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

Cultural Resources Assessment Discipline Report

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

Cultural Resources Assessment Discipline Report

Prepared for

Washington State Department of Transportation

Federal Highway Administration

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MAY 2011

Executive Summary

The Washington State Department of Transportation (WSDOT) proposes to replace the State Route (SR) 520 Portage Bay and Lake Washington bridges and make other highway improvements under the SR 520, Interstate 5 (I-5) to Medina: Bridge Replacement and High-Occupancy Vehicle (HOV) Project (the "SR 520, I-5 to Medina project" or the "project"). As part of the environmental documentation for this project and to comply with Section 106 of the National Historic Preservation Act (NHPA), WSDOT, acting on behalf of the Federal Highway Administration (FHWA), is required to determine if significant historic properties are located within the area of potential effects (APE) established for the project and evaluate project effects on these properties.

WSDOT established the APE (the geographic area within which an undertaking may directly or indirectly cause alterations to the character or use of historic properties) in consultation with interested tribes, the State Historic Preservation Officer (SHPO), and other consulting parties. WSDOT retained consultants to conduct investigations in the project APE to identify and evaluate cultural resources for historic significance; assess project effects on identified historic properties; and recommend mitigation measures or additional investigation, as needed.

In late 2010, WSDOT prepared a Section 106 Technical Report in support of compliance with Section 106 of the NHPA that described the methods used to inventory, evaluate, and assess cultural resources in the APE; synthesized results of the previous investigations conducted within the APE; analyzed the effects of the project on historic properties; and discussed recommendations for additional investigations. The Section 106 Technical Report was prepared in two volumes: Volume 1 addressed archaeological resources (Elder et al. 2011); Volume 2 addressed historic built environment resources within the APE (Gray et al. 2011). This report was submitted to the SHPO in January 2011 for comment on the determination of effect, and there was agreement among the parties that the project would have an adverse effect on historic properties.

WSDOT, on behalf of FHWA, has determined that there are 367 properties in the APE that are listed in or eligible for listing in the National Register of Historic Places (NRHP), which qualifies them as historic properties for the purposes of Section 106. These historic

properties include 8 historic bridges, 3 historic landscapes, 2 historic districts, 1 historic waterway, 1 historic boulevard, 1 traditional cultural property (TCP), and 351 historic buildings. No NRHP-eligible archaeological sites were found in the APE during testing for this project.

WSDOT and its consultants conducted investigations to identify, evaluate, and assess properties located in the APE. The APE includes the anticipated construction footprint (including staging and laydown areas); a buffer area (one property deep or 200 to 300 feet from the limits of construction, as appropriate); additional areas outside the limits of construction, determined through consultation, such as the entire Roanoke Park Historic District, the entire Washington Park Arboretum (Arboretum),[1] the navigable waters of Portage Bay, potential construction haul routes, sites at the Port of Olympia and the Port of Tacoma that were considered for pontoon construction and staging, and possible Section 6(f) mitigation sites.

The results of the inventory, as well as the effects analysis, are presented by study area along the project corridor. These are the Seattle, Lake Washington, and Eastside transition study areas. Within the Seattle study area, project elements are described by approximate geographic segments: I-5/Roanoke, Portage Bay, Montlake, and West Approach. Additional sites at Port of Olympia and Port of Tacoma that were investigated as potential pontoon construction sites are included in a separate group.

- **Seattle Study Area:** This study area is made up of the I-5/Roanoke, Portage Bay, Montlake, and West Approach segments. A total of 355 historic properties were identified and evaluated in these geographical segments of the APE, including two historic districts, the contributing elements to the districts, and individual properties outside district boundaries that are listed in or eligible for listing in the NRHP. The Foster Island TCP is located in the West Approach segment in this study area.
- **Lake Washington Study Area:** Four historic built environment properties were identified and determined eligible for listing in the NRHP in this geographical segment of the project APE: the

[1] A small, noncontiguous portion of the Arboretum, east of the main park and southeast of Foster Island, is not included in the APE.

Governor Albert D. Rosellini (Evergreen Point) Bridge, which was identified and determined eligible for listing in the NRHP in this portion of the APE, and three properties that were once, but no longer, under consideration as potential Section 6(f) replacement sites.

- **Eastside Transition Study Area:** Two historic properties of the built environment were identified in this study area.
- **Pontoon Production Sites:** Five historic properties listed in the NRHP or eligible for listing in the NRHP are located within the APE at the Port of Tacoma. Of the five historic properties, four NRHP-eligible buildings are elements of the Concrete Technology Corporation facility, and have been recommended as a historic district. At the Port of Olympia site, there is one identified historic property within the APE that is eligible for listing in the NRHP.

A total of 366 built environment historic properties and 1 TCP were identified in the APE (see Exhibit ES-1). This total includes previously identified properties, the properties presented in the 2009 Draft Cultural Resources Discipline Report (see Attachment 7 to the Final Environmental Impact Statement [EIS]), and properties identified during the additional cultural resources survey investigations in 2010 and 2011. The geographic segments used to describe the Seattle study area in this Cultural Resources Assessment Discipline Report were established to organize the cultural resources within the APE in a manageable framework due to the large number of properties. The geographic segments discussed here, and depicted in the exhibits in this document, may differ slightly from the supporting tables and from the segments used in other environmental documents prepared for the SR 520 Bridge Replacement and HOV Program (SR 520 Program). The number of historic properties within the APE is constant among all current analyses for the SR 520 Program.

WSDOT, on behalf of FHWA, has evaluated each historic property within the APE, and assessed the Preferred Alternative of the SR 520, I-5 to Medina project's effects on each property's integrity. The assessment resulted in one of four potential findings for each property: Does Not Alter Integrity, Alters Integrity, Diminishes Integrity, or Temporarily Diminishes Integrity, which are defined in Chapter 2 of this Cultural Resources Assessment Discipline Report.

Exhibit ES-1. Summary of Historic Properties Located in the Area of Potential Effects, listed by Study Area and Segment

Study Area	Segment	Historic Properties
Seattle Study Area	I-5/Roanoke	146
	Portage Bay	31
	Montlake	174
	West Approach	4
Lake Washington Study Area		4
Eastside Transition Study Area		2
Pontoon Production Sites		6
Total		**367**

Note: The historic property totals include previously identified properties and properties surveyed as a part of this project.

Although no archaeological sites eligible for listing in the NRHP were found in any of the studies conducted to date, study results indicate that there is the potential for the project to affect unknown and potentially significant archaeological resources within the limits of construction. Several specific areas within the limits of construction were called out as sensitive for intact archaeological sites (or were inaccessible during the initial investigations) and were flagged for additional investigation prior to construction or monitoring during construction.

Based on the collected research, the field investigations, and the analysis of effects, WSDOT, on behalf of FHWA, and in consultation with the SHPO, has determined that the project would have an adverse effect on historic properties within the APE.

To address the adverse effect on historic properties, a Section 106 Programmatic Agreement was developed, in consultation with the SHPO, Advisory Council on Historic Preservation, interested tribes, and other Section 106 consulting parties (the Programmatic Agreement is provided in Attachment 9 to the Final EIS). The Programmatic Agreement stipulates means to avoid, minimize, and mitigate the adverse effect on historic properties. One of the stipulations of the Programmatic Agreement is the execution of an Archaeological Treatment Plan, which will provide a detailed, yet flexible process by which WSDOT and FHWA can comply with and complete the Section 106 process in regards to archaeological resources.

Foster Island was determined eligible for the NRHP as a TCP, and the Preferred Alternative would diminish the integrity of the TCP. To address this, the Programmatic Agreement includes development of a Foster Island Treatment Plan that will identify mitigation measures for project effects on the Foster Island TCP.

Measures to mitigate the adverse effect on historic properties stipulated in the Programmatic Agreement are summarized in Chapter 8 of this Cultural Resources Assessment Discipline Report.

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Acronyms and Abbreviations

1x1	1 by 1 meter
2x2	2 by 2 meter
ACHP	Advisory Council on Historic Preservation
AIA	American Institute of Architects
APE	area of potential effects
Arboretum	Washington Park Arboretum
BMPs	best management practices
BOAS	BOAS, Inc.
CCMP	Community Construction Management Plan
CENPA	Center for Experimental Nuclear Physics and Astrophysics
CFR	Code of Federal Regulations
CTC	Concrete Technology Corporation
CWA	Civil Works Administration
DAHP	Department of Archaeology and Historic Preservation
dBA	A-weighted decibels
DOCOMOMO – WEWA	Documentation and Conservation of the Modern Movement, Western Washington
EIS	Environmental Impact Statement
Evergreen Point Bridge	Governor Albert D. Rossellini (Evergreen Point) Bridge
FHWA	Federal Highway Administration
GIS	geographic information system
GLO	General Land Office
GPR	ground-penetrating radar

HOV	high-occupancy vehicle
HPI	Historic Property Inventory
I-5	Interstate 5
ICF	ICF International
ID#	identification number
LWCF	Land and Water Conservation Fund
LiDAR	light detection and ranging
MHz	megahertz
MOHAI	Museum of History and Industry
mph	miles per hour
NAC	noise abatement criteria
NAIP	National Agriculture Imagery Program
n.d.	no date
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NOAA	National Oceanic and Atmospheric Administration
NPS	U.S. National Park Service
SDEIS	Supplemental Draft Environmental Impact Statement and Section 4(f)/6(f) Evaluation
SDOT	Seattle Department of Transportation
Seattle Parks Board	Seattle Board of Park Commissioners
SEPA	State Environmental Policy Act
Seward School	Denny-Fuhrman (Seward) School
SP	shovel probe
SHPO	State Historic Preservation Officer
SR	State Route

SR 520 Program	SR 520 Bridge Replacement and HOV Program
SR 520, I-5 to Medina project	SR 520, I-5 to Medina: Bridge Replacement and HOV Project
SR 520, Medina to SR 202 project	SR 520, Medina to SR 202: Eastside Transit and HOV Project
TCP	traditional cultural property
TUs	test units
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
UW	University of Washington
WERA	Washington Emergency Relief Administration
WHR	Washington Heritage Register
WISAARD	Washington Information System for Architectural and Archaeological Records Data
WPA	Works Progress Administration
WSAPM	Washington Statewide Archaeology Predictive Model
WSDOT	Washington State Department of Transportation

1. Introduction

The Washington State Department of Transportation (WSDOT) proposes to replace the State Route (SR) 520 Portage Bay and Lake Washington bridges and make other highway improvements under the SR 520, Interstate 5 (I-5) to Medina: Bridge Replacement and High-Occupancy Vehicle (HOV) Project (the "SR 520, I-5 to Medina project" or the "project"). As part of the environmental documentation and to comply with Section 106 of the National Historic Preservation Act (NHPA), WSDOT, acting on behalf of the Federal Highway Administration (FHWA), is required to determine if significant historic properties are located within the area of potential effects (APE) established for the project and to evaluate project effects on these properties. This report summarizes the cultural resources investigations conducted as a component of the preconstruction environmental review in accordance with Section 106 of the NHPA.

WSDOT retained consultants to conduct investigations in the project APE to identify and evaluate cultural resources for historic significance; assess project effects on identified historic properties; and recommend mitigation measures or additional investigation, as needed. Since the initiation of the environmental review for the SR 520, I-5 to Medina project, both the details of construction and the project APE have evolved due to design refinements and in response to public comments. Along with these changes, WSDOT has contracted for several cultural resources investigations of the APE to support project environmental review and Section 106 consultation.

In late 2010 WSDOT prepared a technical report in support of compliance with Section 106 of the NHPA. The Section 106 Technical Report was prepared in two volumes: Volume 1 addressed archaeological resources and Foster Island (Elder et al. 2011) and Volume 2 addressed historic built environment resources within the APE (Gray et al. 2011). This report was submitted to the State Historic Preservation Officer (SHPO) in January 2011 for comment on the determination of effect. This discipline report is adapted from the two volumes of the Section 106 Technical Report.

This introduction presents an overview of the project description, a discussion of the No Build and Preferred Alternatives, a description of the project APE, the regulatory context for the cultural resources studies

conducted in support of the project, and a summary of agency and consulting party consultations.

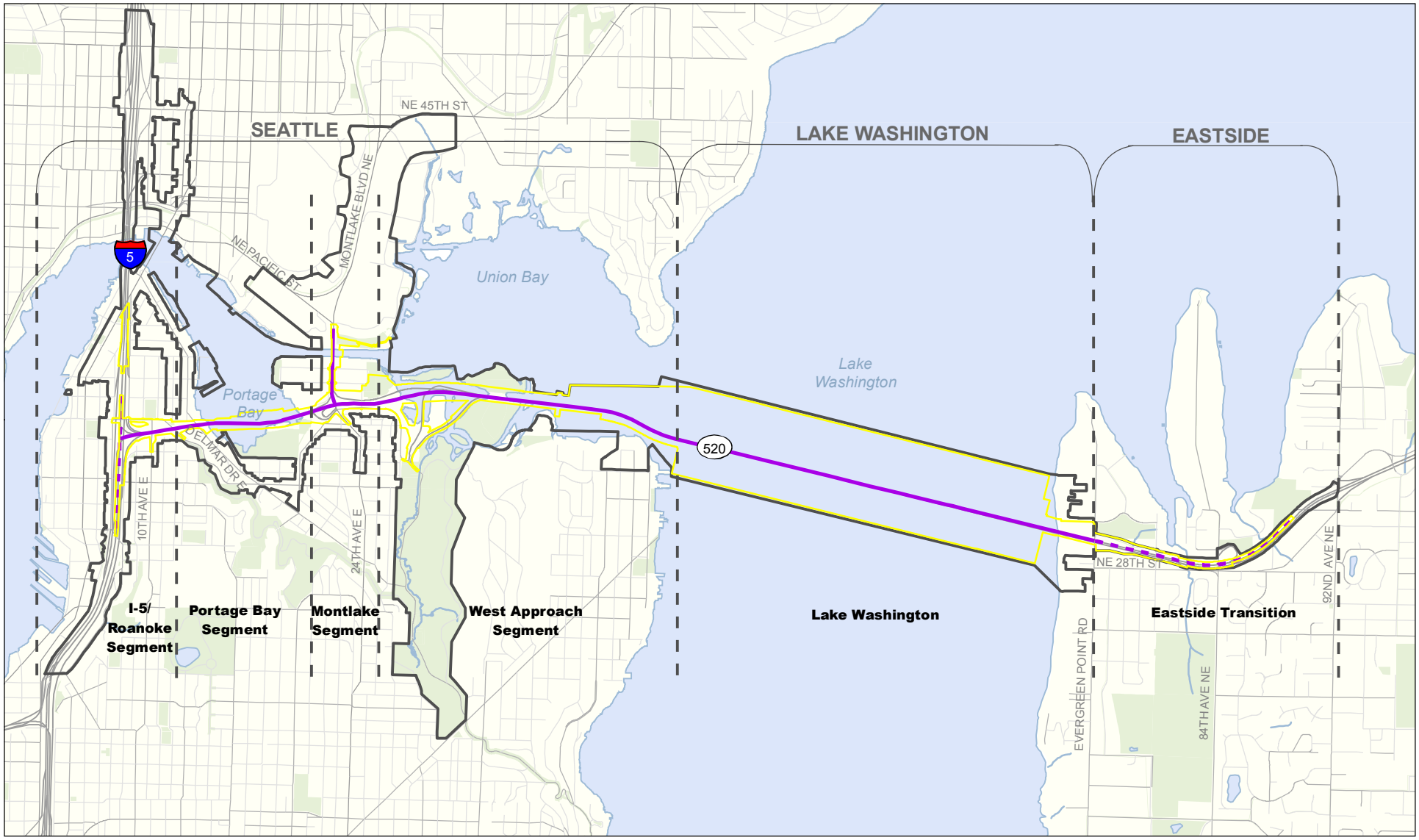
Project Description

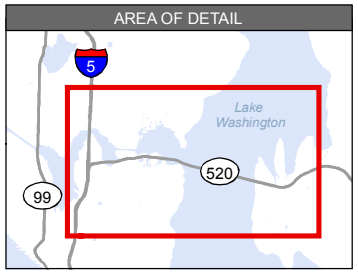
The project is part of the SR 520 Bridge Replacement and HOV Program (SR 520 Program). The project encompasses parts of three study areas—Seattle, Lake Washington, and the Eastside. Within these study areas, project elements are described by their location within smaller geographic segments across the SR 520 corridor. Project limits for this project extend from I-5 in Seattle to 92nd Avenue NE in Yarrow Point, where it transitions into the SR 520, Medina to SR 202: Eastside Transit and HOV Project (the "SR 520, Medina to SR 202 project"). Exhibit 1-1 shows the APE with the project study areas and the geographic segments.

The *SR 520, I-5 to Medina: Bridge Replacement and HOV Project Supplemental Draft Environmental Impact Statement* (SDEIS), published in January 2010 (WSDOT 2010a; see Attachment 10 to the Final Environmental Impact Statement [EIS]), evaluated a 6-Lane Alternative with three design options (Options A, K, and L) for the Seattle portion of the SR 520 corridor and a No Build Alternative. Since the SDEIS was published, WSDOT and FHWA announced a Preferred Alternative for the project. All components of the Preferred Alternative were evaluated in the SDEIS, and the design of the SR 520 corridor has been further refined in response to comments received during public review of the SDEIS. This report presents the inventory and evaluation of properties within the APE and an analysis of the Preferred Alternative effects on historic properties.

No Build Alternative

Under the No Build Alternative, SR 520 would continue to operate as it does today between I-5 and Medina—a 4-lane highway with nonstandard shoulders and without a bicycle/pedestrian path. Exhibit 1-2 depicts a cross section of the No Build Alternative. No new facilities would be added to SR 520 between I-5 and Medina, and none would be removed, including the unused R.H. Thomson Expressway ramps near the Washington Park Arboretum (Arboretum). WSDOT would continue to manage traffic using its existing transportation demand management and intelligent transportation system strategies.





