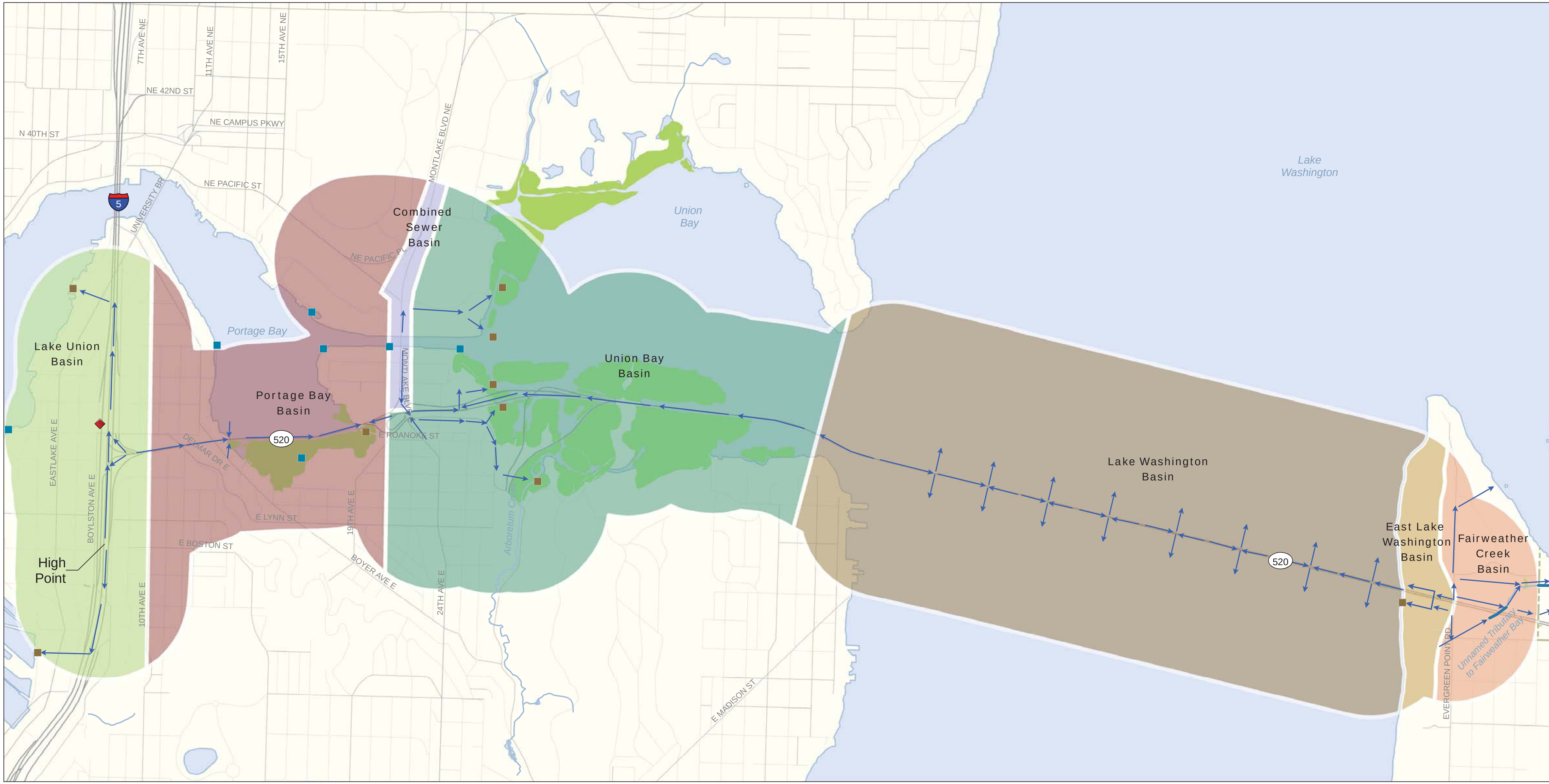
Listing Category	Parameter	Medium
5	2,3,7,8-TCDD	Tissue
5	PCB	Tissue
5	Total Chlordane	Tissue
5	4,4'-DDD	Tissue
5	4,4'-DDE	Tissue
Ecology Map Area 1222465476560 – Fairweather Bay Creek		
1	pH	Water
5	Temperature	Water
5	Fecal Coliform	Water
5	Dissolved Oxygen	Water
Ecology Map Area 47122G2F9 – Lake Washington		
4C	Invasive Exotic Species	Habitat

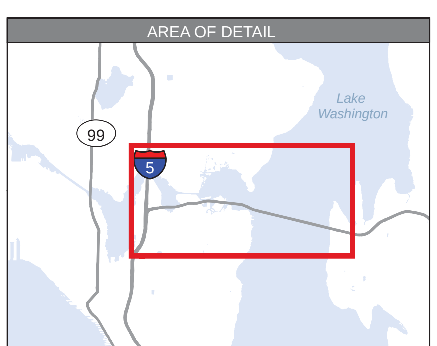
303(d) Listing Categories:
- Category 1 - Meets tested standards for clean waters
- Category 2 - Waters of concern
- Category 4c - Impaired by a non-pollutant
- Category 5 - Polluted waters that require a TMDL

Source: Ecology 2008

Seattle

In addition to the points of connection between the project area and the city stormwater system identified in Exhibit 17 of the 2009 discipline report, there are existing stormwater outfalls within the Lake Union basin along Roanoke Street near the intersection of I-5 and SR 520 (Exhibit 8) that drain westward to an outfall discharging to Lake Union. Several other outfalls along Roanoke Street within the Portage Bay basin drain eastward and discharge to Portage Bay where the existing SR 520 roadway crosses the shoreline. Additional stormwater points of connection with the city system conveying city street runoff are located at the end of Shelby Street on the northwestern shore of Portage Bay, and on both sides of the west entrance of the Montlake Cut (Exhibit 8). Lastly, a stormwater outfall discharging to the south end of Portage Bay is located on the west side of the Montlake Playfield directly north of 16th Avenue East (Exhibit 8). Eight stormwater outfalls are located in the combined sewer basin (Exhibit 8). In the Union Bay basin, a stormwater outfall is located near the intersection of East Montlake Place East and East Lake Washington Boulevard, conveying stormwater from 24th Avenue East and East Montlake Place East into the system discharging to Union Bay near the mouth of Arboretum Creek. An additional six outfalls in the Union Bay basin are located along the western shore of Union Bay, from the east end of the Husky Stadium parking lot to just north of the SR 520 off-ramps. Also in the Union Bay basin, a stormwater





Basin

- Combined Sewer
- East Lake Washington
- Fairweather Creek
- Lake Union
- Lake Washington
- Portage Bay
- Union Bay

- Outfall to Surface Waterbody
- Combined Sewer Overflow (CSO) to Surface Waters
- Flow Pattern to Outfall
- Wetland

Source: King County (2005) GIS Data (Streams and Streets), King County (2007) GIS Data (Water Bodies). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

N

0 500 1,000 2,000 Feet

Exhibit 8. **Current Study Area Creeks, Stormwater Outfalls, Culverts, and Basin Boundaries (Update to Exhibit 17 of the 2009 Discipline Report)**

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outfall discharging to Arboretum Creek is located near the intersection of East Miller Street and Lake Washington Boulevard East.

Lake Washington

Exhibit 13 identifies stormwater treatment facilities in the Lake Washington basin. A stormwater outfall discharging stormwater from the Edgewater Park area is located offshore in Lake Washington, and an additional discharge location in the East Lake Washington basin is located just south of SR 520. Stormwater outfalls are also located at the intersection of Evergreen Point Road and NE 32nd Street and at Evergreen Point Road along the east side of the Three Points Elementary campus of Bellevue Christian School (Exhibit 8).