Limits of Construction
Area of Potential Effects
Project Extent
Limited Improvement
Stream
Park

N

0 1,000 2,000 4,000 Feet

Source: King County (2005) GIS Data (Streams and Streets), King County (2007) GIS Data (Water Bodies), CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 1-1. **Area of Potential Effects and Project Study Areas with Geographic Segments**

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

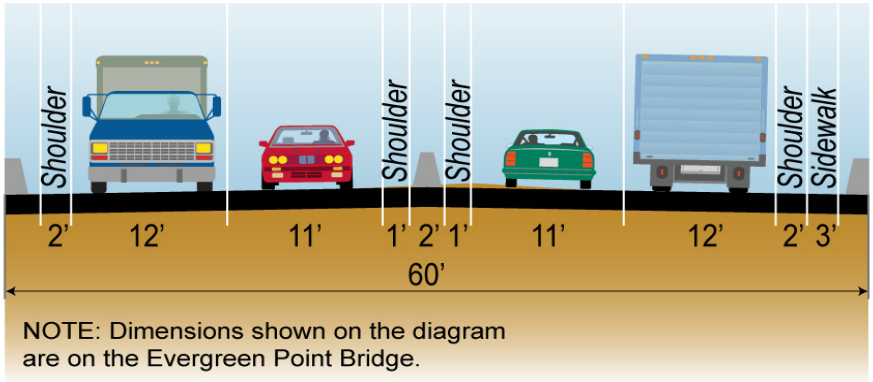


Exhibit 1-2. No Build Alternative Cross Section

The No Build Alternative assumes that the Portage Bay and Evergreen Point bridges would remain standing and functional through 2030 and that no catastrophic events, such as earthquakes or extreme storms, would cause major damage to the bridges. The No Build Alternative also assumes completion of the SR 520, Medina to SR 202 project as well as other regionally planned and programmed transportation projects. The No Build Alternative provides a baseline against which project analysts can measure and compare the effects of the Preferred Alternative.

Preferred Alternative

The Preferred Alternative would widen the SR 520 corridor to six lanes from 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 NE in Yarrow Point. It would replace the vulnerable Evergreen Point Bridge (including the west and east approaches) and Portage Bay Bridge, as well as the existing local street bridges across SR 520. The Preferred Alternative would complete the regional HOV lane system across SR 520, as called for in regional and local transportation plans. New stormwater facilities would be constructed for the project to provide stormwater treatment.

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. In response to community interests expressed during public review of the SDEIS, the SR 520 corridor between I-5 and the Montlake area would operate as a boulevard or parkway with median plantings and a posted speed limit of 45 miles per hour. 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.

The Preferred Alternative would include design elements that would also provide noise reduction such as reduced speed limits between I-5 and the Montlake area, 4-foot concrete traffic barriers, noise-absorptive material on the inside of the traffic barriers and around the lid portals, and encapsulated bridge joints. The Preferred Alternative, like the SDEIS options, would also include quieter concrete pavement along the main line between I-5 and the floating bridge. Traffic noise modeling completed for the Final EIS resulted in fewer recommended noise walls for the Preferred Alternative than for the SDEIS options. Noise walls would meet all FHWA and WSDOT requirements for avoidance and minimization of negative noise effects. In areas where noise walls are warranted, they would only be constructed if approved by the affected communities.

As previously noted, the description of the Preferred Alternative is organized by three study areas along the project corridor: Seattle, Lake Washington, and Eastside. Within the larger area Seattle study area, project elements are described by geographic segment: I-5/Roanoke, Portage Bay, Montlake, and West Approach. The elements of the Preferred Alternative are summarized in Exhibit 1-3 by study area and geographic segment.

Exhibit 1-3. Summary of Preferred Alternative by Study Area and Geographic Segment

Study Area	Geographic Segment	Preferred Alternative Design Elements
Seattle	I-5/Roanoke	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.
	Portage Bay	The Portage Bay Bridge would be replaced with a wider and, in some locations, higher structure with six travel lanes and a 10-foot-wide westbound managed shoulder.
	Montlake	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, and 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.

Exhibit 1-3. Summary of Preferred Alternative by Study Area and Geographic Segment

Study Area	Geographic Segment	Preferred Alternative Design Elements
	West Approach	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 construction through the corridor.
Lake Washington		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 (about 10 to 12 feet higher than the existing bridge deck).
Eastside Transition		A new east approach for the floating bridge and a new SR 520 roadway would be constructed between the floating bridge and Evergreen Point Road.

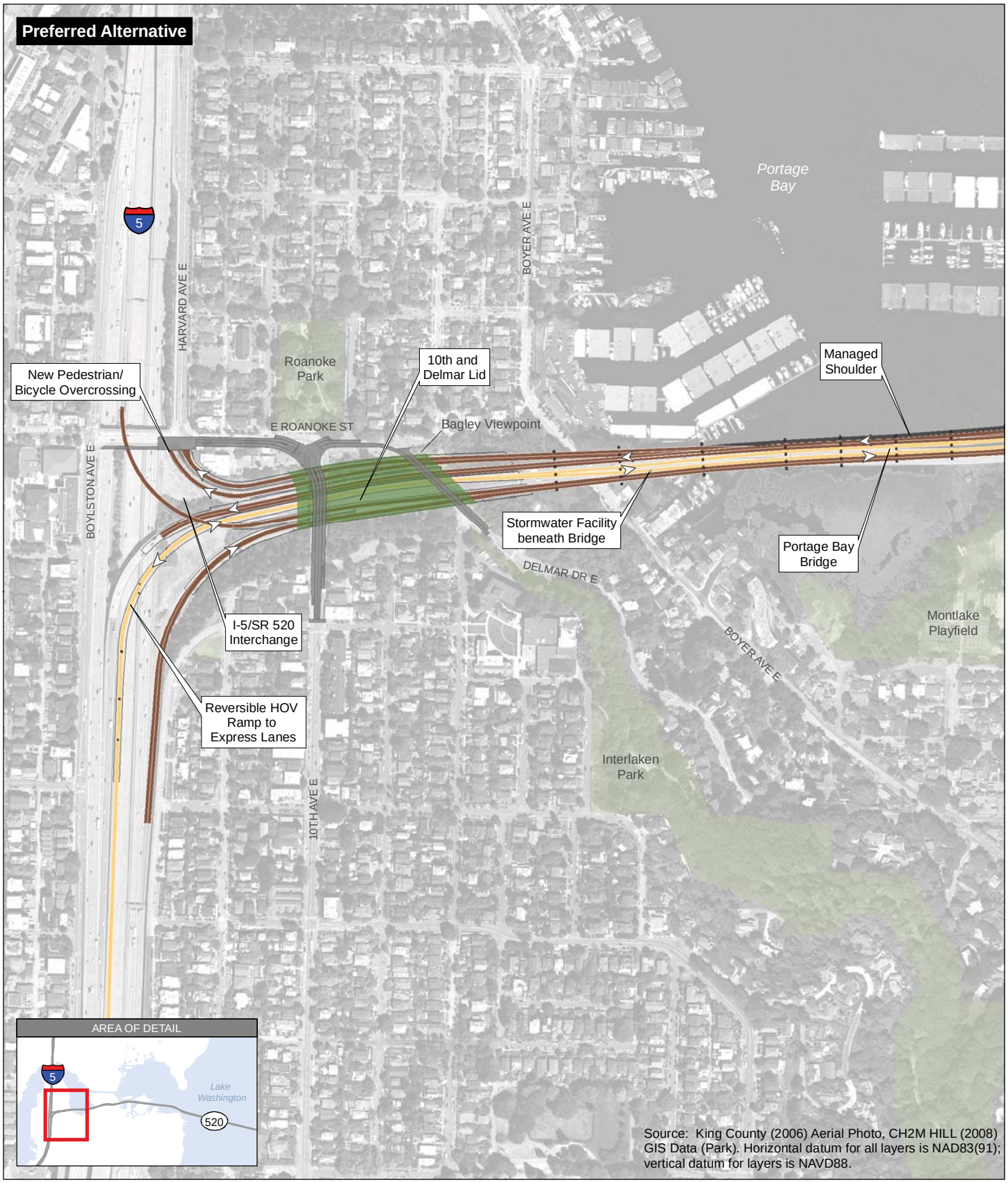
Seattle Study Area

I-5/Roanoke Segment

SR 520 would connect to I-5 in a configuration similar to the way it connects today. Improvements to the I-5/SR 520 interchange would include a new reversible HOV ramp connecting the new SR 520 HOV lanes to existing I-5 reversible express lanes, shown in Exhibit 1-4. The new reversible HOV ramp would reduce the number of I-5 express lanes from four to three between SR 520 and 42nd Street NE. The project would include an enhanced bicycle/pedestrian crossing adjacent to the East Roanoke Street bridge over I-5, and a landscaped lid across SR 520 at 10th Avenue East and Delmar Drive East to help reconnect the communities on either side of the roadway.

Portage Bay Segment

The new Portage Bay Bridge design under the Preferred Alternative would have two general-purpose lanes and an HOV lane in each direction, plus a managed westbound shoulder. In response to community interest and public comment on the SDEIS, the width of the new Portage Bay Bridge at the midpoint has been reduced from previous designs, and a planted median would separate the westbound and eastbound travel lanes. The Preferred Alternative design of the Portage Bay Bridge would operate as a boulevard with a speed limit of 45 miles per hour (mph).



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

- Column
- Lid
- Proposed Bicycle/ Pedestrian Path
- Stormwater Treatment Facility
- General-Purpose Lane
- HOV, Direct Access, and/or Transit-Only Lane
- Westbound Managed Shoulder
- Park

N

0 125 250 500 Feet

Exhibit 1-4. **Preferred Alternative from I-5/Roanoke to Portage Bay**

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

Montlake Segment

Under the Preferred Alternative, the SR 520 interchange with Montlake Boulevard would be similar to today's interchange, connecting to the University District via Montlake Boulevard and the Montlake bascule bridge (Exhibit 1-5). A new bascule bridge would be added to Montlake Boulevard NE, parallel to and east of the existing bridge, and Montlake Boulevard would be restriped and reconfigured between SR 520 and the Montlake Cut to include two general-purpose lanes and one HOV lane for improved transit connectivity.

A large new lid would be provided over SR 520 in the Montlake area, configured for transit and bicycle/pedestrian connectivity, and designed to reconnect communities on either side of SR 520. The lid would function as a vehicle crossing for eastbound SR 520 traffic exiting to Montlake Boulevard and Lake Washington Boulevard. The lid would also serve as a pedestrian crossing, a landscaped area, and an open space. The Lake Washington Boulevard ramps and the Montlake Freeway Transit Station would be removed. Most transfers that currently take place at the freeway station would occur at the new multimodal transit station at Montlake Boulevard and NE Pacific Street.

West Approach Segment

The SR 520 roadway would maintain a constant-slope profile rising from the east portal of the new Montlake lid, through Union Bay, across Foster Island, out to the west transition span of the Evergreen Point Bridge. This profile is slightly steeper than previous designs considered for the west approach structure for improved stormwater management.

The bridge design for the Preferred Alternative as it crosses Foster Island has been refined from previous conceptual designs to address concerns raised during tribal consultations. The new bridge across Foster Island would have a higher profile than previous designs, and has been engineered to use the fewest number of columns possible to minimize the amount of ground disturbance on the island. In contrast to existing conditions, the new SR 520 bridge over Foster Island would reconnect the north and south sides of the island. Construction activities would include building a construction work bridge on the island that would be removed after the permanent structure has been completed.

Lake Washington Study Area

The floating span would be located approximately 190 feet north of the existing bridge at the west end and 160 feet north at the east end. The

new floating bridge would be supported by 21 longitudinal pontoons, 2 cross pontoons, and 54 supplemental stability pontoons. The longitudinal pontoons would not be sized to carry future high-capacity transit, but would be equipped with connections for additional supplemental stability pontoons to support high-capacity transit in the future.

The new bridge would have two 11-foot-wide general-purpose lanes in each direction, one 12-foot-wide HOV lane in each direction, 4-foot-wide inside shoulders, and 10-foot-wide outside shoulders. As a result of comments on the SDEIS, the height of the bridge deck above the water has been lowered from previous designs to reduce visual effects. At midspan, the floating bridge would now rise approximately 20 feet above the water, about 10 feet higher than the existing bridge deck. At each end of the floating bridge, the roadway would be supported by rows of concrete columns. The remainder of the roadway across the pontoons would be supported by steel trusses. Exhibit 1-6 shows the alignment, cross section, and profile of the new floating bridge.

Routine access, maintenance, monitoring, inspections, and emergency response for the floating bridge would be based out of a new bridge maintenance facility located underneath SR 520 between the east shore of Lake Washington and Evergreen Point Road in Medina. This bridge maintenance facility would include a working dock, an approximately 7,200-square-foot maintenance building, and a parking area.

Eastside Transition Study Area

The SR 520, I-5 to Medina project and the SR 520, Medina to SR 202 project overlap between Evergreen Point Road and 92nd Avenue NE in Yarrow Point. Work planned as part of the SR 520, I-5 to Medina project between Evergreen Point Road and 92nd Avenue NE would include moving the Evergreen Point Road transit stop west to the lid (part of the SR 520, Medina to SR 202 project) at Evergreen Point Road, adding new lane and ramp striping from the Evergreen Point lid to 92nd Avenue NE, and moving and realigning traffic barriers as a result of the new lane striping. The restriping would transition the SR 520, I-5 to Medina project improvements into the improvements to be completed as part of the SR 520, Medina to SR 202 project, shown in Exhibit 1-7.

Pontoon Production Sites

WSDOT has completed planning and permitting a new facility in Aberdeen, Washington, that would 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.

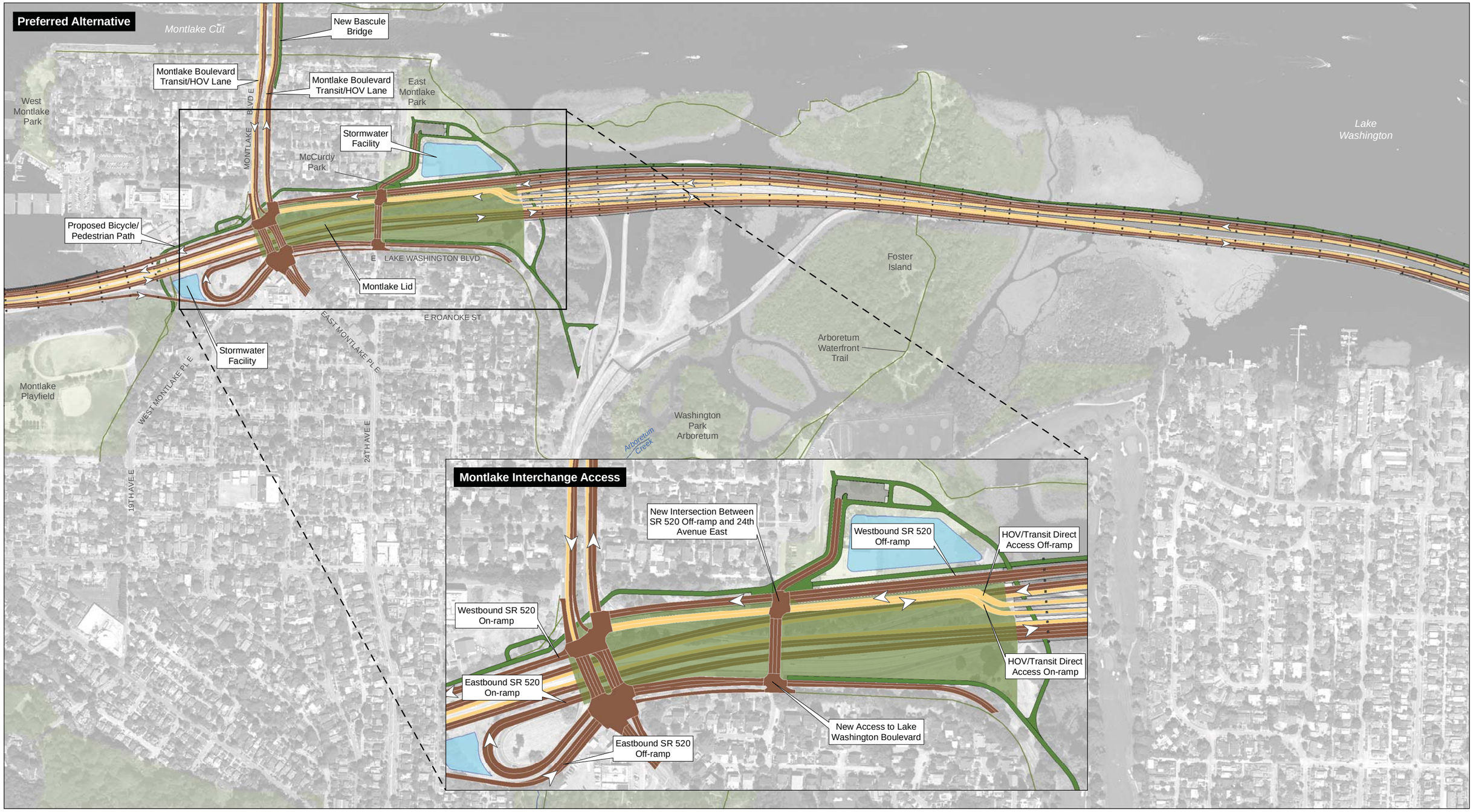
An additional 44 pontoons would be needed to complete the new six-lane floating bridge planned for the SR 520, I-5 to Medina project. The additional pontoons would be constructed as part of this project at the Concrete Technology Corporation (CTC) casting basin in the Port of Tacoma, and, if available, at the new pontoon construction facility located on the shores of Grays Harbor in Aberdeen. Final pontoon construction locations will be identified at the discretion of the contractor.

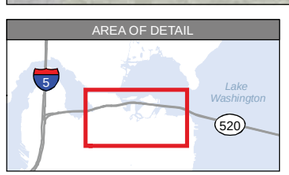
As part of the SR 520, I-5 to Medina project, the pontoons built and stored in Grays Harbor would be towed from a moorage location in Grays Harbor to Puget Sound for outfitting, or would be towed directly to Lake Washington for incorporation into the floating bridge. The additional 44 pontoons would be towed either to an outfitting location in Puget Sound, or to Lake Washington for incorporation into the floating bridge.