Fairweather Creek

In addition to the stormwater outfalls described for the Fairweather Creek area in the 2009 discipline report, another stormwater outfall is located near 80th Avenue NE just north of SR 520, discharging stormwater from the unnamed tributary to Fairweather Bay.

Exhibit 9. Location of Unnamed Tributary to Fairweather Bay

This short (0.2-mile-long) stream drains Fairweather Park on the north side of SR 520 and also provides drainage from the SR 520 roadway and an area south of the highway (Exhibit 9). The stream, which discharges into the eastern shoreline of Fairweather Bay via a pipe under 80th Avenue NE, originates at the outlet of two corrugated metal culverts that discharge into a catch basin on the north side of SR 520. These culverts receive stormwater from paved areas within and south of the SR 520 right-of-way. The stream is perennial, indicating groundwater input into the upstream pipe system. This conclusion is supported by the observed lack of an open channel conveyance above the catch basin. The watershed is moderately developed upstream of SR 520, while the majority of open channel is located in an undeveloped area, with some residential development at the stream mouth.

The stream enters a culvert and stormwater conveyance system just west of 80th Avenue NE. The area surrounding the culvert inlet has been armored by gabion baskets on all sides, forming an engineered pool structure with an overflow sill on the south side. An overflow channel routes high flows to a secondary culvert located to the south. Both the primary culvert and the overflow culvert appear to connect to a stormwater discharge system, which ultimately flows east to Lake Washington to one or more discharge points. Based on the size of the outlet culverts and the presence of inline vaults, fish passage from Lake Washington to the stream is unlikely.

Stormwater Treatment at the Supplemental Stability Pontoon Construction Sites

Up to 44 supplemental stability pontoons will be constructed at the Port of Tacoma, and/or the Port of Grays Harbor. The Port of Tacoma site (referred to as the CTC facility in the 2009 discipline report) is an existing industrial site with an approved and permitted stormwater treatment plan and facilities. Other portions of the Port of Tacoma site may need changes to the existing stormwater systems or discharges at this location. However, all discharges will be managed in accordance with relevant state and local regulations, and all treatment facilities will be constructed and operated in accordance with WSDOT's *Highway Runoff Manual* (WSDOT 2008a), or the local jurisdictions' Ecology- approved stormwater manual. Stormwater treatment facilities for the Grays Harbor site have been described in the Pontoon Construction Project Environmental Impact Statement.

Preferred Alternative Stormwater Treatment

As noted in Exhibit 19 of the 2009 discipline report, no stormwater detention is required for any of the water resources receiving stormwater from the future project roadways. According to Ecology regulations, only basic water quality treatment is required, and flow control is not required because project stormwater is discharged into flow exempt water bodies (Exhibit 18 of the 2009 discipline report). Where feasible, based on specific site constraints and right-of-way availability, WSDOT has chosen to develop facilities, such as constructed stormwater treatment wetlands, that provide enhanced water quality treatment (a higher level of treatment than basic) prior to discharge.

The Preferred Alternative has resulted in the redesign of some of the proposed treatment facilities described in the SDEIS. They are compared to the SDEIS options in Exhibit 10. The most noteworthy change in the proposed design is that biofiltration swales (Facilities U and M) would be used in TDAs 13 and 14 rather than constructed wetlands. This change would result in a basic stormwater treatment level for these TDAs, rather than the enhanced level proposed in the SDEIS. This change was made because of a reduced drainage area for the facilities and lack of available suitable land for constructing stormwater treatment facilities. Constructed stormwater wetlands require large amounts of suitable space, which are not available in all areas with the Preferred Alternative. Even with this change, the project will meet the requirements of the *Highway Runoff Manual* and Ecology because discharge to Lake Washington must receive basic treatment.

The Preferred Alternative proposes to collect and treat stormwater generated from some local streets adjacent to the project right-of-way, in addition to new PGIS associated with SR 520, through basic and enhanced treatment facilities. These city streets currently drain to the City of Seattle combined sewer system (CSS) (Exhibit 8), which ultimately discharges to Puget Sound. The pollutant loading analysis presented herein includes the treatment and discharge of runoff from these existing city streets outside the WSDOT right-of-way to adjacent water bodies.

The City of Seattle drainage codes allow for continued discharge to the CSS for any surface not being disturbed and require detention for discharge from new impervious surfaces to the CSS. During the City of Seattle permitting process, WSDOT may choose to continue having the stormwater generated on city streets drain to the City's CSS rather than to WSDOT-constructed stormwater treatment facilities. If this diversion does occur, it would change the results for some of the Seattle area TDA's stormwater treatment facilities. These changes would be within the range predicted for the SDEIS options, because of reduced drainage areas to the City facilities.

Exhibit 10. Stormwater Treatment for the Preferred Alternative Threshold Discharge Areas Compared with the SDEIS Options (Update to Exhibit 19 of 2009 Discipline Report)

	Preferred Alternative		SDEIS Options	
TDA	**Proposed Facility**	**Level of Treatment**	**Proposed Facility**	**Level of Treatment**
7	Biofiltration swale	Basic	Biofiltration swale, media filter vault	Basic
8	Emerging technology best management practice (AKART)	Basic	Emerging technology best management practice	Basic
9	Constructed stormwater treatment wetland	Enhanced	Constructed stormwater treatment wetland, media filter vaults	Enhanced
10	Constructed stormwater treatment wetland, biofiltration swale	Enhanced/basic	Constructed stormwater treatment wetland	Enhanced
11	Constructed stormwater treatment wetland	Enhanced	Constructed stormwater treatment wetland	Enhanced
12	Constructed stormwater treatment wetland	Enhanced	Constructed stormwater treatment wetland	Enhanced
13	Biofiltration swale	Basic	Constructed stormwater treatment wetland	Enhanced
14	Biofiltration swale	Basic	Constructed stormwater treatment wetland, media filter vaults	Enhanced

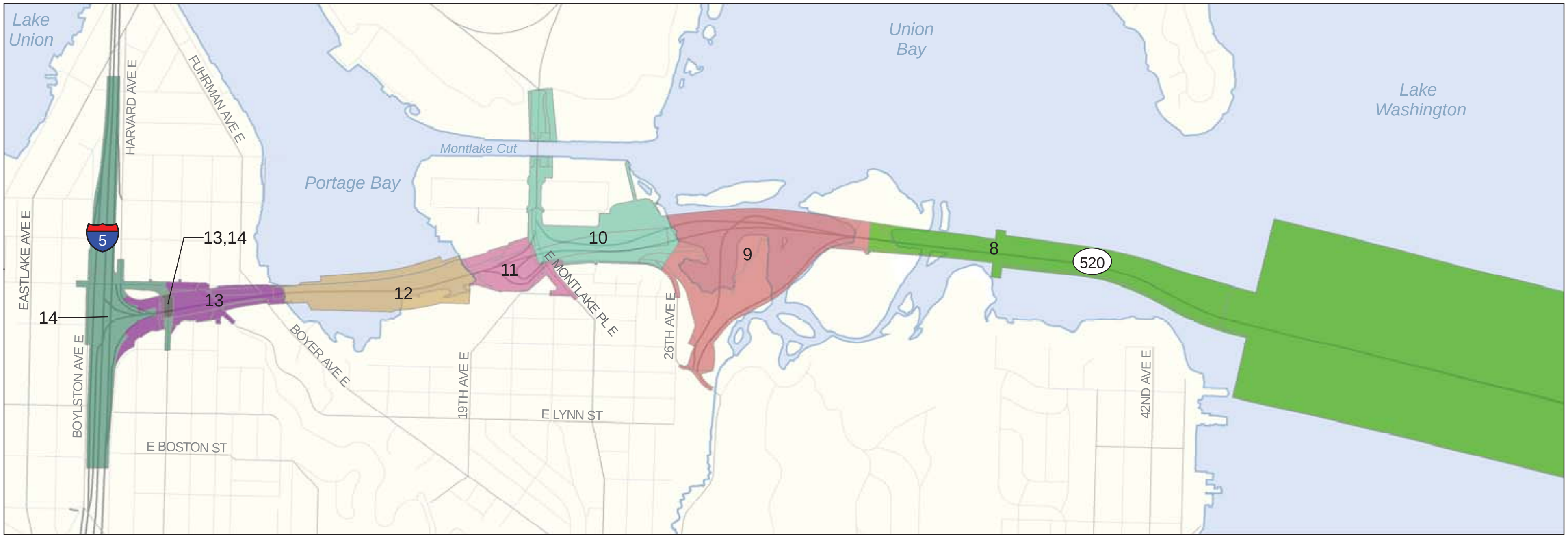
The facilities listed in Exhibit 10 would be constructed to treat stormwater from all new, replaced, and some existing to remain PGIS for the seven TDAs located in this area (Exhibit 11).

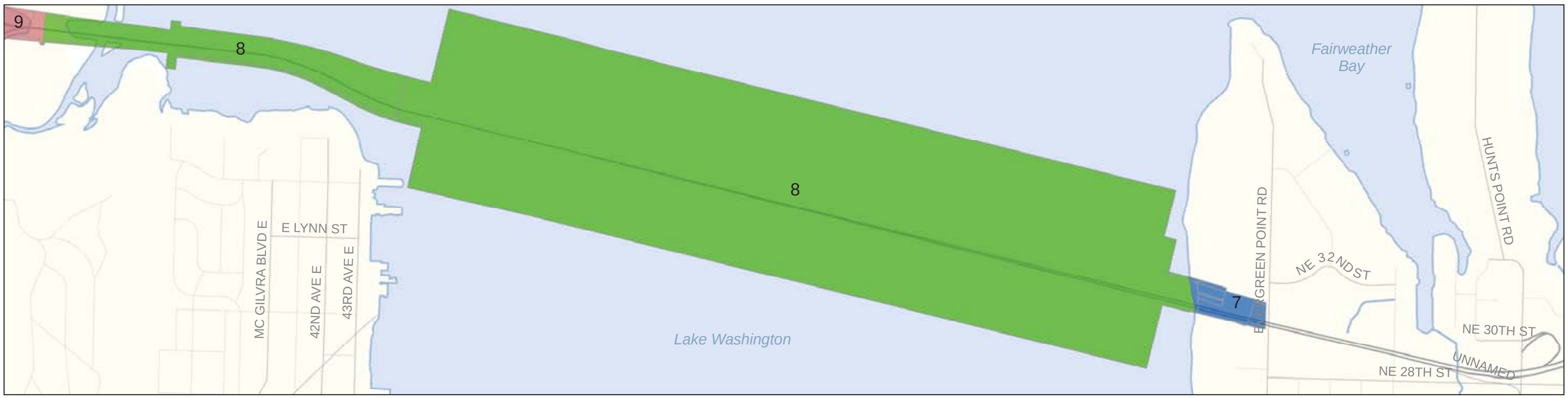
Stormwater Treatment Facilities by Basin

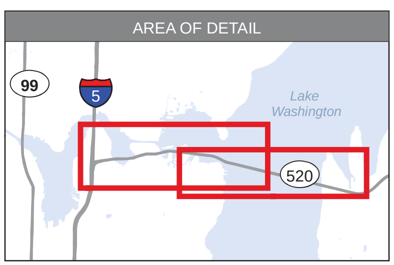
As described in the 2009 discipline report, WSDOT selected each best management practice (BMP) based on space constraints and discharge location. Treatment facilities were sized to meet the *Highway Runoff Manual* requirements. This addendum describes the stormwater treatment facilities in each basin for the Preferred Alternative. Exhibit 12 summarizes this discussion and Exhibit 13 provides a map showing the locations of the facilities discussed below.

Lake Union

Instead of the three facilities identified for the SDEIS options, a single biofiltration swale (basic stormwater treatment facility P) would convey treated stormwater from TDA 14 to Lake Union via an existing stormwater outfall located at Allison Street (Exhibits 12 and 13).







Threshold Discharge Area (TDA)

- 10
- 11
- 12
- 13
- 13,14
- 14
- 7
- 8
- 9

N

0 500 1,000 2,000 Feet

Source: King County (2005) GIS Data (Streets), King County (2007) GIS Data (Water Bodies), Parametrix (2009) GIS Data (TDA). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 11. **Threshold Discharge Areas 7 to 14 for Study Area (Update to Exhibit 20 of the 2009 Discipline Report)**

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Exhibit 12. Proposed Stormwater Management Facility Characteristics – Scenario 1 (Update to Exhibit 22 of the 2009 Discipline Report)

TDA	14	13	12	11	10	9	8	7
Outfall Location	**Lake Union via existing storm system at Allison Street**	**Portage Bay via existing storm drain outfall at western shoreline**	**Portage Bay via existing storm drain outfall at eastern shoreline**	**Portage Bay via existing storm drain outfall at eastern shoreline**	**Union Bay via existing City of Seattle outfall**	**Lake Washington**	**Lake Washington**	**Lake Washington**
Detention Required	No	No	No	No	No	No	No	No
Quality Treatment Required	Basic	Basic	Basic	Basic	Basic	Basic	Basic	Basic
Type of Proposed Facility	Biofiltration swale	Biofiltration swale	Constructed stormwater treatment wetland	Constructed stormwater treatment wetland	Constructed stormwater treatment wetland, biofiltration swale	Constructed stormwater treatment wetland	Emerging Technology BMP (AKART)	Biofiltration swale
Stormwater Wetland/Wet Pond Depth (Average depth in wetland 1.5 feet)	N/A	N/A	2.5	2.5	2.5	2.5	N/A	N/A
Preferred Alternative								
Existing Impervious Area (acres)	*17.4*	*4.6*	*3.2*	*5.4*	*14.9*	*9.1*	*17.8*	*1.7*
Total Impervious Area (acres) (post-project)[a]	*17.3*	*7.3*	*5.7*	*6.5*	*28.3*	*10.4*	*23.9*	*2.8*
Net Impervious Area (acres)	*-0.1*	*2.7*	*2.5*	*1.1*	*13.4*	*1.3*	*6.1*	*1.1*
Net Impervious (%)	*-0.6%*	*59%*	*78%*	*20%*	*90%*	*14%*	*34%*	*65%*
Proposed Facilities	P	O	N	N	M, U	M	N/A	K
Treatment Volume (cubic feet)	17,718	13,009	38,347[b]	38,347[b]	104,067[c]	104,067[c]	N/A	N/A
Surface Area of Stormwater Wetland/Pond (square feet)	N/A	N/A	13,784[b]	13,784[b]	57,628[c]	57,628[c]	N/A	N/A
Biofiltration Swale Dimensions	14 x 292 feet	17 x 157 feet'	N/A	N/A	10 x 130 feet	N/A	N/A	7.5 x 110 feet