Section 6(f) Replacement Properties

Under the Preferred Alternative, selected properties that are protected under Section 6(f) of the Land and Water Conservation Fund (LWCF) Act would be converted from public outdoor recreation land to transportation right-of-way. This includes a portion of Foster Island, a portion of the Arboretum, and a portion of East Montlake Park and the Ship Canal Waterside Trail, both of which are within the Montlake Historic District.

Four historic properties were identified on sites that were considered for replacement property to fulfill the requirements of Section 6(f): the Bryant Building site at 1139-1299 NE Boat Street in the Seattle Study Area, and 10034 Rainier Avenue, 10036 Rainier Avenue, and 10038 Rainier Avenue in the Lake Washington study area. This undertaking identified and evaluated those historic properties to help inform the





- Column
- Existing Regional Bicycle/Pedestrian Path
- Lid
- Proposed Bicycle/Pedestrian Path
- General-Purpose Lane
- HOV, Direct Access, and/or Transit-Only Lane
- Westbound Managed Shoulder
- Park
- Stormwater Treatment Facility

Source: King County (2006) Aerial Photo, King County (2005) GIS Data (Stream), CH2M HILL (2008) GIS Data (Park). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

N

0 250 500 1,000 Feet

Exhibit 1-5. **Preferred Alternative from Portage Bay to Lake Washington**

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

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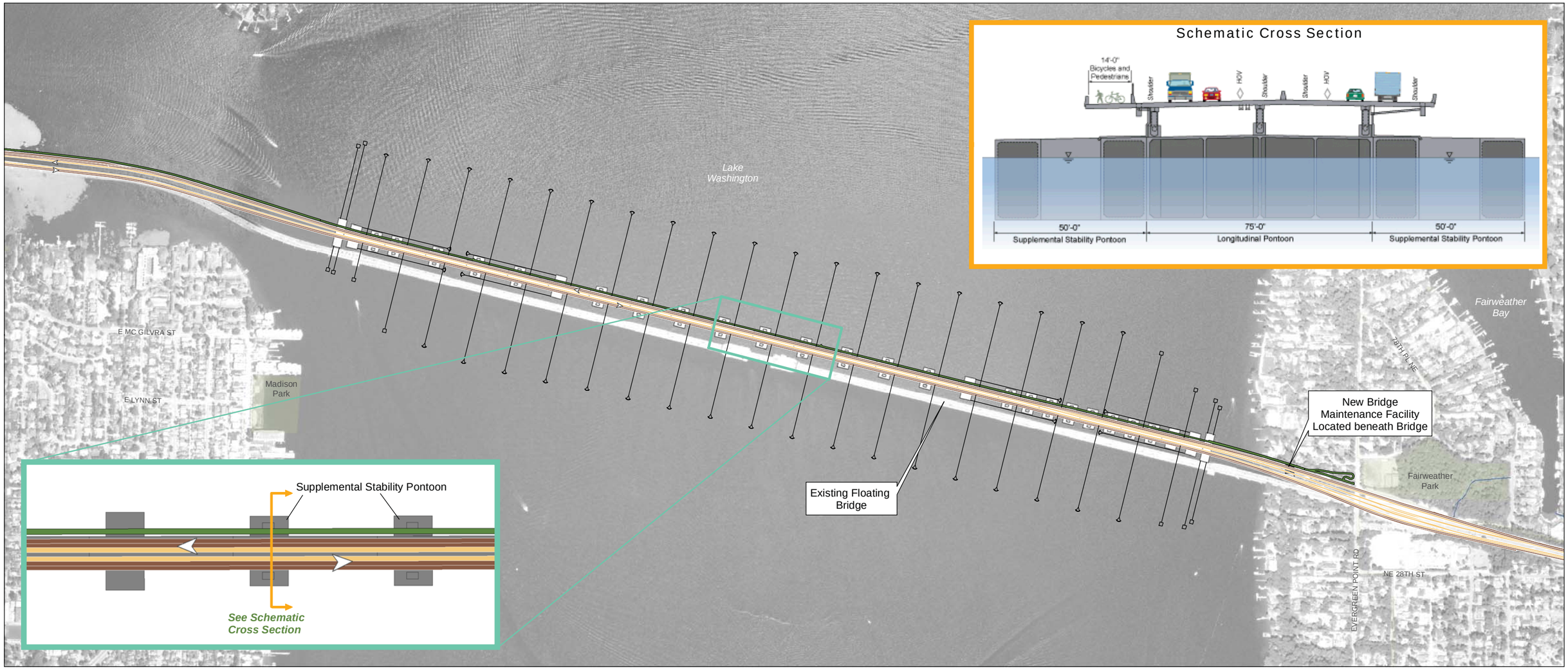
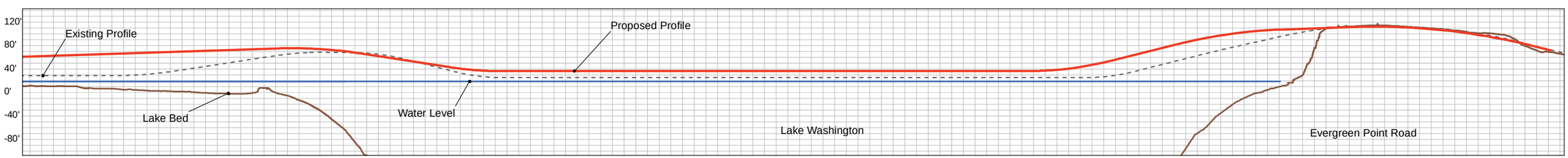
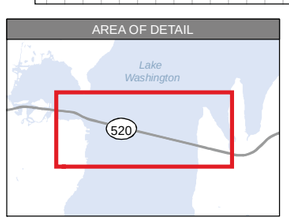






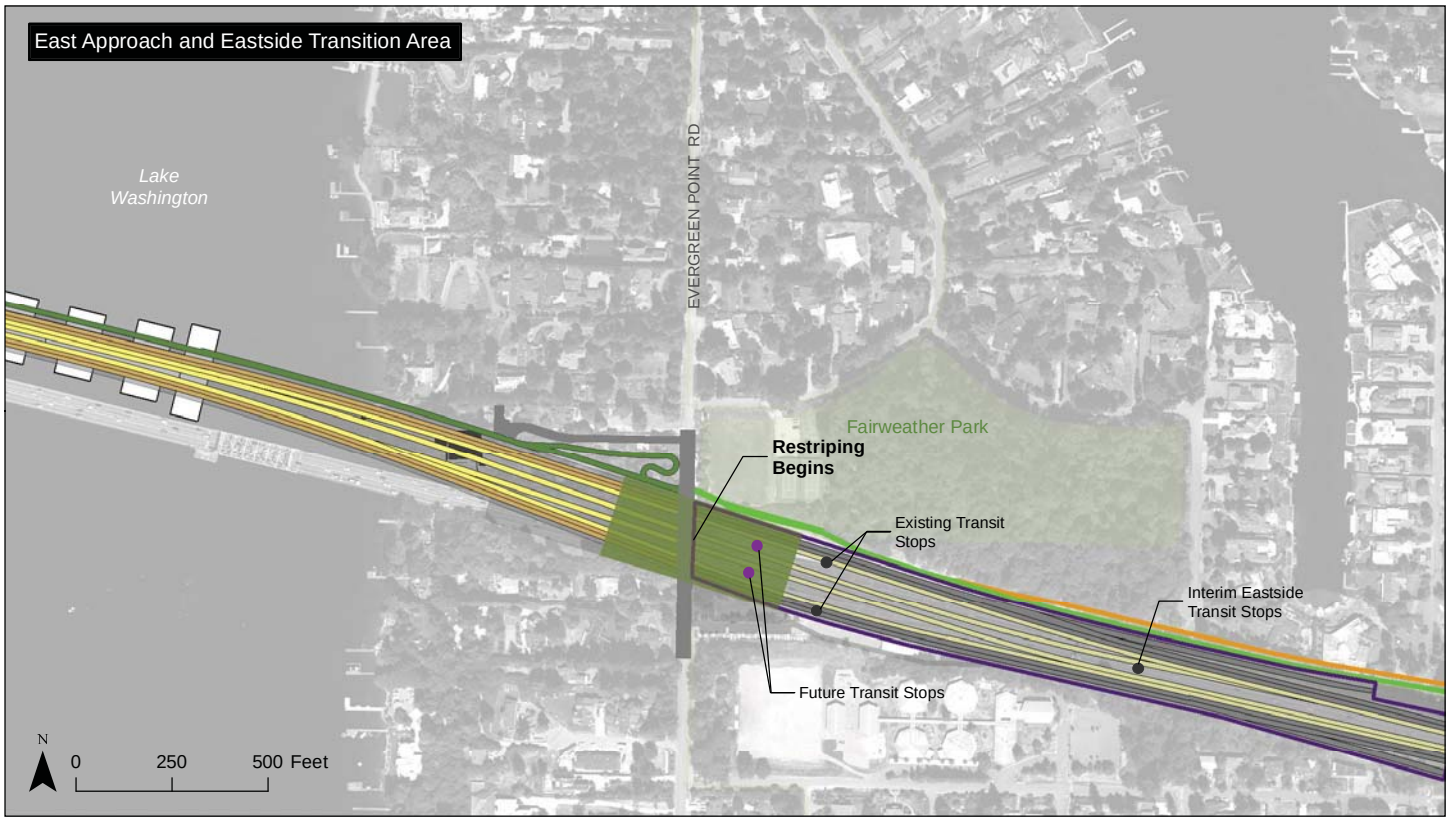
Anchor and Cable
Pontoons
Proposed Bicycle/Pedestrian Path
General-Purpose Lane
HOV, Direct Access, and/or Transit-Only Lane
Park

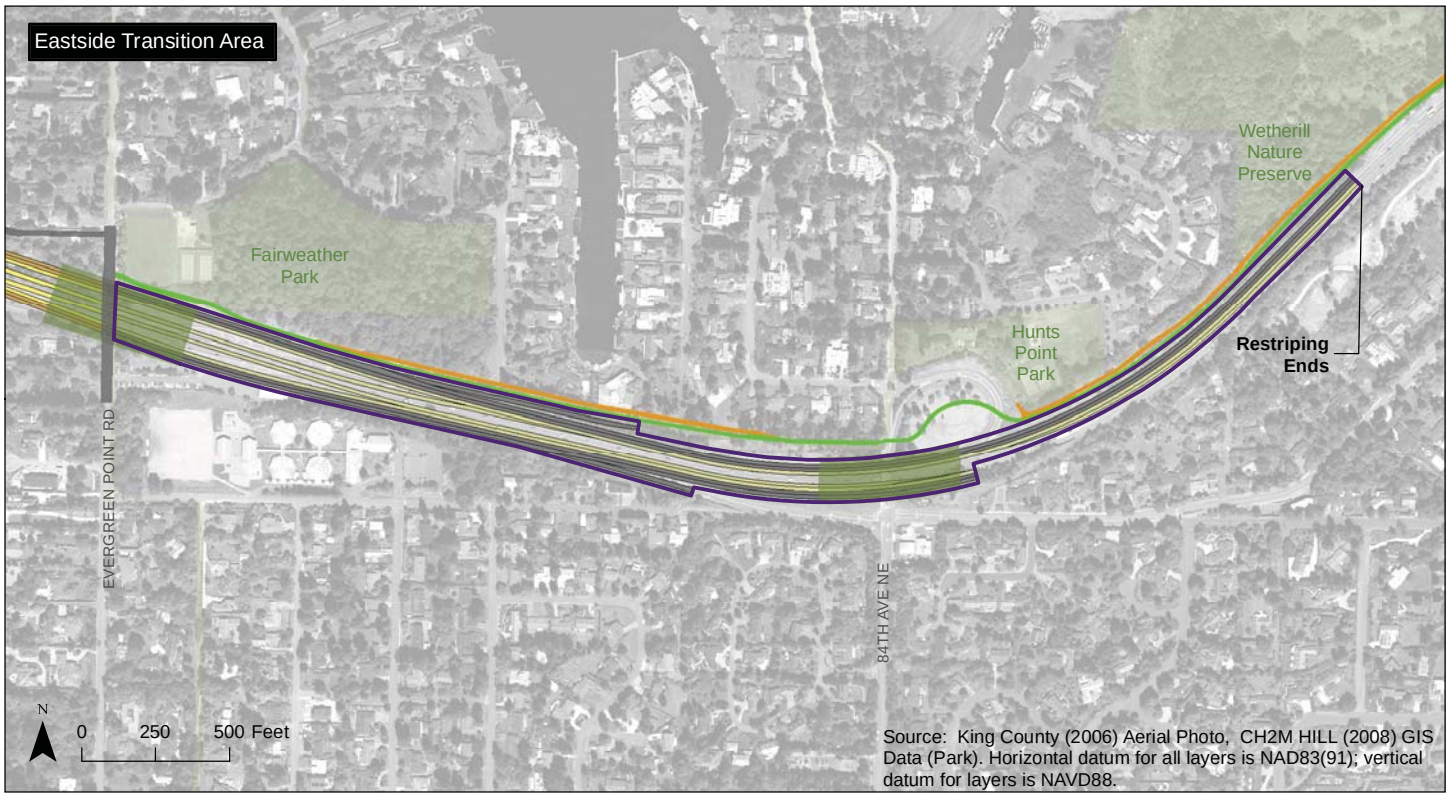
N
0 500 1,000 2,000 Feet

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

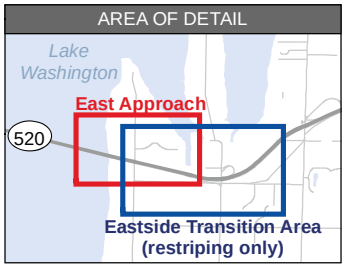
Exhibit 1-6. **Preferred Alternative in the Lake Washington Study Area**

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





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



I-5 to Medina Project Elements

- General-Purpose Lane
- HOV, Direct Access, and/or Transit-Only Lane
- Proposed bicycle/Pedestrian Path
- Pavement
- Restriping Area

Medina to SR 202 Project Elements

- General-Purpose Lane
- HOV Lane
- Local Road Improvement
- Eastside Project Lid

- Bike Path
- Points Loop Trail

Exhibit 1-7. **Preferred Alternative in the Eastside Transition Study Area**

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

decision by the Section 6(f) grantees—the University of Washington and the City of Seattle—as to which sites they would select to serve as replacement properties for park and recreation use.

At the time of publication of this Cultural Resources Assessment Discipline Report, the Section 6(f) replacement site selected by the University of Washington and the City of Seattle is the Bryant Building site, a multi-component warehouse and commercial building with several docks. The site that contains three historic properties located on Rainier Avenue was not chosen as the Section 6(f) replacement property and would be unaffected by the project.

Regulatory Context

Federal, state, and local regulations recognize the public's interest in cultural resources and the public benefit of preserving them. These laws and regulations require analysts to consider how a project might affect cultural resources and take steps to avoid or reduce potential damage to them. A cultural resource can be considered to be any property valued by a group of people (be it monetary, aesthetic, religious, or other value). Valued properties can be historical in character or date to the prehistoric past (the time prior to written records).

The SR 520, I-5 to Medina project involves federal funding and permits; therefore, this project is required to satisfy requirements established under the National Environmental Policy Act (NEPA) (United States Code Title 42, Chapters 4321 through 4347 [42 U.S.C. 4321-4347]) and Section 106 of the NHPA of 1966, as amended [16 U.S.C. 470 et seq.]). The NHPA is the primary mandate governing projects under federal jurisdiction that might affect cultural resources.

Federal Regulations

National Historic Preservation Act

Section 106 of the NHPA requires federal agencies to consider the effects of actions they fund or approve on any district, site, building, structure, or object that is listed in or eligible for listing in the National Register of Historic Places (NRHP). Per 36 Code of Federal Regulations (CFR) 800.16(l)(1), a historic property is any "historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP."

The regulations implementing Section 106 are codified at 36 CFR 800. The Section 106 review process involves four steps:

- Initiate the Section 106 process by establishing the undertaking, developing a plan for public involvement, and identifying other consulting parties.
- Identify cultural resources within an APE, and evaluate their eligibility for inclusion in the NRHP.
- Assess adverse effects by applying the criteria of adverse effect on historic properties.
- Resolve adverse effects by consulting with the SHPO and other agencies and consulting parties, including the Advisory Council on Historic Preservation (ACHP), if necessary, to develop an agreement that addresses the treatment of historic properties.

To determine whether an undertaking could affect historic properties, cultural resources (including archaeological, historic, and traditional cultural properties [TCPs]) must be inventoried and evaluated for eligibility for listing in the NRHP.

Section 4(f) of the Department of Transportation Act

For transportation-related projects, Section 4(f) of the Department of Transportation Act of 1966 (49 U.S.C. 303) and its implementing regulations (23 CFR 774) is another federal regulation that protects historic properties. Section 4(f) resources include any significant publicly owned park, recreation area, or wildlife refuge, or any publicly or privately owned historic property listed in, or eligible for listing in, the NRHP. Section 4(f) applies to all projects that require approval by an agency of the U.S. Department of Transportation, including FHWA. For more information on Section 4(f), see the Final Section 4(f) Evaluation in Chapter 9 of the Final EIS.

National Environmental Policy Act

NEPA requires that all major actions sponsored, funded, permitted, or approved by federal agencies (generally referred to as federal undertakings) undergo planning to ensure that environmental considerations, such as effects on cultural resources, are given due weight in decision-making. The federal implementing regulations for NEPA are in 40 CFR Part 1500 through 1508 (40 CFR 1500-1508; Council on Environmental Quality), and for FHWA actions, 23 CFR 771. The Council on Environmental Quality regulations include sections on

urban quality, historic and cultural resources, and the design of the built environment (40 CFR 1502.16(g)).