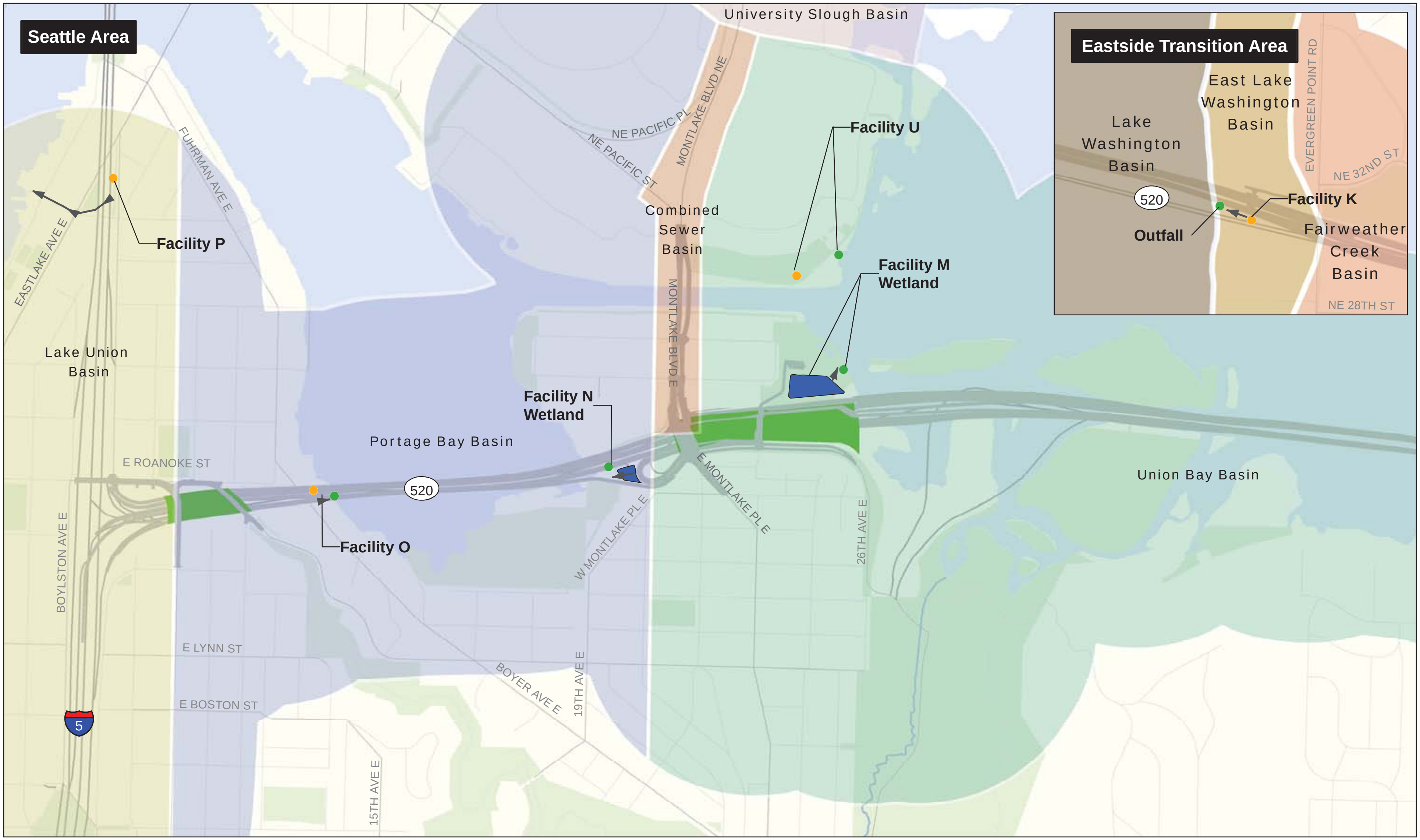
Source: WSDOT 2009d

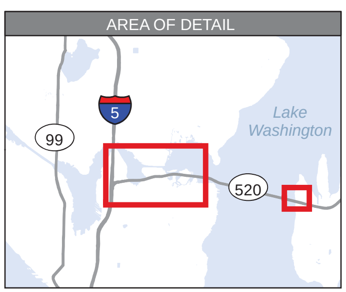
Note: TDAs are presented in order from west to east (i.e., TDA 14 is the westernmost TDA in the project)

[a] Area includes totals of pollution generation impervious surface and non-pollution-generating impervious surface

[b] Treatment volume for Facility N is computed for TDAs 11 and 12 combined as a single facility

[c] Treatment volume for Facility M is computed for TDAs 9 and 10 combined as a single facility





Proposed Stormwater Facility

- Biofiltration Swale
- Outfall
- Stormwater Treatment Facility
- Lid or Landscape Feature
- Pavement

N

0 500 1,000 2,000 Feet

Source: King County (2005) GIS Data (Streets), King County (2007) GIS Data (Water Bodies). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 13. **Proposed Stormwater Management Facilities Preferred Alternative (Update to Exhibit 23 of the 2009 Discipline Report)**

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Portage Bay

Under the Preferred Alternative, similar to the SDEIS options, three TDAs (11, 12, and 13) would discharge treated stormwater to Portage Bay through two existing outfalls—one on the eastern shoreline of Portage Bay and the other on the western shoreline (Exhibits 12 and 13). For the Preferred Alternative, in contrast with the SDEIS options, stormwater from TDA 13 would be treated at facility O with a biofiltration swale (a basic BMP) prior to discharge at the western shoreline. This change was the result of the reduced amount of space for stormwater treatment in the Preferred Alternative project footprint as well as consideration of site constraints such as steep slopes and proximity to Lake Washington. Similar to the SDEIS options, under the Preferred Alternative, stormwater from TDAs 11 and 12 would be treated by means of individual constructed stormwater treatment wetlands and then discharged to Portage Bay on the eastern shoreline (Exhibits 12 and 13).

Union Bay

In contrast with the SDEIS options, the Preferred Alternative would discharge treated stormwater to Union Bay using a new WSDOT outfall sited in near an existing City of Seattle outfall only in TDA 10 (Exhibits 12 and 13). Facilities M and U would consist of a constructed stormwater treatment wetland and a biofiltration swale, respectively. The media filter vault identified for the SDEIS options would not be a part of the treatment facilities constructed for the Preferred Alternative (Exhibit 12).

Lake Washington

The proposed treatment for TDA 9 in the Preferred Alternative is most similar to SDEIS Option L, where stormwater would be conveyed to treatment facility M and then discharged to Union Bay. Stormwater from TDA 8 would be treated in the same manner as for the SDEIS options (as detailed in the AKART study discussed in the following section). Stormwater in TDA 7 would be treated only with a biofiltration swale (Facility K) and not additionally with the media filter vault as described in the 2009 discipline report.

AKART Water Quality Modeling

As discussed in the 2009 discipline report, the floating portion of the Evergreen Point Bridge poses significant challenges for stormwater treatment. WSDOT conducted an AKART analysis to survey available technology for use on the floating bridge, as well as a water quality analysis to determine the potential effects on Lake Washington due to construction and operation of the replacement bridge. Only a draft version of the AKART and water quality studies report (WSDOT 2009b) was available at the time of the publication of the 2009 discipline report. This report has now been finalized (WSDOT 2009c) and conditionally approved by Ecology (Fitzpatrick 2010).

Overall, the draft and final AKART reports are similar in their approach to stormwater treatment and analytical techniques. The technology evaluation identified the same suite of treatment technologies—oversized catch basins and high-efficiency sweeping—prior to discharging into spill control lagoons centered in the supplemental stability pontoons (WSDOT 2009b, 2009c). The effects analysis in both versions of the report involved a pollutant loading analysis of pre- and post-treatment coupled with a dilution modeling analysis after discharge of treated stormwater to the lagoons. The Preferred Alternative spill containment lagoons are slightly smaller than those lagoons evaluated in the SDEIS because the internal bracing of the supplemental stability pontoons needs to be accommodated. This smaller initial volume for stormwater mixing, prior to exiting the bottom of the lagoons and mixing with Lake Washington water, was evaluated in the revised AKART analysis. This evaluation found that there was no change in the assessment of where the discharge met the state water quality standards for the runoff pollutants evaluated. This updated characterization of stormwater discharging to the spill containment lagoons was reviewed by Ecology and used in its conditional approval of the AKART report. The schematic representation of the stormwater mixing processes for the floating bridge (Exhibit 27 of the 2009 discipline report) remains the same.

Potential Effects

The 2009 discipline report provided a detailed discussion of project effects of the No Build Alternative and SDEIS Options A, K, and L (see pages 65 through 78). The discussion below supplements the 2009 discipline report and compares the effects of the Preferred Alternative with those of the SDEIS options, using new or updated exhibits where appropriate. Selected data previously presented in the SDEIS are included in the exhibits for the No Build Alternative and Options A, K, and L for comparison purposes.

What were the methods used to evaluate the potential effects, and have they changed since publication of the SDEIS?

The potential effects of the Preferred Alternative were evaluated using the same methods as those used to assess the potential effects of the No Build Alternative and Option A in the SDEIS (see page 65 of the 2009 discipline report). WSDOT and Ecology-approved methods were used to evaluate effects of stormwater on surface water bodies. WSDOT's approved methods for evaluating effects on surface water resources are described in WSDOT's *Environmental Procedures Manual* (WSDOT 2008b) and the *Highway Runoff Manual* (WSDOT 2008a). In addition, temporary effects on surface water during construction were evaluated by determining construction actions that may disturb soil and in-water sediments and by assessing the potential for accidental spills of hazardous materials.

How would construction of the project affect water resources?

What construction activities could affect water resources in Portage Bay, Union Bay, and Lake Washington?

The potential effects on surface water bodies due to construction of the Preferred Alternative are the same as those assessed for Option A of the SDEIS.

Portage Bay

Under the Preferred Alternative, construction of the replacement Portage Bay Bridge would use the same techniques as for Option A, and the potential effects and stormwater treatment approaches would be the same.

Montlake Area

In the Montlake area, the construction effects and stormwater treatment approaches would be the same as identified for Option A.

West Approach Area

Construction effects from the Preferred Alternative would be the same in the west approach area as noted for Option A.

Lake Washington

The construction techniques used to replace the floating bridge portion of the Evergreen Point Bridge would be the same for the Preferred Alternative as for Option A. As such, the BMPs and potential effects described in the SDEIS would be the same as for the Preferred Alternative.

In-Water – Containment Best Management Practices

BMPs for in-water work implemented for the Preferred Alternative would be the same as described in the 2009 discipline report (WSDOT 2009a), with the addition of the following measures:

- In-water structures would be minimized by increasing span lengths from existing conditions and the use of precast girders to eliminate the need for falsework.
- The maintenance dock would be designed to minimize the length and over-water coverage of this structure.
- The construction schedule would be optimized to limit the number of construction years, with the highest-risk construction activities phased to occur during the periods of lowest risk to aquatic resources (published work periods).
- In-water work would be minimized by performing construction work from barges where feasible and using work bridges to support over-water work in shallow areas.
- A CCDP would detail how water quality would be maintained both during construction of bridge columns and their footings and during demolition of the existing bridge.
- In-water effects would be minimized to the extent possible by incorporating upland construction BMPs to reduce and prevent the movement of soils and sediments to the aquatic environment.

How would project construction affect groundwater?

Potential effects on groundwater during construction of the Preferred Alternative would be similar to those identified in the 2009 discipline report. However, the Preferred Alternative would have a substantially larger lid (over 1,400 feet long) at the Montlake interchange than either of the SDEIS options and a slightly lower profile than Option A. The types of construction activities and their effects would be similar to those of Option A. Negative effects on groundwater during construction would be minimized by implementing water quality pollution control measures outlined in the required spill prevention, control, and countermeasures (SPCC) plans, including compliance with permit conditions.

In some locations and at some times of the year, the profile may be below the groundwater surface, potentially requiring construction dewatering and the construction of additional structural support, uplift-resisting piles, or uplift-resisting anchors to provide an adequate factor of safety against floating. This may be particularly true for constructing the bridge maintenance facility in the east approach area as noted above. In-water effects from upland construction areas would be minimized by the development and implementation of a temporary erosion and sediment control (TESC) plan. The Geology and Soils Discipline Report Addendum and Errata contains additional information.

How would construction of the supplemental stability pontoons affect water resources?

Construction of the supplemental stability pontoons at either the Grays Harbor facility, or the Port of Tacoma facility (referred to as the CTC facility in the 2009 discipline report), would handle two types of water—process water and stormwater. Process water would be any water that comes in contact with concrete manufacturing or concrete construction activities, such as the construction of the pontoons in the casting basin, and water used to clean the casting basins prior to floating out the completed pontoons. Stormwater would be generated from impervious surfaces at the site such as access roads, offices, parking areas, and laydown areas. Construction of pontoons at the Port of Tacoma facility is not expected to result in any new effects on the adjacent surface water features, because each operation would be required to comply with its current municipal NPDES permit conditions, and the expected conditions of a new or existing NPDES Sand and Gravel Permit. These permit conditions would require any stormwater discharge to meet state water quality criteria intended to prevent the discharge of contaminated stormwater to adjacent receiving environments. The Grays Harbor facility has also been designed with process water and stormwater treatment facilities that meet Ecology’s Technical Stormwater Manual criteria as well as the NPDES Sand and Gravel Permit issued for the site.

Effects on groundwater at the Grays Harbor site could result from any dewatering required to maintain casting basin integrity during pontoon construction and storage. However, the proximity of this site to the harbor and the Chehalis River would result in no discernable change in the amount of groundwater moving from this site to these water bodies. Because the Port of Tacoma site is completely built-out, there would be no effects on groundwater at this site due to the construction of any pontoons for this project.

How would operation of the project affect water resources?

Operation of the SR 520, I-5 to Medina project could affect water resources by the discharge of stormwater containing typical road surface pollutants to adjacent receiving waters or TDAs. Evaluating these operational effects requires determining (using a pollutant-loading model to predict) the existing loads of these pollutants and then comparing them with future pollutant loads. Making this comparison requires identifying the existing and future pollution-generating surfaces for the Preferred Alternative. As used in the SDEIS, there are four types of PGIS (Exhibit 14) used in deriving these calculations:

- Existing replaced, untreated PGIS; PGIS to be replaced within the project area
- Existing removed, untreated PGIS; PGIS to be removed from the project area
- Future replaced treated PGIS; PGIS replaced and treated within the project area under future conditions
- Future new treated PGIS; new, treated PGIS constructed by the project

Existing pollutant loads were estimated for the two types of existing PGIS (existing untreated PGIS to be replaced and existing untreated PGIS to be permanently removed) (Exhibit 14). There are also existing areas within the project area that are not being removed or replaced, but their drainage cannot be separated from the proposed treatment facilities. These areas will be treated under the future conditions. Future pollutant loads were calculated based on the sum of replaced PGIS (future), treated, new PGIS (future), treated (Exhibit 28 in the 2009 discipline report), and the additional treated areas noted above. Acreages for each of the PGIS types are presented in Exhibit 14.