State Regulations

State Environmental Policy Act

Washington's State Environmental Policy Act (SEPA) requires that all major actions sponsored, funded, permitted, or approved by state and/or local agencies be planned so that environmental considerations—such as effects on historic and cultural resources—are considered when state agency-enabled projects affect properties of historical, archaeological, scientific, or cultural importance (Washington Administrative Code, Title 197, Chapter 11, Section 960); these regulations closely resemble NEPA. Similar to NEPA, SEPA considers cultural resources to be properties listed in or eligible for the Washington Heritage Register (WHR), which is the state equivalent of the NRHP and sets forth similar criteria for evaluating cultural resources. The WHR, which is administered by the Department of Archaeology and Historic Preservation (DAHP), identifies and records significant historic and prehistoric resources at the state level. A property that is listed in the NRHP is also listed in the WHR.

In the State of Washington, DAHP is the department for the SHPO. Both terms (DAHP and SHPO) are used in this report to refer to the office with which WSDOT consulted.

Local Regulations

The Seattle Landmarks Preservation Board may designate historic properties within the Seattle city limits as local landmarks or landmark districts. Once Seattle landmarks or landmark districts are designated by a City ordinance and approved by the Seattle City Council, they are protected under a Controls and Incentives Agreement from demolition and unsympathetic changes. Certificates of Approval are necessary to permit specific changes to the landmark building or within the district. The steps necessary to permit demolition of a designated landmark are detailed in Seattle Municipal Code 25.12.835. The eligibility of properties noted as "eligible Seattle landmarks" in this report is based on professional judgment of their potential eligibility; they are not officially designated.

City regulations support and relate to SEPA as detailed in Seattle Municipal Code 25.05. For projects involving structures or sites that have been designated as historic landmarks, compliance with the

Landmarks Preservation Ordinance is required. For projects involving structures or sites that are not yet designated as historic landmarks but appear to meet the criteria for designation, the site or structure may be referred to the Seattle Landmarks Preservation Board for consideration. If the Board approves the site or structure for nomination as a historic landmark, consideration of the site or structure for designation as a historic landmark and application of controls and incentives would proceed as provided by the Landmarks Preservation Ordinance. If the property is rejected for nomination, the project would not be conditioned or denied for historic preservation reasons.

When a project is proposed adjacent to or across the street from a designated site or structure, the proposal must be referred to the City's Historic Preservation Officer for an assessment of adverse effects on the designated landmark and for comments on possible mitigating measures. Mitigation may be required to ensure the compatibility of the project with the designated landmark and to reduce effects on the character of the landmark's site. For sites with potential archaeological significance, an assessment of the archaeological potential of the site may be required.

Unlike the City of Seattle, the City of Medina has no specific historic property or landmarks regulation or recognition.

Consultation

WSDOT initiated formal consultation with the SHPO under Section 106 of the NHPA in December 2008 for the SR 520, I-5 to Medina project. Consultation with interested and affected parties is an essential and critical aspect of the Section 106 process. Because of the size and scope of the project, as well as the historic and cultural significance of many resources in the APE, WSDOT contacted, or was contacted by, several groups who were invited to participate as Section 106 consulting parties, per provisions in 36 CFR 800.2(c)(5)(d)(i).

WSDOT consulted with the SHPO, interested tribes, and other consulting parties to develop the project APE. WSDOT conducted outreach and held regular briefings with the SHPO and area tribes between 2008 and the present. Interested tribes were formally invited to participate in the NEPA process and Section 106 consultation in 2009. WSDOT sent letters of request to the following area tribes to initiate government to government consultation:

- Muckleshoot Indian Tribe
- Suquamish Tribe
- Snoqualmie Tribe
- Tulalip Tribes
- Yakama Nation

The Puyallup and Nisqually tribes were invited to participate in Section 106 consultation in August 2010. However, the Puyallup Tribe of Indians deferred to the tribes mentioned above with regard to the Foster Island TCP; the Nisqually Indian Tribe was informed about the project. Both tribes will be consulted as required if future design or construction decisions indicate that the undertaking will affect areas of significance for these tribes.

Due to the size and scope of the project, as well as the historic and cultural significance of many resources within the APE, WSDOT invited numerous non-tribal groups to participate as Section 106 consulting parties. The majority of these parties were invited to participate in Section 106 consultation on March 2, 2009.

The Section 106 consulting parties (non-tribal) include the following:

- DAHP
- City of Seattle Department of Neighborhoods, Historic Preservation Program
- King County Historic Preservation Office
- University of Washington (UW)
- National Oceanic and Atmospheric Administration (NOAA) Northwest Fisheries Science Center
- Washington Trust for Historic Preservation
- Historic Seattle
- Friends of Seattle's Olmsted Parks
- Washington Park Arboretum Foundation
- Portage Bay/Roanoke Park Community Council
- Montlake Community Club
- Concerned Citizens of Montlake—SR 520

- North Capitol Hill Neighborhood Association
- Seattle Yacht Club
- Documentation and Conservation of the Modern Movement; Western Washington (DOCOMOMO WEWA)
- Historic Bridge Foundation
- Eastlake Community Council
- Shelby-Hamlin Residents
- Madison Park Community Council

WSDOT invited consulting parties to participate in project and Section 106 briefings on May 28, June 4, October 20, and October 21, 2009. These meetings focused on the Section 106 process, the APE, determinations of NRHP eligibility for resources located in the APE, and early discussions of potential effects on historic properties. Individual meetings with the consulting parties were also held in 2009 and early 2010, as requested. This time period coincided with the publication of the SDEIS (WSDOT 2010a; see Attachment 10 to the Final EIS), and some consulting parties provided written comments during the NEPA public comment period. Additionally, WSDOT invited the ACHP to participate in the Section 106 process in May 2010. In June 2010, the ACHP accepted the invitation to participate.

The consulting parties actively participated and contributed valuable input to the determination of the APE, identification of historic properties, and assessment of effects. They also participated in the development of the Section 106 Programmatic Agreement (see Attachment 9 to the Final EIS), which identifies measures for avoiding, minimizing, and mitigating the Preferred Alternative's adverse effect on historic properties.

In June 2010, WSDOT retained the services of SRI Foundation to act as liaison between the project team and the consulting parties and facilitate better understanding of the issues regarding the Preferred Alternative's potential effects on historic properties. SRI Foundation developed a consultation plan and carried out the following steps:

- June 2010: Conducted an introductory meeting with all consulting parties to introduce them to the SRI Foundation consultants and provide an overview of the Section 106 process.

- July 2010: Met with consulting parties to introduce and describe the Preferred Alternative and answer questions about potential temporary and permanent effects.
- July-August 2010: Collected comments from consulting parties about potential project effects.
- September 2010: Brainstormed with consulting parties on measures to resolve adverse effects.
- November-December 2010: Continued conversations about resolving adverse effects.
- January 10, 2011: Sent a first draft of the Programmatic Agreement to consulting parties for their review and comment.
- January 25, 2011: Met with consulting parties to further discuss the Section 106 consultation process, and to answer questions pertaining to the first draft of the Programmatic Agreement.
- February 2011: Collected comments from the consulting parties on the first draft of the Programmatic Agreement.
- March 16, 2011: Sent a second draft of the Programmatic Agreement to consulting parties for their review and comment.
- March 22, 2011: Met with consulting parties to discuss implementation of the commitments contained within the Programmatic Agreement, review development of the Community Construction Management Plan (CCMP), and answer questions pertaining to the second draft of the Programmatic Agreement.
- April 2011: Collected comments from the consulting parties on the second draft of the Programmatic Agreement.
- May, 2011: Sent the final Programmatic Agreement to consulting parties for their review and signature.
- May-June 2011: Consulting parties concurred with the project's final Section 106 Programmatic Agreement.

Consultations will continue throughout design and construction of the project in accordance with the stipulations and commitments in the Programmatic Agreement, the Archaeological Treatment Plan, and the Foster Island Treatment Plan. All required signatories to the Programmatic Agreement will the sign the agreement prior to issuance of the Record of Decision.

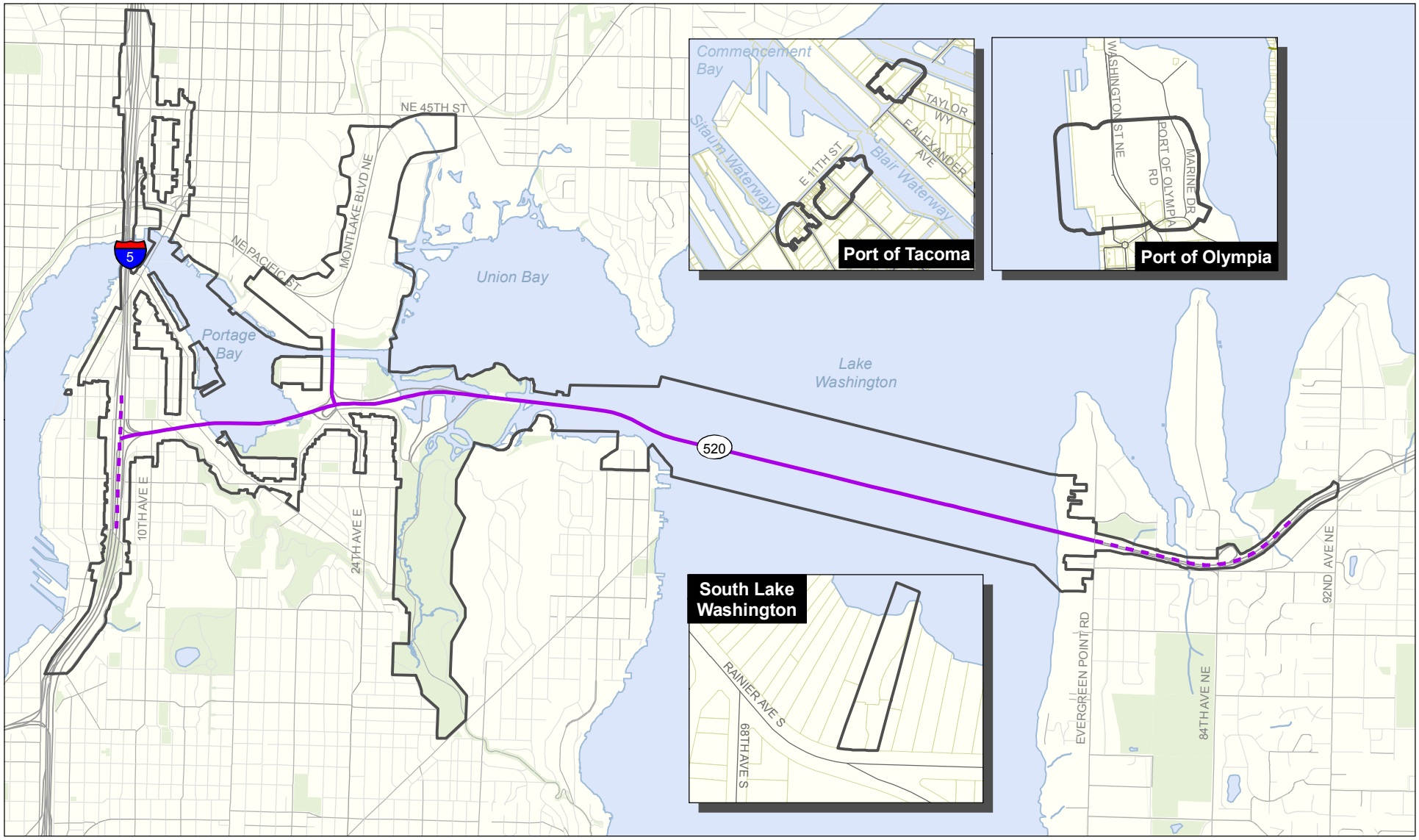
Area of Potential Effects

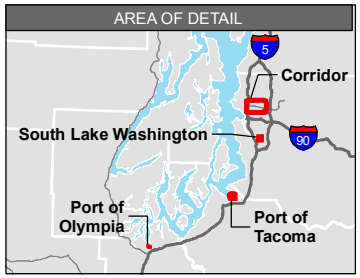
The APE is defined as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties (i.e., archaeological sites, TCPs, and/or built environment resources listed or eligible for listing in the NRHP). The APE for the SR 520, I-5 to Medina project evolved over time and at each stage, the SHPO and the consulting parties were notified and invited to comment. The opening consultation with DAHP included a request for a review of the initial APE; DAHP agreed with the initial APE on April 16, 2009. Comments from the consulting parties were received and taken into consideration. The APE was amended to accommodate these concerns and WSDOT formally requested DAHP's review of the revisions to the APE in July 2009 and June 2010. DAHP agreed with the revisions in August 2009 and June 2010, respectively. In August 2010, the APE was expanded to include the potential Section 6(f) mitigation sites and the Port of Olympia and Port of Tacoma sites, which are not contiguous with the rest of the APE. The SHPO responded to this revised APE on August 17, 2010, with no additional comments. The APE was expanded a final time in early 2011 to include the barge anchoring location. Concurrence from the SHPO on the revised APE was received on January 31, 2011.

The project APE (see Exhibit 1-8) consists of four footprints:

- The known or anticipated construction footprint (referred to as the limits of construction), which includes staging and laydown areas.
- A buffer area (one property deep or 200 to 300 feet from the limits of construction, as appropriate), which includes sufficient area to encompass historic structures, commercial buildings and residences, historic districts, and public facilities (including parks and bridges) that might be directly or indirectly affected by demolition, change of land use, noise, dust, vibration, degraded visual quality, or other effects.
- Additional areas outside the construction footprint, determined through consultation, such as the entire Roanoke Park Historic District, the Arboretum,[2] identified potential construction haul

[2] A small, noncontiguous portion of the Arboretum, east of the main park and southeast of Foster Island, is not included in the APE.





Project Extent

Limited Improvement

Area of Potential Effects

Park

N

0 1,000 2,000 4,000 Feet

Source: King County (2005) GIS Data (Streams and Streets), King County (2007) GIS Data (Water Bodies), CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 1-8. **Area of Potential Effects for the SR 520, I-5 to Medina: Bridge Replacement and HOV Project**

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

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routes, potential Section 6(f) replacement sites, and all the navigable waters of Portage Bay.

- Additional sites at the Port of Olympia and the Port of Tacoma that were considered for pontoon construction and staging and that are not contiguous with the rest of the APE.

The limits of construction define the area within which potential archaeological deposits could be affected. This boundary includes all potential vertical and horizontal ground disturbance associated with the project.

Archaeological Resources

WSDOT has assisted FHWA with previous consultations in the project area, beginning with the Trans-Lake Washington Study and continuing through the Draft EIS (WSDOT 2006a; see Attachment 12 to the Final EIS). In 2005, WSDOT retained BOAS, Inc. (BOAS) to conduct cultural resources investigations in the APE. BOAS conducted an extensive inventory of the APE, which included ethnographic research, subsurface investigations, and a geomorphological assessment. Additional studies have been conducted in peripheral support of the Section 106 process, including the use of ground-penetrating radar (GPR), geomorphological and historic map analysis of the historic shoreline, and conducting ethnographic research and subsequent archaeological studies in response to the redesign and alteration of project alternatives and the limits of construction. In 2010, WSDOT retained ICF International (ICF) to prepare the Section 106 Technical Report (Elder et al. 2011; Gray et al. 2011), which presented the methods used to inventory, evaluate, and assess the project's effect on historic properties, synthesized results of the numerous investigations conducted within the APE, and discussed recommendations for additional investigations. This Cultural Resources Assessment Discipline Report was adapted from that technical report, which was submitted to the SHPO in January 2011.

The archaeological investigations for the SR 520, I-5 to Medina project focused primarily on the boundary defined for the limits of construction (Exhibit 1-8). This boundary includes potential vertical and horizontal ground disturbance associated with the project. The vertical extent of the limits of construction are from the level of existing ground surface to 120 feet below ground surface, which allows for the maximum extent of potential subsurface ground disturbance. Depths of

the proposed ground disturbance will vary depending on the proposed activity. Project activities include the following categories:

- Surface Improvements: repaving and restriping (limited to the surface)
- Facilities: stormwater facilities, detention pond, bioswales, maintenance building (maximum depth 40 feet below surface)
- Roadway Excavation/Earthwork: retaining walls and roadway excavation (maximum depth 30 feet below surface)
- Shaft Excavation: specific to overcrossings and temporary work bridge piles (maximum depth 100 feet below surface)
- Pile-Driving: associated with piers and temporary work bridges (maximum depth 120 feet below surface)

This discipline report summarizes the archaeological investigations conducted as a component of the preconstruction environmental review, in accordance with Section 106 of the NHPA. As a part of this reporting process, ICF archaeologists reviewed all reports, field notes, and data collected by BOAS, the GPR, and geomorphological studies. ICF also conducted supplemental research to determine if additional investigations were needed to adequately assess the project's effects on historic properties.

Historic Built Environment Resources

The intensive and reconnaissance-level investigation of historic built environment resources in the APE included built environment resources constructed prior to 1972. The results are organized by the three overarching study areas: the Seattle, Lake Washington, and Eastside transition study areas. Within the Seattle study area, there are four approximate geographical segments: I-5/Roanoke, Portage Bay, Montlake, and West Approach. Other study areas include two sites at the Port of Tacoma and the Port of Olympia, initially investigated as possible pontoon production sites, and other locations as potential Section 6(f) replacement sites.

2. Methods

This chapter discusses the methods used to conduct cultural resource investigations of archaeological and historic built environment resources. The expectations for the archaeological sensitivity of the limits of construction within the APE and the potential for archaeological sites to be present are also discussed.

Archaeological investigations were conducted by BOAS in 2006 (Blukis Onat et al. 2007); however, supplemental research has been conducted to build upon the sensitivity assessment and probability model initially established by BOAS. In Volume 1 of the Section 106 Technical Report (Elder et al. 2011), the Probability Areas discussed in this discipline report were identified by number. To protect the exact locations, the numbers have been removed from the summaries in this report, and these locations are presented by project segment. The objective of the historic built environment investigations was to identify previously recorded historic properties located in the APE, as well as to identify additional historic properties in the APE through field survey. This section describes where and how the information was gathered, and how it informs the results of the archival research and field survey. Results of the studies are presented in Chapters 5 and 6.

The research design and survey methods for this project fall into four primary categories: records and archival research, development of the historic context, consultation under Section 106, and built environment resource inventory.