Exhibit 14. Pollution-Generating Impervious Surface (acres) (Update to Exhibit 29 of the 2009 Discipline Report)

	Threshold Discharge Areas								Total Project
	7	8	9	10	11	12	13	14	
Preferred Alternative Scenario 1– Pollutant-Generating Impervious Surface (acres)									
Existing Replaced Untreated	1.4	17.6	6.7	11.9	4.7	3.1	4.1	16.9	66.4
Existing Removed Untreated	1.0	17.4	3.0	0.1	0.4	0.6	0.1	0.7	23.3
Future Replaced Treated	0.3	0.3	3.3	9.7	3.4	2.5	3.5	2.7[a]	25.7
Future New Treated	1.9	19.7	4.8	10	1.0	2.6	2.0	0.6[a]	42.6
Additional Existing PGIS to Be Treated[b]	0.1	0.0	0.4	2.0	1.0	0.0	0.5	0.0	-4.0
Total Future Treated[c]	**2.3**	**20**	**8.5**	**21.8**	**5.3**	**5.2**	**6.0**	**4.3**	**73.4**
% Total Future Treated	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Exhibit 14. Pollution-Generating Impervious Surface (acres) (Update to Exhibit 29 of the 2009 Discipline Report)

	Threshold Discharge Areas								Total Project
	7	**8**	**9**	**10**	**11**	**12**	**13**	**14**	
Preferred Alternative Scenario 2– Pollutant-Generating Impervious Surface (acres)									
Existing Replaced Untreated	1.4	17.6	6.7	11.9	4.7	3.1	4.1	16.9	66.4
Existing Removed Untreated	1.0	17.4	3.0	2.4	0.4	0.6	1.1	0.7	26.6
Future Replaced Treated	0.3	0.3	3.3	7.5	3.4	2.5	2.4	2.8[d]	22.5
Future New Treated	2.1	19.7	4.8	9.1	1.0	2.6	1.2	1.3[d]	41.8
Additional Existing PGIS to Be treated[b]	0.1	0.0	0.4	2.1	1.0	0.0	0.5	0.0	-4.1
Total Future Treated[c]	**2.5**	**20**	**8.5**	**18.6**	**5.3**	**5.2**	**4.1**	**4.3**	**68.5**
% Total Future Treated	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

[a] An equivalent amount of existing highway equaling approximately 4.3 acres will be captured and treated to account for the new (2.8 acres) + replaced (0.6 acre) = 3.4 acres PGIS. Approximately 0.9 acre above that necessary will be treated due to location of facility and physical parameters of infrastructure.

[b]This category of PGIS represents existing PGIS to be treated that discharges to the TDAs but is not being replaced or disturbed. This stormwater could not be hydrologically separated from the project, and as such represents PGIS that will be treated in the proposed stormwater treatment facilities.

[c]Future treated PGIS includes both the new and the remaining existing impervious surface that would be present once the project has been constructed.

[d] An equivalent amount of existing highway equaling approximately 4.3 acres will be captured and treated to account for the new (2.8 acres) + replaced (1.3 acres) = 4.1 acres PGIS. Approximately 0.9 acre above that necessary will be treated due to location of facility and physical parameters of infrastructure.

Two design scenarios for the Preferred Alternative were analyzed in this addendum to determine if the pattern of precipitation (such as high winds blowing water under lids) would increase the amount of pollutants washed off roadways and into adjacent water bodies. Lid Scenario 1 includes the entire SR 520 roadway but does not include the areas above SR 520 that are associated with the landscaped lids at 10th Avenue East and Delmar Drive East and in the Montlake area. Lid Scenario 2 includes both the SR 520 roadway areas and the areas under the two lids, to the extent that rain falling at an angle of 30 degrees would be able to wash pollutants off these surfaces and into the stormwater conveyance and treatment system.

As shown in Exhibit 15, the total acreage of untreated stormwater on existing PGIS (existing replaced untreated PGIS) is greater in both scenarios of the Preferred Alternative than the acreage for Option A, but less new treated PGIS is added. The amount of PGIS to be removed and not replaced (removed untreated) is approximately the same for Lid Scenario 1 and Option A but greater for Lid Scenario 2. Overall, the total amount of future treated PGIS would be less than Option A for both Lid Scenario 1 and Lid Scenario 2 (Exhibit 15).

Exhibit 15. Comparison of Total Pollution-Generating Impervious Surface for the Preferred Alternative and the SDEIS Options (acres)

	Preferred Alternative				
	Lid Scenario 1	**Lid Scenario 2**	**Option A**	**Option K**	**Option L**
Existing Replaced Untreated	66.4	66.4	57.5	64.2	60.4
Existing Removed Untreated	23.3	26.6	24.8	22.2	20.9
Future Replaced Treated	25.7	22.5	32.8	42.0	39.5
Future New Treated	42.6	41.8	44.7	51.3	47.5
Additional Existing PGIS to be Treated[a]	4.0	4.1	-	-	-
Total Future Treated	**73.4**	**68.5**	**77.5**	**93.3**	**87.0**
% Total Future Treated	**100%**	**100%**	**100%**	**100%**	**100%**

[a] The additional PGIS to be treated was not calculated for Options A, K, and L. If one of the SDEIS options were chosen as the Preferred Alternative, then additional analysis of the future treated PGIS may be needed.

The predicted change in pollutant loads for the Preferred Alternative under Scenarios 1 and 2 is presented for comparison with the estimated change in pollutant loads for each SDEIS option in Exhibit 16. The patterns of net changes in pollutants loads were generally the same for the Preferred Alternative as for the three SDEIS options. For the total study area, the Preferred Alternative and the three SDEIS options show a predicted net reduction for all five stormwater pollutants—total suspended solids (TSS), total zinc, dissolved zinc, total copper, and dissolved copper—compared with the No Build Alternative. The differences in net reduction between the Preferred Alternative and SDEIS options are slight (Exhibit 16), with either Option A, K, or L showing the greatest reduction in pollutant load for each evaluated pollutant (see Total Load at the bottom of Exhibit 16).

Exhibit 16. Net Changes in Pollutant Loads between Pre- and Post-project Conditions (pounds) (Update to Exhibit 30 of the 2009 Discipline Report)

		TSS	**Total Zinc**	**Dissolved Zinc**	**Total Copper**	**Dissolved Copper**
TDA 7	Preferred Alternative – Lid Scenario 1	**-635.5**	**-0.8**	**-0.08**	**-0.1**	**0.0**
	Preferred Alternative – Lid Scenario 2	**-626.5**	**-0.8**	**-0.04**	**-0.1**	**0.0**
	Option A	**-554.0**	**-0.4**	0.2	**-0.02**	0.1
	Option K	**-554.0**	**-0.4**	0.2	**-0.02**	0.1
	Option L	**-554.0**	**-0.4**	0.2	**-0.02**	0.1
TDA 8	Preferred Alternative – Lid Scenario 1	**-9,100.5**	**-13.9**	**-3.08**	**-2.2**	**-0.2**
	Preferred Alternative – Lid Scenario 2	**-9,100.5**	**-13.9**	**-3.08**	**-2.2**	**-0.2**
	Option A	**-8,611.0**	**-11.1**	**-1.1**	**-1.6**	0.1
	Option K	**-8,575.0**	**-10.8**	**-0.9**	**-1.5**	0.1
	Option L	**-8,611.0**	**-11.1**	**-1.1**	**-1.6**	0.1

Exhibit 16. Net Changes in Pollutant Loads between Pre- and Post-project Conditions (pounds) (Update to Exhibit 30 of the 2009 Discipline Report)