Archaeological Resources

Archaeological Research Design

The following section integrates the expectations previously presented by BOAS with supplemental research to evaluate the potential for archaeological sites and deposits within the limits of construction. ICF archaeologists conducted this supplemental research to help determine the potential for archaeological sites to be located within the limits of construction.

Several methods were used to assess the archaeological sensitivity of the limits of construction to determine where archaeological sites may be located. These methods include the identification of ethnographic

place name locations through background research, analysis of the probability model provided by the DAHP, geologic landform analysis, and the use of light detection and ranging (LiDAR) images to identify areas of previous ground disturbance and sediment removal.

Ethnographic Place Name and Resource Procurement Locations

Previous ethnographic research (Miller and Blukis Onat 2004) revealed that Lake Washington and associated shorelines were used extensively by the Lakes Duwamish people in precontact and ethnohistoric times. Additional research (Blukis Onat and Kiers 2007; Blukis Onat et al. 2006) identified several locations within and adjacent to the APE, which had associated Lushootseed place names or areas that would have supported ethnographic resource procurement activities. BOAS (Blukis Onat and Kiers 2007; Blukis Onat et al. 2006) made the implicit assumption that modern locations tied to ethnographic place names and resource exploitation areas would have a high potential to contain archaeological deposits. It is, therefore, expected that these localities, delineated as Probability Areas by BOAS, have a high potential to contain archaeological deposits.

Washington Statewide Archaeology Predictive Model

Subsequent to the identification of ethnographic place name and resource procurement locations, the Washington Statewide Archaeology Predictive Model (WSAPM), maintained by DAHP, was used to determine whether additional areas that were not located within previously defined high probability areas had the potential for archaeological deposits. The WSAPM correlates several environmental datasets (elevation, slope, aspect, distance to water, geology, soils, and landforms) and cultural datasets (archaeological sites recorded with DAHP, archaeological survey locations, General Land Office [GLO] records) to generate predictions about where archaeological resources might be located on the landscape.

Geologic Landform Analysis

To determine the potential for deeply buried archaeological deposits in the APE, local geologic maps were consulted (Booth et al. 2009; Waldron et al. 1962). This analysis revealed that most of the land surface located in the limits of construction was formed during the Pleistocene epoch, as a result of the advance, and subsequent retreat, of glacial ice into the region, a period when there would have been no opportunity for human occupation of the land surface. Because human

occupation of the land surface could only occur after the formation of these landforms, the physical remains of these activities would be located at or near the ground surface. If the ground surface has been removed or redeposited, then there is no potential for intact archaeological deposits.

A smaller portion of the land surface within the limits of construction was formed after the advance and retreat of glacial ice in the region. These locations include areas that have been inundated by Lake Washington or are located within stream drainages. Since there is evidence for human occupation of the region since the early Holocene, there is the potential for deeply buried intact archaeological deposits in Holocene-aged sediments. Therefore, any landforms composed of Holocene sediments have the potential to contain intact archaeological sites and deposits.

Analysis of Previous Ground Disturbance

Much of the APE was extensively modified during the excavation of the Montlake Cut, during the construction of SR 520, and by urban development along the SR 520 corridor. Because of this widespread disturbance and the presence of Pleistocene-aged landforms within the limits of construction, an analysis of previous ground disturbance using LiDAR imagery was undertaken. This analysis revealed that much of the SR 520 corridor and Montlake Cut has been subject to extensive sediment removal. Analysis of the paved and constructed areas adjacent to the SR 520 corridor was not possible, since no clear indications of sediment removal were present at the ground surface or on LiDAR maps. It is highly unlikely that archaeological sites or deposits will be discovered on Pleistocene-aged landforms where extensive sediment removal has occurred.

Summary

Based on the analysis above, the following four nested expectations were developed:

- Intact archaeological sites will be located at or near the surface of Pleistocene-aged landforms, and have the potential to be deeply buried below the surface in areas that contain Holocene aged landforms.

- If extensive ground disturbance has occurred on Pleistocene-aged landforms, there is no potential for the discovery of intact archaeological sites.
- If ground disturbance has occurred in Holocene-aged sediments, the potential for intact archaeological sites is not reduced until all Holocene-aged sediments have been removed.
- On all undisturbed Pleistocene landforms and in Holocene sediments, archaeological sites that warrant further investigation may be located in areas with ethnographic place names, in traditional resource processing locations, and/or in areas designated as very high or high probability localities, as defined by the WSAPM model.

When combined, these expectations provide three levels of archaeological potential, which include the following:

- Holocene Landform: Buried archaeological deposits possible
- Pleistocene Landforms: Archaeological deposits possible
- Cut Areas – Pleistocene Landforms: Intact archaeological deposits unlikely

Previous Investigations

Research

BOAS conducted ethnographic, historic, and geological research to define areas in the APE that had a high probability for containing archaeological deposits. These Probability Areas were defined where archaeological investigations should occur within the limits of construction. To define the Probability Areas, BOAS first identified post-glacial landforms that would have been available for use and/or occupation during the Holocene epoch (Blukis Onat at al. 2005). Areas of ethnographic importance, resource procurement areas, and places associated with historic activities were identified on these landforms. An analysis of post-glacial processes and historic landscape modification using historic and geologic research and field reconnaissance (Blukis Onat et al. 2006; Blukis Onat and Kiers 2007) was implemented to determine whether these areas had been extensively modified in the historic or recent past. Once the Probability Areas were defined, polygon and point features of these areas were

created using a geographic information system (GIS) computer program.

Research materials were obtained from the City of Seattle Municipal Archives, the Museum of History and Industry (MOHAI), the UW Archives and Special Collections, the UW Map Library, the Miller Library at the Center for Urban Horticulture, the Seattle Public Library, DAHP, and the City of Seattle Solid Waste Department.

Field Survey

BOAS designed and implemented an archaeological field testing program based on the identified Probability Areas (Blukis Onat and Kiers 2007; Blukis Onat et al. 2006, 2007). Between April and October 2006, BOAS conducted archaeological investigations within the proposed limits of construction in the APE. BOAS excavated 81 shovel probes (SPs), 8 trenches, and a 2-by-2 (2x2) meter excavation unit in the APE. Of these probes, 61 were excavated within the current limits of construction and 20 were located within Probability Areas that fall outside of the limits of construction but are located in the APE.

A total of 33 SPs were excavated in the vicinity of the Miller Street Landfill. The 2x2 excavation unit was placed within the boundaries of the landfill in response to the discovery of a human patella in one SP. The excavation unit, referred to by BOAS as the "block excavation unit," expanded the SP where the human patella was found to evaluate the context and determine the probability for other human remains in the vicinity (Blukis Onat et al. 2007).

From September 26 to September 29, 2006, BOAS conducted backhoe trenching at selected locations in the APE to delineate and characterize the Miller Street Landfill deposit and assess local geomorphology in three Probability Areas in the West Approach segment. Trenching was intended to explore deeply buried deposits to characterize the landfill deposits. No further archaeological investigations were conducted (Blukis Onat et al. 2007).

Shovel Probes

Eighty-one SPs were excavated in the APE. SPs were approximately 40 centimeters in diameter and placed at 20-meter intervals. The probes were excavated by shovel to an average depth of 0.9 meter, although some were terminated because of standing groundwater, severely compacted deposits, or unsafe conditions. A 10-centimeter-diameter bucket auger was used to excavate further in some probes to define the

vertical limits of fill in select areas (Blukis Onat et al. 2007). The average depth for augured probes was 1.76 meters, although some reached 3 meters or more below the surface. All sediments were screened through 0.25-inch hardware mesh (Blukis Onat et al. 2007).

Trenches

BOAS excavated eight trenches in the APE. Three trenches were excavated within the boundaries of the Miller Street Landfill. Archaeologists recorded stratigraphy, cultural materials, and evidence of disturbance on standardized forms. The excavation of these trenches proceeded in 1 meter arbitrary intervals. Sediments were not screened, but the archaeological monitors examined the sediments in the back dirt piles adjacent to each trench (Blukis Onat et al. 2007).

Unit Excavation

As noted above, BOAS excavated a 2x2 block excavation unit expanded from the SP where a human patella was found. The block was divided into four 1-by-1 (1x1) meter units, oriented to true north. One unit was the northwest quadrant, one was the northeast, another was the southwest, and the fourth was the southeast. Each unit was excavated and documented separately, but the same level was completed in all four units before the next level was begun. For the initial 80 centimeters below the datum at the southwest corner, excavation proceeded by shovel in 20-centimeter arbitrary levels. Once an 80-centimeter depth was reached, excavation continued in 10-centimeter arbitrary levels as the units approached the depth at which the patella was found. All sub-units were excavated to 1.2 meters below the surface. After 1.2 meters, a 0.5-by-1.0 meter unit was opened in the northern portion of the block. This smaller unit was excavated to 1.5 meters below surface, and an auger was used to reach a depth of 2.5 meters. All sediments were screened through 0.25-inch hardware mesh, and all block excavation was documented with standardized forms for each 10- to 20-centimeter arbitrary level. A field director's log recording all aspects of fieldwork was kept, and digital photographs with an accompanying photo log were maintained to provide additional documentation of the excavation. In addition, stratigraphic profiles of the four block walls were drawn upon completion of the excavation. A monitor for the Snoqualmie Indian Tribe was present during these excavations (Blukis Onat et al. 2007).

Artifact Collection

Artifact collection was conducted for investigations within the Miller Street Landfill. Collection methods varied with the method of excavation. In SP excavations, a few diagnostic artifacts were collected for reference, while the majority were described on the field forms according to vertical provenience and then reburied as the probe was backfilled. Artifacts recovered from the backhoe trenches were grouped by arbitrary 1-meter levels. Only potentially diagnostic artifacts (mostly whole bottles and unique items) were collected. Other cultural materials were noted, photographed, and reburied as the trench was backfilled with the excavated sediment. Most of the artifact descriptions from the SPs and trenches did not include quantities or size, only artifact types.

During the block excavation, potentially diagnostic historic artifacts were collected by unit and level provenience; others were noted, photographed, and reburied as the unit was backfilled with the excavated sediment. The uncollected artifacts were listed and counted on the field forms (Blukis Onat et al. 2007).

Supplemental Research, Investigations, and Analysis

Additional studies conducted in support of the Section 106 process included the use of GPR, geomorphological and historic map analysis of the historic Lake Washington shoreline, ethnographic research, and subsequent archaeological studies in response to redesign of project alternatives and changes to the limits of construction boundaries.

Subsequent to the initiation of the environmental review process for the SR 520 project in 2005, DAHP made the WSAPM available to professional archaeologists. This model prompted the additional research to ensure that all areas within the SR 520, I-5 to Medina project APE having the potential to contain archaeological deposits had been identified. All additional supplemental analysis was conducted to address this concern. Additional research included analyzing the APE using the WSAPM, a geologic landform analysis, an analysis of previous disturbance in the APE, and a review of previous archaeological studies. Brief descriptions of these supplemental investigations and their methods are provided below.

Foster Island Ground-Penetrating Radar Study

The Geophysical Archaeometry Laboratory Inc. conducted a GPR survey of Foster Island in July 2008. Based on the hypothesis that the original island sediments would differ from those that "accumulated as shallow lake bed deposits" and are now exposed above the lower Lake Washington water level, the GPR survey was intended to map sediment changes and identify those that were part of the original island landform prior to 1916 (Goodman et al. 2008). Because of property access and instrument constraints, the survey was focused on the northern portion of the island in low-cut grassy areas that were devoid of underbrush. The GPR survey consisted of setting stakes at 10-meter intervals along east-west–oriented linear transects across the study area. The GPR device, which included a radar transmitter and receiver, was manually transported across the ground surface along these transect lines. Data were collected continuously by the GPR device along the transect lines, with temporary pauses at the staked locations to check for accuracy and control. In order to provide two levels of resolution for the GPR data, two antennas were used (270 megahertz [MHz] and 400 MHz). The 270-MHz antenna penetrated deeper into the ground than the 400-MHz antenna, but the resulting data had a lower resolution. Approximately 5,565 square meters of ground surface were surveyed with the 270-MHz antenna and 5,609 square meters were surveyed using the 400-MHz antenna, for total surface area coverage of 11,174 square meters.

The resulting GPR data were processed using GPR-SLICE® software to filter out background noise. The resulting radargrams (vertical subsurface profiles) were compiled and separated into horizontal slices representing the entire survey area at different depths. These "time slices" were then corrected using LiDAR-obtained elevation data to accurately represent the varied topography of Foster Island. The final data were analyzed to identify the presence and depths of sediment variations on the island (Goodman et al. 2008).

Foster Island Historical Map Research

In 2009, ICF conducted a historic records and map research project to supplement the previous shoreline analysis and GPR survey of Foster Island. Ten historic maps were georeferenced using GIS to track the landform and shoreline changes of Foster Island between circa 1850 and the present day. ICF archaeologists examined aerial photographs and maps on file at the Maps and Records office at the U.S. Army Corps of Engineers (USACE), Seattle District headquarters and UW's map

collections and the online repository Early Washington Maps: A Digital Collection. Maps varied in terms of their original intended function, and included U.S. Coast and Geodetic Survey (now NOAA) T-sheets (nineteenth-century coast survey maps), GLO survey maps, U.S. Geological Survey Land Classification maps, and City of Seattle directory and engineering development maps.

The digital maps and aerial photographs were georeferenced to a 2006 United States Department of Agriculture, National Agriculture Imagery Program (NAIP) King County aerial image. The georeferencing process involved overlaying the historic map image onto a projected coordinate system base and applying control points to known spatial points that are shared between the georeferenced maps and NAIP imagery. The most common control points used for the older historic maps were the section boundary corners, section midpoints, and quarter-section corners. Common landforms, street intersections, rail line intersections, and landmarks were used as additional control points when section lines were unavailable or inaccurate. The final georeferenced maps were saved as GIS spatial layers that could be overlain, compared, and analyzed to document changes to the historic shoreline over time.

Foster Island Geomorphic Analysis

Geomorphic analysis investigations were conducted at Foster Island in May 2010 by Pacific Geoarchaeological Services. This investigation was designed to ground-truth the results of the GPR study and identify the location of relict shoreline in the APE through hand-excavated units and micromorphological analysis. The excavation units ranged from 0.5-by-0.5 meter to 1.0-by-0.5 meter and were placed within the limits of the 2008 GPR study area (Hodges 2010). In addition, a 6.5-meter-long trench (0.5 meter wide) was excavated where the GPR results indicated an anomaly considered to be the southern shoreline of the island. Sediments in the excavation unit walls were characterized in the field following standardized lithostratigraphic nomenclature provided by Hodges (2010). An additional 0.75-inch soil probe was used to investigate the modern shoreline's landform history. Further sedimentary micromorphological analysis was conducted in an off-site laboratory to determine the formation processes of the sediment horizons observed during the investigations.

Miller Street Landfill—NRHP Eligibility Evaluation

As a result of archaeological studies conducted in 2006, the Miller Street Landfill (45KI760) was initially recommended as potentially eligible for

listing in the NRHP, but no evaluation or formal significance assessment was undertaken (Blukis Onat et al. 2007). Additional research and analysis were necessary to assess the site's data potential and significance. In 2010, ICF reviewed the previous BOAS reports, data, files, and sample artifacts and conducted additional research to evaluate the eligibility of the site for listing in the NRHP. The evaluation of significance was based on data from the previous archaeological investigations conducted at the site, as well as extensive additional archival research and comparative archaeological studies.

The additional historical research focused on refuse collection and management within Seattle, including primary source materials from the Seattle Municipal Archives. These materials were records relating to the City of Seattle Parks Department, Health and Sanitation Services, and Engineering Department, and included historical maps, photographs, department reports, correspondence, petitions, ordinances, and laws. Additional maps and photographs were found at the UW and the Seattle Public Utilities records vault. ICF also used a number of secondary sources, including books, journals, theses, and unpublished reports.

In addition, ICF conducted comparative archaeological research at both the regional and national levels to further determine the research potential of the Miller Street Landfill. This comparative research included the review of seven regional studies and four national studies.

Foster Island Field Investigations

In August and September 2010, ICF conducted Phase 1 and Phase 2 archaeological investigations at Foster Island. Phase 1 involved excavating 116 1x1 test units (TUs); Phase 2 included excavating 497additional TUs. TUs were excavated in layers (one sediment layer was removed at a time) until culturally sterile sediments, either glacially deposited clays or till, were reached. The depth of these sterile glacial deposits ranged between 11 and 110 centimeters below ground surface. In TUs that contained deep deposits of fill, round SPs or augers were excavated in the bottom of the TUs to reach the natural glacial deposits and confirm that intact Holocene soils were not present below the fill.

Supplemental Analysis

To further analyze the archaeological sensitivity of the APE, ICF archaeologists reviewed and analyzed BOAS' original research,

fieldwork, and all subsequent research and investigations conducted in the APE. ICF consulted and analyzed the probability model provided by DAHP, geologic landform analysis data, original engineering construction as-built drawings, and LiDAR imagery. ICF also conducted field reconnaissance visits to identify and confirm areas of previous ground disturbance and sediment removal to better determine whether all areas that had the potential to contain archaeological deposits had been investigated.

Historic Built Environment Resources

Records and Archival Research

Intensive research of primary and secondary source data was conducted to identify previously recorded historic properties; historical developments that influenced the project area; and important architectural, engineering, and development trends that would help inform the historic significance of resources within the APE. Background information that provided a historic and cultural context was generated from a variety of sources. Previous cultural resource studies provided invaluable ethnographic and historic background material, including relevant ethnographic reports, oral histories, local histories, newspaper articles, census data, city directories, historical photographs, and historical maps.

The following is a list of individuals and organizations that provided information and resources related to the built environment:

- Washington State DAHP—Dr. Allyson Brooks, SHPO; Mr. Greg Griffith, Deputy SHPO; Mr. Michael Houser, State Architectural Historian:
  - Determinations of NRHP Eligibility at DAHP
  - Historic Resources Inventory files and previous cultural resources studies at DAHP
  - Historic Property Inventory (HPI) files at DAHP's online database, the Washington Information System for Architectural and Archaeological Records Data (WISAARD)
  - NRHP nomination forms at DAHP

- City of Seattle Historic Preservation Division (Department of Neighborhoods)—Ms. Elizabeth Chave, Landmarks Preservation Board; Ms. Karen Gordon, Seattle City Historic Preservation Officer:
  - List of Seattle landmarks
  - Landmark nominations
  - Seattle landmark ordinances
- King County Historic Preservation Program
- Sanborn Fire Insurance Company (maps)
- King County Assessor's Office
- Seattle Municipal Archives—database of photographs
- Seattle Public Utilities Engineering Department (records vault)–city maps, plat books, and historical aerial photos
- Seattle Department of Parks and Recreation—Mr. Terry Dunning
- Historic Seattle
- Friends of Seattle's Olmsted Parks—Mr. Larry Sinnott
- HistoryLink (online encyclopedia of Seattle, King County, and Washington State history)
- University of Washington (UW):
  - Suzzallo Library
  - Burke Museum
  - Special Collections and Manuscripts
  - School of Architecture Library
  - School of Architecture—Professor Jeffrey Ochsner and Professor Grant Hildebrand
- MOHAI—historic photographs database
- Seattle Public Library—Seattle Room
- NOAA Northwest Fisheries Science Center—Mr. John Herkelrath and Mr. John Rheaume
- DOCOMOMO WEWA
- USACE—Seattle District Cultural Resources Staff

As a result of these research efforts, WSDOT identified previously identified historic properties, developed the historic context through which newly recorded resources could be evaluated (described below), and gathered enough information about communities to identify and evaluate properties in the APE for NRHP eligibility.

Development of the Historic Context

The historic context presented in Chapter 4 is a narrative statement that describes a broad pattern of historical development of the communities in the APE. The historic context establishes the significant themes and property types of the neighborhoods located in the APE. These themes include, but are not limited to, transportation development, residential development, maritime activities, social organizations, and scientific or educational institutions.

The context was developed through archival research and background data on western Washington, Seattle, and the communities that intersect or are adjacent to SR 520. The preparation of this historic context involved identifying the concepts, themes, chronological period, and geographical areas; collecting information about the communities in the APE; and identifying trends in settlement and development.

Field Survey and Historic Resource Inventory

WSDOT, in consultation with DAHP, conducted an extensive field survey to identify potential historic properties located in the APE. At minimum, resources were surveyed at the "reconnaissance" level, as defined by DAHP. However, many resources—particularly those within one parcel of the Preferred Alternative's construction footprint—were conducted at the "intensive" level.

DAHP defines reconnaissance-level surveys as "visual or predictive surveys that identify the general distribution, location, and nature of cultural resources within a given area" (DAHP 2010). The survey generally does not include ownership information; historic use or name of the property; the study unit theme (provided in the HPI forms); the names of the architect, builder, or engineer; an in-depth statement of significance; or a bibliography. For this survey, however, when the significance of a property could not be determined based on the reconnaissance-level survey, more intensive research was conducted on certain properties. For the majority of the properties located within one

parcel of the construction footprint, an intensive-level survey was conducted.

The survey involved examining and photographing buildings and structures in the APE that were determined to have been built before 1972. This date was selected to include resources 50 years old at the time of the survey, in addition to any that might become 50 years old during the course of the project construction. The parcel-by-parcel field surveys of properties in the APE were conducted between 2007 and 2011. There were multiple surveys during this period because of APE expansions as a result of consultation with DAHP and other parties, as well as project changes. Previously surveyed resources were resurveyed if the previous survey had not been carried out within the previous 5 years in accordance with DAHP guidelines. The following steps were taken to identify, evaluate, and record cultural resources:

- Construction dates were established using data from the King County Tax Assessor, and properties built before 1972 were identified for the pedestrian field survey.
- Sanborn Fire Insurance Maps (Sanborn Map Company 1893, 1904, 1916, 1930) were consulted to assess the general location and distribution of buildings and structures over time.
- A parcel-by-parcel pedestrian survey of properties located in the APE built before 1972 was conducted by senior architectural historians.
- Each resource was visually evaluated, photographed from the public right-of-way, and noted for its significant visual characteristics. The following information was collected on each historic built environment resource:
  - the precise location,
  - the architectural style (if identifiable),
  - the type and materials of significant features,
  - quantity and types of alterations,
  - the overall physical integrity, and
  - potential for historic district.

An HPI form was prepared for each resource; all HPI forms can be found in Attachment 4 to this Cultural Resources Assessment Discipline Report. The forms were prepared using information on the physical description of each resource collected in the field. A Statement

of Significance for each resource was prepared based on historic research of the history of the project area and neighborhoods.

Identification of Historic Properties in the Built Environment

Section 106 requires the identification of historic properties listed or eligible for listing in the NRHP that are located in the APE. Senior historians completed the identification of historic properties by evaluating the surveyed properties in the APE in accordance with NRHP evaluation criteria, and made recommendations for eligibility for listing in the NRHP on each property surveyed. WSDOT, on behalf of FHWA, then made determinations of eligibility. WSDOT submitted those determinations to the SHPO for concurrence and the SHPO concurred on the eligibility findings of the majority of these properties. DAHP correspondence is included in Appendix 2 to this discipline report. Results of the surveys of the built environment resources are presented in Chapter 6 of this report.

Assessment of Project Effects

WSDOT, on behalf of FHWA, evaluated cultural resources located in the APE, and for those that qualified as historic properties under 36 CFR 800, assessed the Preferred Alternative's effects on each property's seven aspects of integrity (i.e., the property's location, design, setting, materials, workmanship, feeling, and association). The assessment resulted in one of four potential findings:

- **Does Not Alter Integrity:** Either no historic properties are present, or there is no effect of any kind, neither harmful or beneficial, on historic properties.
- **Alters Integrity:** The undertaking affects historic properties, but does not diminish the characteristics that qualify the property for listing in the NRHP.
- **Diminishes Integrity:** There is an effect from the undertaking which alters the characteristics that qualify the property for listing in the NRHP in a way that diminishes the integrity of the historic property. This includes diminishing the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.
- **Temporarily Diminishes Integrity:** There is an effect from the undertaking, and that effect temporarily (during construction of the

project) alters the characteristics that qualify the property for listing in the NRHP in a way that diminishes the integrity of the historic property. This includes diminishing the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

Information reported in associated environmental analyses prepared for the SR 520, I-5 to Medina project were also used in this analysis (see Attachment 7 to the Final EIS, which contains the discipline reports prepared for the SDEIS and the discipline reports and the addenda and errata prepared for the Final EIS):

- Noise Discipline Report Addendum and Errata—existing and predicted noise and vibration levels on historic properties
- Visual Quality and Aesthetics Discipline Report Addendum and Errata—assessment of existing visual and aesthetic qualities in areas around historic properties and effects analysis on visual quality in these areas
- Land Use, Economics, and Relocations Discipline Report Addendum and Errata—information on acquisitions, relocations, and changes in land use that may affect historic properties
- Air Quality Discipline Report Addendum and Errata—information on existing and predicted air quality levels that might affect the setting of historic properties
- Transportation Discipline Report—information on existing and predicted traffic conditions that could affect historic properties
- Navigable Waterways Discipline Report Addendum and Errata—information on potential effects on marine-related historic properties
- Recreation Discipline Report Addendum and Errata—information on effects on recreation resources, as those resources may also be historic properties

The built environment analysis includes information from the 2006 Draft EIS (WSDOT 2006a; see Attachment 12 to the Final EIS) and the 2010 SDEIS (WSDOT 2010a; see Attachment 10 to the Final EIS).

3. Literature Search

Archaeological Resources

ICF archaeologists conducted a records search at DAHP through the Web-based WISAARD database. Information regarding previous cultural resources efforts in and within a 0.4-kilometer (0.25-mile) radius of the APE was obtained. This information consisted of, but was not limited to, previous cultural resources survey reports and archaeological site records.

Fourteen cultural resources studies were previously completed within a 0.25-mile radius of the APE after 1995. A listing of these investigations is provided in Exhibit 3-1 including a brief explanation of the study's findings.

Exhibit 3-1. Previous Cultural Resources and Related Geotechnical Investigations

Author and Date	Report Title	Description	Results
Courtois 1998	Sound Transit Central Link Light Rail Draft EIS: Historic and Archaeological Resources Technical Report	Preformed a reconnaissance survey of the project area and recommended monitoring of construction activities in the area.	No sites were found in the APE.
Courtois 1999	Central Link Rail Transit Project: Historic and Prehistoric Archaeological Sites, Historic Resources, Native American Traditional Cultural Properties, Paleontological Sites	Preformed a reconnaissance survey of the project area and recommended monitoring of construction activities in the area,	No sites were found in the APE,
WSDOT 2006b	SR 520 Bridge Replacement and HOV Project Draft EIS: Cultural Resources Discipline Report	Conducted a field survey and excavated three SPs on Foster Island, south of SR 520.	No cultural materials were recovered from the probes. Additional ethnographic study and research were recommended to determine if Foster Island was a TCP.
Blukis Onat et al. 2005	Preliminary Ethnographic and Geoarchaeological Study of the SR 520 Bridge Replacement and HOV Project	Identified potentially archaeologically sensitive areas in the APE.	Recommended limited subsurface testing (SPs) to investigate sensitive areas.

Exhibit 3-1. Previous Cultural Resources and Related Geotechnical Investigations

Author and Date	Report Title	Description	Results
Blukis Onat et al. 2006	Addendum to the Preliminary Ethnographic and Geoarchaeological Study of the SR 520 Bridge Replacement and HOV Project, including the Pacific Interchange and Second Montlake Bridge Option	Amended the previously identified archaeologically sensitive areas to accommodate the updated APE.	Recommended limited subsurface testing (SPs).
Blukis Onat and Kiers 2007	Ethnographic and Geoarchaeological Study of the SR 520 Corridor and Archaeological Field Investigations in the SR 520 Bridge Replacement and HOV Project, including the Pacific Interchange and Second Montlake Bridge Option, King County, Washington	Conducted additional research, including gathering ethnographic documents and geoarchaeological background.	Identified Foster Island as a potential TCP. Recommended additional study to verify.
Blukis Onat et al. 2007	Tribal History of the SR 520 Corridor and Archaeological Field Investigations within the SR 520 Bridge Replacement and HOV Project	Conducted further research and oral history investigations to provide additional tribal history; 33 SPs, one 2x2 excavation block, and backhoe trenches were excavated to characterize and delineate landfill.	Identified Foster Island as a potential TCP. Recommended additional study to verify. Landfill investigations identified historic artifacts and human patella.
Goodman et al. 2008	Foster Island Seattle, Washington Ground-Penetrating Radar Survey July 23–26, 2008	Surveyed Foster Island with GPR to determine depositional history of island and if subsurface archaeological features or internments could be identified with this study method	Determined that this method of analysis was reliable for obtaining both research objectives, but further investigations were needed, covering a broader area, to confirm.
WSDOT 2010a	SR 520: I-5 to Medina Bridge Replacement and HOV Project Supplemental Draft EIS: Cultural Resources Discipline Report	Conducted additional research to more accurately define the historic shoreline and enhance the ethnographic understanding of Foster Island.	FHWA determined that Foster Island should be treated as an NRHP-eligible TCP. Recommended that a formal determination of eligibility is needed, as well as additional cultural resources investigations to determine the site boundaries.

Exhibit 3-1. Previous Cultural Resources and Related Geotechnical Investigations

Author and Date	Report Title	Description	Results
Schneyder et al. 2009	SR 520 Bridge Replacement and HOV Program: Historic Records and Map Research in Support of Cultural Resource Investigations of Foster Island and the Miller Street Landfill	Conducted extensive map research to supplement previous analysis of the Foster Island shoreline.	Produced figures demonstrating the variation and evolution of the Foster Island location and landform over the past 150 years.
WSDOT 2009	SR 520, Medina to SR 202: Eastside Transit and HOV Project Environmental Assessment: Cultural Resources Technical Memorandum	Conducted survey and shovel testing in the Eastside APE.	No sites found within the current APE. Historic road (45KI00945) located in the APE.
Walker Gray and Juell 2009	Cultural Resources Survey, Lake Washington Congestion Management Program, SR 520/I-90 Active Traffic Management Project	Conducted a windshield survey.	Overview. No fieldwork was conducted.
Bartoy 2010	I-90/SR 520 Urban Partnership Survey Agreement, Active Traffic Management System, Determination of No Effects and Request for Concurrence	Conducted a pedestrian survey of several locations along I-90 and SR 520; only two locations surveyed within APE.	No cultural resources identified in APE.
Schneyder et al. 2010	SR 520, I-5 to Medina: Bridge Replacement and HOV Project: NRHP Evaluation Report for the Miller Street Landfill (45KI760)	Research and evaluation of the Miller Street Landfill.	Determined that Miller Street Landfill is not eligible for listing in the NRHP.

TCP = traditional cultural property
SP = shovel probe

A total of 13 previously recorded archaeological resources (sites and isolates) are located within a 1.6-kilometer (1-mile) radius of the APE. Six of these resources are located inside the APE. Basic information regarding these sites and their NRHP status can be found below in Exhibits 3-2 and 3-3.

Exhibit 3-2. Previously Recorded Archaeological Resources within the APE

Site Number	Citation	Site Type	Project Segment	NRHP Evaluation
45KI760	Blukis Onat et al. 2007; Schneyder 2010	Miller Street Landfill	West Approach	Not Eligible
45KI761	Calvit and Bard 2005a	Submerged wooden vessel	Lake Washington	Not Eligible

Exhibit 3-2. Previously Recorded Archaeological Resources within the APE

Site Number	Citation	Site Type	Project Segment	NRHP Evaluation
45KI762	Calvit and Bard 2005b	Submerged barge	Lake Washington	Not Eligible
45KI763	Calvit and Bard 2005c	Submerged shipwreck	Lake Washington	Not Eligible
294.10-1	Elder et al. 2010a	Precontact isolate	West Approach	Not Evaluated
294.10-2	Elder et al. 2010b	Precontact isolate	West Approach	Not Evaluated

Exhibit 3-3. Previously Recorded Archaeological Resources within 1 Mile of the APE

Site Number	Citation	Site Type	NRHP Evaluation
45KI426	Mester 1992a	Submerged World War II Corsair	Potentially eligible
45KI433	Mester 1992b	Submerged coal cars	Potentially eligible
45KI945	Jordan et al. 2009	Historic road – Lake Washington Boulevard	Not evaluated
45KI952	Boggs 2009a	Isolated historic bottle	Not evaluated
45KI955	Boggs 2009b	Historic wood pipeline	Potentially eligible
45KI957	Louderback and Jolivette 2009	Precontact lithic scatter	Not evaluated
45KI980	Major 2010	Submerged tugboat	Potentially eligible

As shown in Exhibit 3-2, of the six resources within the APE, two are precontact and four are from the historic era. ICF discovered two isolated precontact tool fragments during cultural resources investigations on Foster Island (Elder et al. 2010a, 2010b). These isolated finds consisted of a single chert biface fragment and a fine-grained, volcanic, Cascade-style projectile point. These precontact isolates were found 40 meters apart in highly disturbed sediments, making it unlikely that they were in their primary depositional context. As such, each artifact was given a unique isolate number and they were not designated as a new site (Elder et al. 2010a, 2010b). The Miller Street Landfill (45KI760), located within the APE in the West Approach segment, is a site dating between 1912 and the 1930s. BOAS conducted extensive archaeological investigations to characterize the landfill deposits and delineate the site boundaries (Blukis Onat et al. 2007). Site 45KI761 consists of a damaged and degraded wooden vessel thought to be either a schooner or a steamer (Calvit and Bard 2005a). Two wooden barges (45KI762 and 45KI763) also lie at the bottom of Lake Washington (Calvit and Bard 2005b, 2005c). The barge identified as 45KI762 appears

to date from the early 1900s; barge 45KI763 does not have an associated date but markings indicate the vessel to be the Forest No. 15 from Aberdeen, Washington.

Seven archaeological resources, as shown in Exhibit 3-3, were located outside, but within 1.6 kilometers (1-mile), of the APE. Of the seven resources, one was precontact and the remaining six were from the historic era. Site 45KI957 is a precontact lithic scatter consisting of two quartzite flakes and a single side-notched chert projectile point (Louderback and Jolivette 2009). These artifacts were found below the surface in disturbed sediments, as evidenced from historic artifacts and modern debris identified within the same context. In 2009, as part of Sound Transit's University Link Light Rail Project, Boggs (2009a, 2009b) recorded a single historic, amber glass bottle that dated between 1920 and 1930 (45KI952) and a segment of wood stave pipe from an abandoned pipeline (45KI955).

An abandoned portion of Lake Washington Boulevard (45KI945) identified within the SR 520, Medina to SR 202 project APE, just outside of the SR 520, I-5 to Medina project's APE, was recorded in 2009. The site consisted of a two-lane asphalt roadway with a single amber glass bottle (Jordan et al. 2009). Site 45KI426 is a single engine World War II era Corsair aircraft (Mester 1992a), which sank as the result of a mid-air collision on July 26, 1950. Eighteen coal cars (45KI433) were cut loose from a sinking tugboat in 1875 and are distributed across an area of nearly 1.5 acres at the bottom of Lake Washington (Mester 1992b). Site 45KI980 has been identified as the wreck of the tugboat *S.L. Dowell*, which was built in Friday Harbor, Washington, in 1899 and wrecked off of Mercer Island in 1922 (Major 2010).

Of the six recorded archaeological resources within the APE, none have been determined eligible for the NRHP. Two precontact isolates were identified within the Foster Island portion of the APE; however, the isolates were clearly located within disturbed sediments and were not in primary context. These isolates were not evaluated for NRHP eligibility, but due to their lack of primary context, they were not recommended as potentially NRHP-eligible. The remaining four resources in the APE (45KI760, 45KI761, 45KI762, and 45KI763) have been determined not eligible for listing in the NRHP.

Of the seven sites located within 1.6 kilometers (1 mile) of the APE, three have not been evaluated for the NRHP, and four are thought to be potentially eligible for listing in the NRHP.