		TSS	Total Zinc	Dissolved Zinc	Total Copper	Dissolved Copper
TDA 9	Preferred Alternative – Lid Scenario 1	**-3,195.0**	**-4.7**	**-0.9**	**-0.7**	**-0.1**
	Preferred Alternative – Lid Scenario 2	**-3,195.0**	**-4.7**	**-0.9**	**-0.7**	**-0.1**
	Option A	**-4,466.1**	**-7.3**	**-1.9**	**-1.2**	**-0.2**
	Option K	**-5,096.5**	**-7.1**	**-1.2**	**-1.1**	**0.0**
	Option L	**-3,295.8**	**-4.0**	**-0.3**	**-0.6**	0.1
TDA 10	Preferred Alternative – Lid Scenario 1	**-4,650.5**	**-5.3**	0.02	**-0.7**	0.17
	Preferred Alternative – Lid Scenario 2	**-4,846.5**	**-6.2**	**-0.64**	**-0.9**	0.1
	Option A	**-6,625.4**	**-10.3**	**-2.4**	**-1.7**	**-0.2**
	Option K	**-9,551.0**	**-14.0**	**-2.7**	**-2.2**	**-0.2**
	Option L	**-9,527.1**	**-14.6**	**-3.3**	**-2.4**	**-0.3**
TDA 11	Preferred Alternative – Lid Scenario 1	**-1,949.0**	**-2.9**	**-0.64**	**-0.5**	**-0.1**
	Preferred Alternative – Lid Scenario 2	**-1,949.0**	**-2.9**	**-0.64**	**-0.5**	**-0.1**
	Option A	**-2,759.9**	**-4.3**	**-1.0**	**-0.7**	**-0.1**
	Option K	**-2,253.7**	**-3.7**	**-1.0**	**-0.6**	**-0.1**
	Option L	**-2,185.3**	**-3.5**	**-0.9**	**-0.6**	**-0.1**
TDA 12	Preferred Alternative – Lid Scenario 1	**-1,522.0**	**-2.0**	**-0.22**	**-0.3**	0.0
	Preferred Alternative – Lid Scenario 2	**-1,522.0**	**-2.0**	**-0.22**	**-0.3**	0.0
	Option A	**-1,436.9**	**-1.7**	**-0.1**	**-0.2**	0.0
	Option K	**-1,482.8**	**-2.0**	**-0.3**	**-0.3**	0.0
	Option L	**-1,471.1**	**-1.9**	**-0.2**	**-0.3**	0.0
TDA 13	Preferred Alternative – Lid Scenario 1	**-1,786.5**	**-2.4**	**-0.3**	**-0.4**	0.0
	Preferred Alternative – Lid Scenario 2	**-1,815.5**	**-2.8**	**-0.7**	**-0.5**	**-0.1**
	Option A	**-2,687.8**	**-3.8**	**-0.6**	**-0.6**	0.0
	Option K	**-2,687.8**	**-3.8**	**-0.6**	**-0.6**	0.0
	Option L	**-2,687.8**	**-3.8**	**-0.6**	**-0.6**	0.0
TDA 14	Preferred Alternative – Lid Scenario 1	**-1,772.5**	**-2.8**	**-0.7**	**-0.5**	**-0.1**
	Preferred Alternative – Lid Scenario 2	**-1,793.0**	**-2.7**	**-0.6**	**-0.4**	**-0.1**
	Option A	**-1,872.0**	**-2.7**	**-0.5**	**-0.4**	0.0
	Option K	**-1,872.0**	**-2.7**	**-0.5**	**-0.4**	0.0
	Option L	**-1,872.0**	**-2.7**	**-0.5**	**-0.4**	0.0

Exhibit 16. Net Changes in Pollutant Loads between Pre- and Post-project Conditions (pounds) (Update to Exhibit 30 of the 2009 Discipline Report)

		TSS	Total Zinc	Dissolved Zinc	Total Copper	Dissolved Copper
Total Load	Preferred Alternative – Lid Scenario 1	**-24,611.5**	**-34.8**	**-5.94**	**-5.4**	**-0.2**
	Preferred Alternative – Lid Scenario 2	**-24,848.0**	**-36.0**	**-6.78**	**-5.6**	**-0.4**
	Option A	**-29,013.0**	**-41.6**	**-7.5**	**-6.5**	**-0.3**
	Option K	**-32,074.0**	**-44.5**	**-7.0**	**-6.8**	**-0.1**
	Option L	**-30,204.0**	**-42.1**	**-6.8**	**-6.4**	**-0.2**

Note: Bolded entries indicate pollutant loads are the same or less than the No Build Alternative.

Overall, the Preferred Alternative had a somewhat lower net reduction in pollutant load for TSS, total and dissolved zinc, and total copper than any of the three SDEIS options. This is because the SDEIS options treated more existing PGIS that is currently untreated. Project-wide, the net reduction in dissolved copper was essentially the same for the Preferred Alternative and the three SDEIS options, with Lid Scenario 2 having the greatest reduction in dissolved copper of all the alternatives evaluated. Specific differences between the Preferred Alternative and the SDEIS options are:

- In TDA 7, the Preferred Alternative shows a greater net reduction in the five stormwater pollutants than the three SDEIS options. For example, the Preferred Alternative shows a reduction in dissolved zinc concentration relative to the No Build Alternative, while the SDEIS options show a relative increase. The Preferred Alternative shows no change in dissolved copper compared to the No Build Alternative, while the SDEIS options show a relative increase in copper.
- In TDA 8, the net reductions in pollutants are greater for the Preferred Alternative than for the SDEIS options, and the Preferred Alternative shows a predicted reduction in copper relative to the No Build Alternative and compared to a predicted increase for the SDEIS options.
- In TDA 9, the Preferred Alternative shows the same pattern of reduction as the SDEIS options in the five stormwater pollutants evaluated, but the net reduction in loading is less for the Preferred Alternative than for the SDEIS Options A and K, except for dissolved copper.
- In TDA 10, the Preferred Alternative shows a lower reduction in pollutant loading from the SDEIS options, with the predicted reduction in pollutant loading less for the Preferred Alternative than for the No Build Alternative. Copper loads for the Preferred Alternative are predicted to increase slightly compared to the No Build Alternative in this TDA.
- In TDA 11, the predicted pollutant load reduction is less for the Preferred Alternative than the for three SDEIS options.
- In TDA 12, the predicted pollutant load reduction is greater for the Preferred Alternative than for the three SDEIS options, except for dissolved copper. All alternatives show no relative

change in dissolved copper loads compared to the No Build Alternative in this TDA.

- In TDA 13, the Preferred Alternative shows less predicted reduction in any of the five stormwater pollutants than the SDEIS options, except for Lid Scenario 2 for dissolved zinc and copper.
- In TDA 14, Lid Scenario 1 of the Preferred Alternative shows a slightly greater predicted reduction than any of the SDEIS options for the five stormwater pollutants evaluated, except for TSS. In contrast, Lid Scenario 2 of the Preferred Alternative shows the same level of predicted reduction as the SDEIS options for total zinc and total copper.

Floating Bridge

The design of the floating bridge did not vary among the SDEIS design options and has changed only slightly between the SDEIS and the Final EIS. Thus, the AKART water quality modeling results presented in Exhibit 17 are essentially the same as those reported in the 2009 discipline report. The only difference is the concentration of lead predicted at the 5-foot mixing zone boundary, which increased from 1.3 to 1.5 micrograms per liter (µg/L) for the Preferred Alternative (Exhibit 17). The resulting concentrations in receiving water meet all the applicable acute water quality criteria in the spill lagoons, including all chronic water quality criteria at the 50-foot mixing zone boundary. This mixing zone limit has been conditionally approved by Ecology (Fitzpatrick 2010).

Exhibit 17. **Effluent Concentrations of Dissolved Metals at Specific Locations on the Floating Bridge (Update to Exhibit 31 of the 2009 Discipline Report)**

	Cadmium (µg/L)	Copper (µg/L)	Lead (µg/L)	Zinc (µg/L)
Untreated Stormwater Runoff	0.7	10	9.2	93
At Discharge Pipe to Spill Control Lagoon	0.7	10	9.2	93
In Spill Control Lagoon	0.14	2.0	1.8	18.6
At 5-Foot Mixing Zone Boundary	0.12	1.7	1.5	15.5
At 50-Foot Mixing Zone Boundary	0.02	0.2	0.2	2.0

X (dark blue)	Does not meet acute water quality criteria (dissolved metals)
X (light blue)	Does not meet chronic water quality criteria (dissolved metals)

How would operation of the project affect groundwater?

The preferred alternative and the SDEIS options would have a minimal effect on the overall quantity or quality of the study area groundwater. After construction, only at the bridge maintenance facility would groundwater dewatering be needed to reduce hydrostatic pressure on the facility structures. It is not expected that dewatering at the specific site would affect groundwater resources of the study area. See the Geology and Soils Discipline Report Addendum and Errata (WSDOT 2011c) for additional information.

How do the Preferred Alternative's operational effects on water resources compare to the SDEIS options'?

As discussed above and shown in Exhibit 18, the SDEIS options and the Preferred Alternative under both lid scenarios would all achieve a net overall environmental improvement relative to the No Build Alternative.

The net pollution reductions reported in Exhibit 18 would be achieved primarily as a consequence of the project adding stormwater treatment facilities for a large amount of existing pavement that currently goes untreated. This reduction is greater than the increase in pollutant loads resulting from the creation of new PGIS by the project. (Because stormwater treatment systems are all less than 100 percent effective in removing pollutants, adding new PGIS will always increase the pollutant load for each acre added.)

This project would achieve an overall net reduction by treating sufficient acreage of untreated stormwater on existing PGIS to offset the increased pollutant load associated with the new PGIS. Thus, the amount of existing untreated PGIS is a direct reflection of the overall estimate of net pollutant load reduction (Exhibit 18). Because the three SDEIS options all included greater amounts of existing untreated PGIS in their original designs, they show greater predicted pollutant reductions relative to either lid scenario of the Preferred Alternative, with the exception of dissolved copper, which is essentially the same for all five configurations (Exhibit 18).

Exhibit 18. Project Operation and Permanent Effects – Quantitative Impacts Summary

	Preferred Alternative		Operational Effects		
Type of Effect	Lid 1	Lid 2	Option A	Option K	Option L
Total Future Pollution-Generating Impervious Surface Area (acres)	73.4	68.5	77.5	93.3	87.0
Reduction in Pollutant Loadings Compared to No Build Alternative (pounds)					
TSS	-24,988.0	-24,900.0	-29,013.0	-32,074.0	-30,204.0
Total Zinc	-35.5	-36.1	-41.6	-44.5	-42.1
Dissolved Zinc	-6.2	-6.8	-7.5	-7.0	-6.8
Total Copper	-5.5	-5.7	-6.5	-6.8	-6.4
Dissolved Copper	-0.2	-0.4	-0.3	-0.1	-0.2

Mitigation

What has been done to avoid or minimize negative effects?

As described for the SDEIS options in the 2009 discipline report, permanent negative effects of the Preferred Alternative would be minimized by including stormwater treatment facilities as part of the project. Overall, these facilities would reduce current pollutant loading levels to water bodies in the study area, providing a benefit compared to the existing condition.

Negative effects on surface water bodies during construction would be minimized by implementing water quality pollution control measures outlined in the required TESC), SPCC, and CCDP plans, including compliance with permit conditions.

How would the project mitigate unavoidable adverse effects on surface water?

No mitigation would be required because discharges resulting from the Preferred Alternative would meet or exceed WSDOT's *Highway Runoff Manual* requirements, as well as all applicable water quality regulations.

What has been done to avoid or minimize negative effects on groundwater?

Potential effects on groundwater during construction of the Preferred Alternative would be minimized through the implementation of the TESC and SPCC plans and are expected to be negligible. Under the Preferred Alternative, the project's stormwater treatment facilities would protect groundwater quality, similar to Option A.

How would the project mitigate unavoidable negative effects on groundwater?

Because permanent effects on groundwater would be negligible, and human use of groundwater in the study area is limited, there would be no unavoidable adverse effects, and no mitigation is required.

References

Arhonditsis, G.B., M.T. Brett, C.L. DeGaspari, and D.E. Schindler. 2004. Effects of Climate Variability on the Thermal Properties of Lake Washington. *Limnology and Oceanography* 49(1): 256-270.

Fitzpatrick, K. 2010. Letter to John White, PE, Director Floating Bridge and Landings, Washington Department of Transportation. Re: Ecology's Conditional Approval of WSDOT's AKART and Water Quality Studies Report. June 30, 2010.

King County. 2010. Major Lakes Monitoring. http://green.kingcounty.gov/lakes/Map.aspx. Accessed August 3, 2010.

Washington State Department of Ecology (Ecology). 2008. Washington State's Water Quality Assessment [303(d)]. http://www.ecy.wa.gov/programs/wq/303d/2008/index.html. Accessed August 9, 2010.

Washington State Department of Transportation (WSDOT). 2008a. *Highway Runoff Manual*. M 31-16.01. Environmental and Engineering Programs Design Office, Washington State Department of Transportation. Olympia, WA. June 2008.

WSDOT. 2008b. *Environmental Procedures Manual*. Washington State Department of Transportation. Olympia, WA.

WSDOT. 2009a. *Water Resources Discipline Report*. SR 520**:** I-5 to Medina Bridge Replacement and HOV Project. Supplemental Draft Environmental Impact Statement and Section 4(f)/6(f) Evaluation. SR 520 Bridge Replacement and HOV Program. Olympia, WA. December 2009.

WSDOT. 2009b. *Draft AKART and Water Quality Studies for SR 520 Replacement Floating Bridge.* SR 520 Bridge Replacement and HOV Project. Prepared for Washington State Department of Transportation, Federal Highway Administration, and Sound Transit by CH2M HILL. May 2009.

WSDOT. 2009c. *Project I-5 to Medina: Bridge Replacement and HOV Project AKART and Water Quality Studies for SR 520 Replacement Floating Bridge.* Final Report. Prepared for Washington State Department of Transportation and Federal Highway Administration by CH2M HILL. August 2009.

WSDOT. 2009d. *Stormwater Management and Siting Feasibility Study for Options A, K and L.* Prepared for Washington State Department of Transportation, Urban Corridors Office, Seattle, WA by HDR Inc., Parametrix Inc., and Parsons Brinckerhoff Inc. January 26, 2009.

WSDOT. 2010a. *SR 520, I-5 to Medina: Bridge Replacement and HOV Project Supplemental Draft Environmental Impact Statement and Section 4(f)/6(f) Evaluation*. SR 520 Bridge Replacement and HOV Program. Olympia, WA. January 2010.

WSDOT 2010b. *Ecosystems Discipline Report Addendum and Errata.* SR 520, I-5 to Medina: Bridge Replacement and HOV Project. Final Environmental Impact Statement and Final Section 4(f) and 6(f)

Evaluations SR 520 Bridge Replacement and HOV Program. October 2010.

WSDOT. 2011a. *Description of Alternatives Discipline Report Addendum and Errata.* SR 520, I-5 to Medina: Bridge Replacement and HOV Project. Olympia, WA.

WSDOT. 2011b. *Construction Techniques and Activities Discipline Report Addendum and Errata*. SR 520, I-5 to Medina: Bridge Replacement and HOV Project. Olympia, WA.

WSDOT. 2011c. *Geology and Soils Discipline Report Addendum and Errata.* SR 520, I-5 to Medina: Bridge Replacement and HOV Project. Olympia, WA.

Attachment 1

Errata

Attachment 1
Water Resources Discipline Report Errata

The following table corrects errors in and provides clarifications to the Water Resources Discipline Report (WSDOT 2009d). The discipline report and SDEIS will be further updated as errors are discovered or to clarify points of confusion. Additional updates and corrections will be made either with additional errata or in the Final EIS, anticipated to be released in spring 2011.

PAGE	CURRENT TEXT	CORRECTED TEXT/CLARIFICATION
7	• Usual and accustomed fishing areas of tribal nations that have historically used the area’s aquatic resources and have treaty rights	• Usual and accustomed fishing areas of the Muckleshoot Tribe, which has~~tribal nations that have~~ historically used the area’s aquatic resources and has~~have~~ treaty rights for their protection and use
32		Unnamed Tributary added to the “Study Area Surface Water Bodies” and to Exhibit 9.