Historic Built Environment

A literature and records search was conducted using WISAARD to identify previously documented historic properties in the APE. WISAARD contains all records and reports on file with DAHP recorded since 1995. Ten cultural resources studies that included built environment resources were previously completed within the search area. A listing of these investigations, which provide information on the built environment results, is provided in Exhibit 3-4.

Exhibit 3-4. Previous Cultural Resources Studies with Built Environment Resources

Author and Date	Report Title	Description	Results
Courtois 1998	Sound Transit Central Link Light Rail Draft EIS: Historic and Archaeological Resources Technical Report	Performed reconnaissance survey of the project area.	73 individual historic properties, 2 historic districts, 2 historic district expansions, and 1 multiple property resource were identified.
Courtois 1999	Central Link Rail Transit Project: Historic and Prehistoric Archaeological Sites, Historic Resources, Native American Traditional Cultural Properties, Paleontological Sites	Performed reconnaissance survey of the project area.	74 individual historic properties, 2 historic districts, 2 historic district expansions, and 1 multiple property resource were identified.
WSDOT 2006b	SR 520 Bridge Replacement and HOV Project, Draft EIS: Cultural Resources Discipline Report	Performed intensive survey of the project area.	Numerous historic properties identified in the APE.
Gray 2008	Cultural Resources Survey of SR 520 Urban Partnership Agreement Variable Tolling Project, Evergreen Point Bridge, Seattle, Washington	Conducted a field survey.	Determined Evergreen Point Bridge is NRHP-eligible.
WSDOT 2010a	SR 520: I-5 to Medina Bridge Replacement and HOV Project, SDEIS: Cultural Resources Discipline Report	Performed intensive survey of the project area.	Numerous historic properties identified in the APE.
WSDOT 2009	SR 520, Medina to SR 202: Eastside Transit and HOV Project: Environmental Assessment, Cultural Resources Technical Memorandum	Conducted a built environment survey.	Three built environment NRHP-eligible properties and one WHR-eligible property identified.
Gray and Juell 2009	Cultural Resources Survey, Lake Washington Congestion Management Program, SR 520/I-90 Active Traffic Management Project	Conducted a windshield survey.	No newly identified cultural resources identified in the APE.

Exhibit 3-4. Previous Cultural Resources Studies with Built Environment Resources

Author and Date	Report Title	Description	Results
Bartoy 2010	I-90/SR 520 Urban Partnership Survey Agreement, Active Traffic Management System, Determination of No Effects and Request for Concurrence	Conducted a pedestrian survey of several locations along I-90 and SR 520; only two locations were surveyed in the APE.	No newly identified cultural resources identified in the APE.
WSDOT 2010b	SR 520 Bridge Replacement and HOV Project, SR 520 Pontoon Construction Project: Cultural Resources Discipline Report	Comprehensive assessment of all cultural resources within the project APE.	Three archaeological sites and six significant historic sites were identified within the APE,
Archer 2010	Request for Concurrence: Area of Potential Effects and Finding of No Adverse Effect; SR 520 Evergreen Point Toll Signing Project, King County, WA	Conducted a windshield survey of the project area.	No newly identified historic cultural resources identified in the APE.

A total of 22 historic properties were previously recorded in the APE. These properties occur in each of the project's study areas and at the potential pontoon production sites. The following sections summarize these properties by study area and include information about prior evaluations and NRHP eligibility. The properties in each study area and segment are listed by property identification numbers (ID#). See Attachment 3 to this Cultural Resources Assessment Discipline Report for copies of the forms for previously recorded properties. The geographic segments within the Seattle study area, as described in Section 1 of this report under the *Preferred Alternative* section, were established to organize the cultural resources within the APE in a manageable framework. The geographic segments discussed, and depicted in the exhibits in this document, may differ slightly from the supporting tables and from the segments used in other environmental documents prepared for the SR 520 Program. However, the number of historic properties within the APE is constant among all current analyses for the program.

Seattle Study Area

I 5/Roanoke Segment

The literature review identified six previously recorded historic properties in the I-5/Roanoke segment of the APE (Exhibit 3-5). (These properties are shown on the maps in Exhibits 6-2 a-j.)

Exhibit 3-5. Previously Recorded Historic Properties in the I-5/Roanoke Segment

ID#	Property Name	Street Address/ Location	Construction Date/Period of Significance	Eligibility Status
10	Denny-Fuhrman (Seward) School	2515 Boylston Avenue East	1893, 1905, 1917	Designated Seattle Landmark; Seward School Lunchroom and Gymnasium listed in the WHR
16	L'Amourita Apartment Building	2901 Franklin Avenue East	1909	NRHP-eligible and designated Seattle Landmark
37	Roanoke Park Historic District	Roughly bounded by East Roanoke Street, Harvard Avenue East, East Shelby Street, and 10th Avenue East	1899–1939	NRHP-listed under Criteria A and C; 80 contributing elements out of 101 properties (including individually listed William H. Parsons House); WHR-listed
38	William H. Parsons House	2706 Harvard Avenue East	1903	Individually NRHP-listed under Criteria A and C and contributing element of Roanoke Park Historic District; designated Seattle Landmark
600	Lake Washington Ship Canal Bridge	I-5 Bridge over Lake Washington Ship Canal	1958	NRHP-eligible under Criteria A and C
601	University Bridge	Spans Lake Washington Ship Canal in Portage Bay	1919	NRHP-eligible under Criteria A and C

Portage Bay Segment

The literature review identified no previously recorded historic properties in the Portage Bay segment of the APE.

Montlake Segment

The literature review identified six previously recorded historic properties in the Montlake segment (Exhibit 3-6). (These properties are shown on the maps in Exhibits 6-2 a-j.)

Exhibit 3-6. Previously Recorded Historic Properties in the Montlake Segment

ID#	Property Name	Street Address/ Location	Construction Date/Period of Significance	Eligibility Status
53	Montlake Cut	Lake Washington Ship Canal	1916	NRHP-listed under Criteria A and C as part of Lake Washington Ship Canal multiple property listing; designated Seattle Landmark
54	Montlake Bridge	Over the Lake Washington Ship Canal	1924	NRHP-listed under Criteria A and C (Historic Bridges/Tunnels in Washington State); and designated Seattle Landmark
55	Seattle Yacht Club—Main Station	1807 East Hamlin Street	1919	NRHP-listed under Criterion A, WHR-listed, and designated Seattle Landmark
126	Montlake Community Center	1618 East Calhoun Street	1935	Designated Seattle Landmark; not previously evaluated for NRHP eligibility
203	Canoe House (Naval Military Hangar/ University Shell House)	UW Campus	1918	NRHP-listed under Criterion C
215	Nuclear Reactor Building (More Hall Annex)	UW Campus	1961	NRHP-listed under Criteria A and C

West Approach Segment

The literature review identified two previously recorded historic properties in the West Approach segment, both within the boundaries of the Arboretum. The Seattle Japanese Garden (ID# 200) was built in 1960 and is a designated Seattle Landmark, but has not been evaluated for NRHP eligibility. The Arboretum Aqueduct (also called the Arboretum Sewer Trestle) (ID# 210), which passes over Lake Washington Boulevard in the Arboretum, was built in 1912. It is listed in the NRHP under Criterion C as part of the Historic Bridges and Tunnels in Washington State nomination, is listed in the WHR, and is a designated Seattle Landmark. (These properties are shown on the maps in Exhibits 6-2 a-j.)

Lake Washington Study Area

The literature review identified one previously recorded historic property in the APE in the Lake Washington study area. The Evergreen Point Bridge (ID# 206), built in 1968, was previously determined eligible for listing in the NRHP. Although it has not yet reached

50 years of age, it was considered eligible for listing in the NRHP under Criteria Consideration G for its exceptional importance. It is eligible for listing in the NRHP under Criteria A and C. The SHPO concurred with this eligibility determination in January 2009. (This property is shown on the maps in Exhibits 6-2 a-j.)

Eastside Transition Study Area

The literature review identified one previously recorded historic property in the Eastside transition study area. The James Arntson House (ID# 235) at 2851 Evergreen Point Road is eligible for listing in the NRHP under Criterion C. An additional property, the Helen Pierce House (ID# 232) at 2857 Evergreen Point Road, is not eligible for listing in the NRHP, but could be eligible for listing in the WHR. (These properties are shown on the maps in Exhibits 6-2 a-j.)

Pontoon Production Sites

The literature review identified seven previously recorded historic properties in the potential pontoon production sites (Exhibit 3-7). The Hylebos Bridge at the Port of Tacoma was previously determined not eligible for listing in the NRHP, but is eligible for listing in the WHR. (These properties are shown on the map in Exhibit 6-36.)

Exhibit 3-7. Previously Recorded Historic Properties in the Potential Pontoon Production Sites

ID#	Property Name	Street Address/ Location	Construction Date/Period of Significance	Eligibility Status
702	Fire Station #15	3510 East 11th Street, Tacoma	1928–1929	NRHP-listed under Criteria A and C
703	CTC—Administration Building	1123 Port of Tacoma Road, Tacoma	1956	NRHP-eligible under Criteria A and C as contributor to historic district
704	CTC—Research Building	1123 Port of Tacoma Road, Tacoma	1951	NRHP-eligible under Criteria A and C as contributor to historic district
705	CTC—Laboratory Building	1123 Port of Tacoma Road, Tacoma	1951	NRHP-eligible under Criteria A and C as contributor to historic district
706	CTC—Structural Plant	1123 Port of Tacoma Road, Tacoma	1956	NRHP-eligible under Criteria A and C as contributor to historic district
802	Port of Olympia Office	915 Washington Street, Olympia	1944	NRHP-eligible under Criterion C

Potential Section 6(f) Replacement Sites

The literature review did not result in the identification of previously recorded historic properties at the potential Section 6(f) replacement sites.

4. Environmental and Cultural Setting

Environmental Setting

Geology

The APE is located within the Puget Lowland, a structural and topographic basin that lies between the Cascade Range and Olympic Mountains. The modern topography of the Puget Sound basin is primarily the result of three forces:

- Surface scouring and moraine formation caused by the most recent glacial advance, known as the Vashon stade of the Fraser glaciations, which took place in Puget Sound between 18,750 and 16,950 years ago (Booth 1994; Porter and Swanson 1998)
- Deposition of glacial sediments caused by glacial retreat between 16,950 and 16,400 years ago (Booth and Goldstein 1994; Booth et al. 2009; Porter and Swanson 1998).
- Post-glacial infilling of valleys and recessional meltwater channels (Troost and Booth 2008).

During the Vashon stade, Seattle was covered with glacial ice from 17,400 years ago to around 16,400 years ago. As glacial ice advanced into Puget Sound, glacial melt- and streamwater accumulated against the southern margins of the continental ice sheet, creating a series of meltwater lakes, which drained to the Chehalis River through a network of spillways located around Olympia. As glacial ice began to recede, but still blocked the Strait of Juan de Fuca, these glacial lakes enlarged. One such lake, Glacial Lake Russell, enlarged northward as the glaciers retreated, and combined with other lakes as it expanded. At its maximum extent, Glacial Lake Russell covered much of the lowland surface between present-day Olympia and Whidbey Island, with relict shorelines extending as much as 330 feet above modern sea level in the Seattle area (Troost and Booth 2008).

As glacial ice continued to retreat, a second lower elevation spillway, the Chimacum valley, was exposed. The exposure of this spillway resulted in an abrupt lowering of water levels to approximately 100 feet

above modern sea level, creating relict shorelines around the Seattle area (Haugerud 2006, as cited in Troost and Booth 2008).

Once glacial ice receded north of the Olympic Peninsula, meltwater began to drain into the Strait of Juan de Fuca, and mixed with rapidly incurring marine water. Marine water backfilled the lowland areas previously occupied by proglacial lakes, including the location of present-day Lake Washington (Diether et al. 1995).

Lake Washington remained inundated with marine water until around 16,000 years ago, when the Cedar River delta formed an outlet that was above sea level at the time (Gould and Budinger 1958). At around 3,500 years ago, a rapidly aggrading Black River floodplain isolated Lake Washington from Puget Sound. After Lake Washington was cut off from Puget Sound, lake levels changed independent of the tides, rising to around 30 feet above sea level at their peak prior to 1916. With the construction of the Lake Washington Ship Canal in 1916, lake levels were lowered by around 9 feet (Hodges 2010). Exhibit 4-1 shows major drainages and water bodies in the Seattle area.

The APE spans several landforms formed during the Pleistocene epoch and modified during the historic and modern eras. The following discussion outlines the variety, age, and distribution of landforms across the APE. This information was obtained from two geologic maps, overlaid with the limits of construction and LiDAR imagery. In developing these maps, boundaries for geologic units were defined from previous field mapping of outcrops and excavations, subsurface data, topographic and geomorphic analysis, and in the case of Booth et al. (2009), preexisting geologic maps of the vicinity. As a result, some of the boundaries for geologic units are inferred, and have not been subject to ground-truthing.

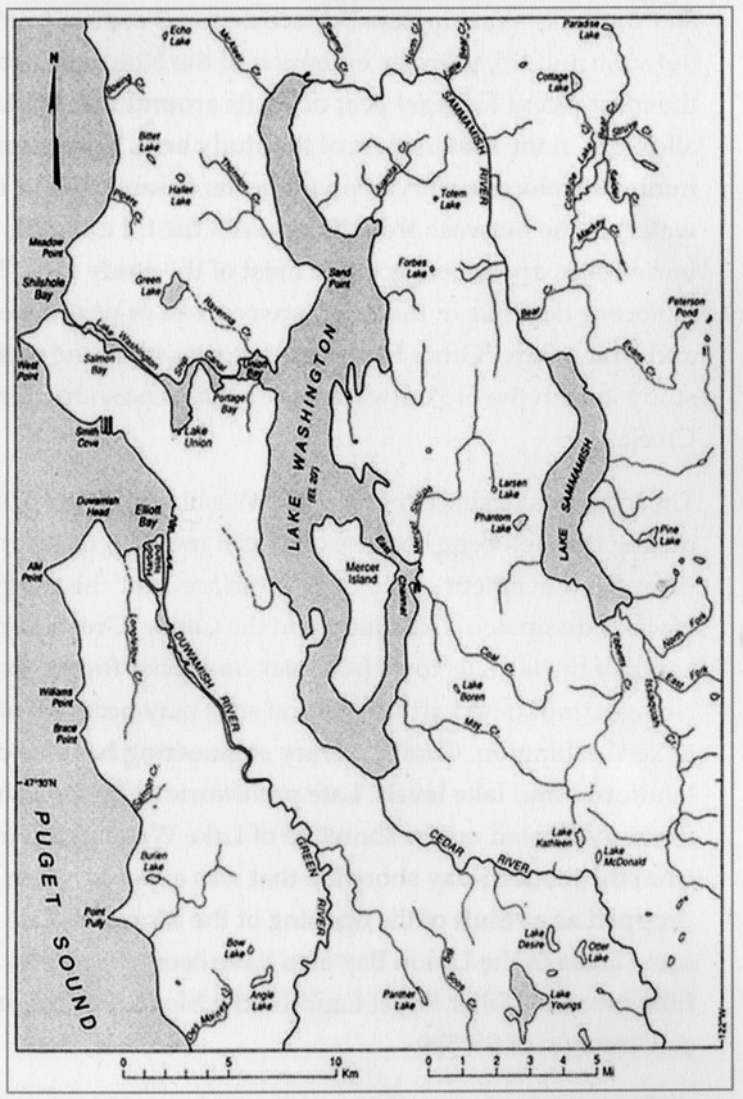

Exhibit 4-1. Map Showing Major Drainages and Water Bodies of the Seattle Area *(Galster and Laprade 1991:245).*

In mapping the surface expression of geologic units in North Seattle, Booth et al. (2009) provided geologic data for the ground surface of the APE on the west side of Lake Washington. Eight geologic units are identified in the APE on the west side of Lake Washington. Pleistocene-aged deposits are widely distributed across the APE ground surface and tend to be located above the historic and modern elevations of Lake Washington and Lake Union. Till (Qt), for example, is the most widespread geologic unit in the western portion of the APE, and is most commonly encountered on upland plains. Holocene-aged deposits are located near the modern shoreline of Lake Washington, consist of peat (Qp) and silt/clay (Ql) deposits, and likely represent areas that were inundated by Lake Washington prior to the lowering of the lake in 1916.

Mapping of the surface expression of geologic units on the east side of Lake Washington was conducted by Waldron et al. (1962); no subsequent geologic maps have been completed for this area since 1962. Using this map, three geologic units are identified in the APE on the east side of Lake Washington.

Pleistocene-aged deposits are widely distributed across the ground surface of the eastern portion of the APE (located on the east side of Lake Washington). Like the west side of Lake Washington, till (Qt) is the most widespread geologic unit in this portion of the APE. Holocene-aged sediments are located in a small segment of land in the APE, adjacent to an unnamed stream that drains into Fairweather Bay north of the APE.

Flora and Fauna

The APE is located in the Puget Sound area subtype of the western hemlock (*Tsuga heterophylla*) vegetation zone. Softwoods such as Douglas fir (*Pseudotsuga menzesii*), western hemlock, and western red cedar (*Thuja plicata*) are the dominant tree species in the region, while hardwoods such as red alder (*Alnus rubra*) and bigleaf maple (*Acer macrophyllum*) are generally subordinate and found near water courses or riparian habitats. Garry oak (*Quercus garryana*) groves are found in lower elevations. In some areas, stands of pines (*Pinus* spp.) are major forest constituents, along with Douglas fir (Franklin and Dyrness 1988). Understory shrubs with potential food and resource value in the western hemlock zone include, but are not limited to, swordfern (*Polystichum muritum*), bracken fern (*Pteridium aquilinum*), Oregon grape (*Mahonia aquifolium*), vine maple (*Acer circinatum*), blackberry (*Rubus*

spp.), ocean spray (*Holodiscus discolor*), salal (*Gaultheria shallon*), blueberries and huckleberries (*Vaccinium* spp.), and red elderberry (*Sambucus racemosa*). Wapato (*Sagittaria latifolia*), another traditionally important plant resource, would have been available in inundated wetland areas along lake and stream margins.

Terrestrial faunal resources in the region historically include, but are not limited to, mule deer (*Odocoileus hemionus*), elk (*Cervus elaphus*), cougar (*Puma concolor*), wolf (*Canis lupus*), coyote (*Canis latrans*), black bear (*Ursus americanus*), squirrels (*Scirius* sp.), muskrat (*Ondatra* sp.), and raccoon (*Procyon lotor*) (Dalquest 1948). Ducks and geese (*Anas* spp.) are seasonally abundant in the area (Kruckeberg 1995).

Cultural Setting

Precontact Context

Precontact cultural chronologies of the Pacific Northwest and the Puget Sound area have been developed by numerous archaeologists (including, but not limited to, Kidd 1964; Greengo and Houston 1970; Nelson 1990; Matson and Coupland 1995; Ames and Maschner 1999; Blukis Onat et al. 2001). The cultural chronology summarized in this section divides precontact cultural sequences into multiple phases or periods, which include the time from about 12,500 years ago to 225 years ago (approximately when Euroamerican contact began). Phases or periods are usually defined by patterns in land use, subsistence, and tool types, and delineated by changes in these patterns. Local chronologies tend to follow similar broad patterns but rarely have congruent phase or period delineations (Exhibit 4-2). Cultural chronologies provide a useful framework for analysis, but do not necessarily reflect tribal views of history, cultural boundaries, affiliations, or time.

This document uses the cultural chronology developed by Ames and Maschner (1999) for the Pacific Northwest coast to provide the necessary temporal structure for discussion of Pacific Northwest and Puget Sound archaeology. This chronology was developed for the Pacific Northwest region—of which Puget Sound is a part—and incorporates data from Canada and Alaska.

Exhibit 4-2. Northwest Coast Phases

Years Before Present	Northwest Coast Chronology Ames and Maschner 1999	Gulf of Georgia Matson and Coupland 1995	San Juan Islands King 1950	Western Washington Greengo and Houston 1964	Cascade Region of Puget Sound Blukis Onat 2001
500	Late Pacific	Gulf of Georgia	Late	Late Period	
1000					
1500		Marpole			
2000	Middle Pacific		Maritime		
2500					
3000		Locarno Beach	Developmental		
3500				Middle Period	
4000	Early Pacific	St. Mungo			
4500					
5000		Old Cordilleran	Island		
5500				Early Period	
6000					Tolt
6500	Archaic				
7000					
7500					
8000					
8500					
9000					
9500					
10,000					
10,500					
11,000					
11,500					
12,000					
12,500					
13,000	Paleo-Indian				
13,500					
14,000					
14,500					
15,000 +					

Puget Sound is located near the southern extent of this cultural region but follows the general trends of this chronology. The sequence includes five periods, provided below:

- Paleo-Indian (prior to 12,500 years ago)
- Archaic (12,500 years ago to 6,400 years ago)
- Early Pacific (6,400 years ago to 3,800 years ago)
- Middle Pacific (3,800 years ago to 1,800/1,500 years ago)
- Late Pacific (1,800/1,500 years ago to around 225 years ago)

The following section summarizes Puget Sound prehistory, sorted by the cultural sequence periods provided by Ames and Maschner (1999).

Paleo-Indian Period (prior to 12,500 years ago)

Few identified archaeological sites in North America undisputedly date earlier than 14,500 years ago, and none are located within the Puget Sound area (Meltzer 2003). The Clovis culture represents the first undisputed consensus evidence for human occupation on the continent, although an increasing amount of research in support of earlier human occupations (Erlandson et al. 2007; Dillehay et al. 2008; Thomas et al. 2008) continues to challenge this view. This culture, dated between 12,800 and 12,500 years ago in other regions, is identified by characteristically large-fluted stone bifaces and bone technology. Clovis assemblages are characterized by extensive bone and stone technology and, on the west coast of North America, a wide but sparse distribution of sites (Ames and Maschner 1999). Based on these data, it is hypothesized that the Clovis people were highly mobile terrestrial mammal hunters (Bonnichsen and Turnmire 1991; Waguespack and Surovell 2003).

Although there are no confirmed Clovis site assemblages in the Puget Sound area, at least seven isolated Clovis style points have been collected. Isolated Clovis points have been found on the southern shore of Penn Cove on Whidbey Island (45IS112, Wessen 1988), east of Port Orchard on southeast Kitsap Peninsula (45KP139, Stein et al. 2004), southeast of Seattle in Hamilton Bog (45KI215, Avey 1991), and have been identified in private collections in the Chehalis River Valley south of Olympia (Avey 1991), west of Olympia in the Black Hills (Avey 1991), on Anderson Island just west of Steilacoom (Avey 1991), and near Waughop Lake in Pierce County (Avey 1991). These Clovis isolates are typically part of private collections, lacking precise provenience information. However, even without precise provenience, their

distribution indicates widespread land use by the Clovis culture within Puget Sound.

Recently, Hodges et al. (2009) reported the presence of an archaeological site consisting of two flakes at Bear Creek in Redmond, Washington (45KI839), which dated between 8,730 and 10,180 years ago. Subsequent data recovery excavations revealed the presence of an extensive artifact assemblage that included projectile points, bifaces, expedient tools, and debitage. Two projectile point fragments exhibited some diagnostic attributes associated with both Clovis and later lithic technologies. Many of the artifacts (including the two point fragments) were recovered from sediments that were located below peats dated to between 8,420 and 9,840 years ago. A radiocarbon date of 12,820 years ago from detrital charcoal within sediments below the peat layer was physically associated with—but perhaps not directly related to—these artifacts (Kopperl et al. 2010). Regardless, the site contains unambiguous archaeological materials from a well-defined stratigraphic context and represents the oldest such assemblage in Washington.

The Manis mastadon site (45CA218) is one possible Paleo-Indian period site in western Washington. This site is located on the Olympic Peninsula near Sequim and contains the 12,800-year-old remains of a Mastodon (*Mammut americanum*) with a possible bone point lodged in one of the ribs. The site investigators concluded that the possible point was likely human-manufactured (Gustafson et al. 1979). The cultural origin of this site is still subject to debate, however. If it does represent human activity, it would represent a site contemporaneous with Clovis-era sites.

Site 45SJ454 located on Orcas Island may contain evidence for human occupation. The site includes the remains of a now-extinct bison species (*Bison antiquus*), dated from 13,740 to 13,460 years ago (Wilson et al. 2009). The bison remains exhibit modifications (fractures, cut marks, abrasion, polish), which are thought to indicate human butchering (Kenady et al. 2007). If substantiated, this site may represent a pre-Clovis occupation of western Washington.

Firmly established Paleo-Indian sites and artifacts are geographically widespread and rare in the greater Puget Sound region. Controversy surrounding sites such as Manis and 45SJ454 indicate investigators' interest in discovering sites from this era and spur new research (Wilson et al. 2009). Given that most of the previously identified Paleo-

Indian period archaeological sites in Puget Sound have been discovered in association with peat deposits on till plains, isolates and sites associated with Paleo-Indian occupations are likely to be found on these landforms.

Archaic Period (12,500 to 6,400 years ago)

Although less common than Pacific-period sites discussed below, numerous Archaic-period archaeological sites can be found throughout the Pacific Northwest. According to Ames and Maschner (1999), Archaic-period sites are characterized by a pattern of generalized resource use (terrestrial and aquatic resources), cobble and cobble flake tools, the emergence of microblade technology in some areas, leaf-shaped bifaces, and a wide spatial distribution in multiple environments.

Archaic-period sites situated in littoral zones are uncommon on the southern Pacific Northwest coast. It is likely that most littoral archaic sites have been submerged and/or deeply buried as a result of rapid eustatic sea-level rise since the end of the Pleistocene epoch (Ames and Maschner 1999) and valleys infilling with sediment since the early Holocene (Troost and Booth 2008). However, the Glenrose Cannery site located just north of Puget Sound on the Fraser River contains Archaic-period occupations situated ideally for littoral exploitation. The Archaic-period component (a discrete, culturally homogenous stratigraphic unit) of the Glenrose Cannery site was used between 9,000 and 6,300 years ago, based on radiocarbon dating of hearth features (Matson and Coupland 1995). This component contains large leaf-shaped bifaces, cobble and cobble flake tools, and antler wedges, but lacks microblades. In addition to tools, the component contains the remains of terrestrial resources (deer and elk) and a diverse array of aquatic resources from numerous marine environments (Matson and Coupland 1995). No littoral archaeological sites attributed to the Archaic period have been identified in Puget Sound.

Throughout Puget Sound, sites with heavily weathered basalt flakes, cores, and lanceolate or Cascade-style points are commonly assigned to the Archaic period. These “Olcott complex sites” are named for a discrete artifact assemblage that embodied the attributes of Early period archaeological sites, both of which are defined by Kidd (1964). Later, Nelson (1976) used the term to define a portion of a precontact cultural sequence that he developed for Puget Sound, giving "Olcott" a definition based on both age and assemblage composition. Subsequent

use of the term has been inconsistent and has led to some confusion (Dancey 1969; Stilson and Chatters 1981; Morgan 1999). Based on well-dated stylistic comparisons from the Glenrose Cannery site, Nelson (1990) suggests that Olcott complex sites are comparable in age and date between 10,000 and 6,000 years ago. However, several investigators have noted that leaf-shaped points are found in a variety of contexts that range from 9,950 to 2,260 years in age (Blukis Onat et al. 2001; Greengo and Houston 1970; Shong et al. 2007). By their very definition, Olcott sites lack faunal remains and datable features and are typically unstratified, which makes their temporal assignment tenuous. Investigators have variously attributed this lack of materials to acidic soils and bioturbation (Nelson 1990). The fact remains that these sites, often attributed to the Archaic period, are enigmatic because of their lack of associated dates.

Several riverine and upland Archaic-period sites are located in the southern Pacific Northwest. Of these, few contain faunal materials; however, some exceptions exist. The Roadcut Site (35WS4, 35WS8) near the Dalles, Oregon, on the Columbia River contained up to 250,000 salmon remains that date between 9,500 and 7,600 years ago (Cressman 1960; Butler 1993). This site represents early and heavy salmon exploitation on a scale rarely seen elsewhere on the southern Northwest Coast and indicates that the region's inhabitants exploited riverine resources much earlier than once thought. Another archaeological site (45LE223) located south of Mount Rainier contained stratified archaeological deposits (Daugherty et al. 1987). These deposits included a hearth feature, hundreds of flake tools, and deer bones (*Odocoileus* spp.). A single basalt point was recovered from the uppermost component of the Manis site dated to just before 6,700 years ago, but contained no faunal remains (Gustafson 1985).

Site 45KI464 located on the Tolt River dates from 7,700 to 4,100 years ago and includes an Olcott component (Blukis Onat 2001). The site is not well-stratified and includes artifacts typically associated with the Archaic period (leaf-shaped points, large flake and cobble artifacts, and microblades), as well as corner-notched and shouldered points that may reflect later more ephemeral, task-specific use of the site circa 3,000 years ago.

In summary, Archaic-period archaeological sites in Puget Sound tend to lack stratified archaeological deposits as well as faunal remains. Analysis of the spatial distribution of sites and variety of artifact types, combined with inferred function from similar assemblages outside of

the region, indicate that the people from this period inhabited upland areas near rivers and exploited terrestrial and riverine resources. The absence of littoral Archaic sites in Puget Sound is more likely a function of Holocene sea level rise and drainage infilling than a pattern in early Holocene human settlement and subsistence strategies.

Early Pacific Period (6,400 to 3,800 years ago)

During the Early Pacific period, sea levels began to stabilize. As a result of this stabilization, many of the area's river outlets began to develop habitats similar to modern estuaries. This estuary formation and subsequent salmon colonization has been cited as the driving force behind socioeconomic development within the Pacific Northwest (Fladmark 1975). Large shell middens appear at this time, although earlier presence of such shell middens is probably masked by fluctuations in sea level. Artifact assemblages are dominated by bone tools, and may in part be a reflection of the better preservation conditions provided by shell middens (Linse 1992). Increased frequency of groundstone tools at sites from this time period indicates an increased time investment in the creation of technology.

West Point (45KI428 and 45KI429) cultural component 1 is dated from 4,250 to 3,500 years ago (Larson and Lewarch 1995). A suite of 68 radiocarbon dates from this site indicates it was occupied from approximately 4,200 to 200 years ago with a nearly 1,000-year hiatus in use circa 2,350 to 1,500 years ago. The site's location in a littoral setting and the high diversity of both terrestrial and marine fauna within the deposits indicate a well-adapted and broad spectrum subsistence regime, as indicated in Ames and Maschner's (1999) early period sketch. There is little evidence of food storage, and subsistence appears to be geared toward resources within the intertidal zone. The appearance of a single T-shaped labret is indicative of ethnographically observed expression of social inequality in the region (Ames 1994). Other finely crafted decorative objects such as gaming pieces, a blanket pin, and a "bracelet" fragment demonstrate the development of art and may indicate some form of social inequality (Ames 2007).

Site 45PI72 is a small shell midden on the Nisqually delta that dates to approximately 5,200 years ago (Wessen 1988). This is the oldest shell midden on Puget Sound and, while some issues are apparent with the dating sequence, the site as a whole indicates generalized exploitation of both littoral and terrestrial fauna. There is no groundstone from this site and chipped stone dominates the artifact assemblage, which is

principally composed of non-local materials and cryptocrystalline silicates, unlike West Point (see above).

Early occupations at the Sequim bypass sites (45CA426 and 45CA433) have been interpreted as Olcott, yet the earliest dates from these sites fall squarely within the Early Pacific period (Morgan 1999). The artifact assemblages from these upland sites are overwhelmingly dominated by chipped stone artifacts made of locally available dacite. Cobble tools from the site indicate animal and perhaps wood processing were the primary activities of the site's occupants. Subsistence-related data are generally lacking from this period, but terrestrial game almost assuredly played a large role in the occupants' foodways given the high frequency of projectile points recovered. A large number of microblades were also recovered from this occupation. Stone tools from these sites (leaf-shaped points, microblades, and cobble tools) are more similar to Archaic-period occupations, but may be more indicative of a seasonally occupied hunting camp that was used intermittently throughout the middle Holocene.

Materials recovered from West Point component 1 and 45PI72 are in line with general trends as discussed by Ames and Maschner (1999) for this period—both indicate generalized subsistence associated with increased access to littoral resources. The upland location of 45CA426 and 45CA433 may suggest subsistence was less oriented toward exploitation of littoral resources, although the Straits of Georgia lay nearby. Finely crafted artifacts from West Point are not observed within the 45PI72, 45CA426, or 45CA433 assemblages; however, each site has a high occurrence of chipped stone materials which are locally derived at West Point and the Sequim sites, but are likely non-local at 45PI72.

Middle Pacific Period (3,800 to 1,800/1,500 years ago)

The Middle Pacific period is characterized by a cultural florescence throughout the Pacific Northwest (Ames and Maschner 1999). The development of art similar to ethnographically documented styles and early permanent social inequality—two of the hallmarks of Pacific Northwest cultures—took place during this time. Technological innovation and intensification in the form of increasingly complex composite food-procurement technology (e.g., toggling harpoons, fish weirs) and greater numbers of groundstone artifacts may be the result of continued environmental stability. Decreased mobility at this time is indicated by the development of large wooden plank houses,

sometimes together in villages, which may have contributed to the development of social inequality across the region (Schalk 1977; Ames 1994). This period is also characterized by increased warfare and interpersonal violence, as evidenced by physical trauma indicators observed in burials from this time (Ames and Maschner 1999).

Cultural components 2 and 3 at West Point (45KI428 and 45KI429) are dated to the Middle Pacific period (Larson and Lewarch 1995). Year-round occupation with a broad-spectrum diet continued at the site until approximately 2,700 years ago when sea-level rise appears to have greatly affected site function, limiting both site use during the year and the number of activities performed. The artifact assemblages from these components are not indicative of the regional trend toward technological intensification. Both the modified bone and groundstone assemblages are diverse, but present a picture of more utilitarian tool use and production than might be expected from the Pacific period chronology (Ames and Maschner 1999). A similar trend is noted in the chipped stone assemblage, which appears to be derived primarily from on-site cobbles. A single labret recovered from component 2 suggests continued social inequality at this time, while the presence of beads and finely crafted pendants, bracelets, and blanket pins provide early evidence for art and may also indicate social inequality. An increase in the frequency of clams and salmon cranial elements may be indicative of increased storage activities during component 2, since there is ethnographic evidence for processing of both resources for storage. This increase in the frequency of clams and salmon elements is not continued in component 3. Late to Middle period use of the West Point site (component 3) is indicative of food procurement and land use activities associated with the decreased mobility observed elsewhere during this time. Other sites in the region contemporaneous with component 3 at West Point afford a view of littoral-situated "village life" during this time.

Inundated or “wet” archaeological sites provide a unique opportunity to recover and analyze artifacts that would have otherwise perished but for the anaerobic conditions that preserve them. One such site, the Biederbost site (45SN100), was occupied approximately 2,000 years ago and includes several perishable artifacts (Nelson 1976; Miss 1991). Excavations at this waterlogged site yielded numerous baskets, bone, and wood and bark items, as well as ground stone implements like adzes that were probably ubiquitous at similar long-term occupation

sites. Numerous net weights and evidence of fish weirs from this site indicate exploitation of fish.

Non-littoral sites with datable materials are more common during the Middle Pacific period than in previous periods. Site 45KI11 is situated near the northeastern edge of Lake Washington, along what used to be the Sammamish River (Shong et al. 2007). Two radiocarbon dates from this site indicate that it dates to approximately 2,700 years ago. However, patinated lithic materials, commonly associated with the Olcott complex, and a single obsidian microblade were recovered during excavations. Excavations at Marymoor (45KI9) yielded similar materials dated to approximately this period as well (Greengo and Houston 1970). Highly fragmented and calcined faunal remains and a generally expedient lithic assemblage suggest the site was used as a processing location. Sites such as 45KI11 and 45KI9, which exhibit technologies attributed to earlier periods, like microblades, suggest the use of these tool types may be temporally less discrete than is suggested by Ames and Maschner (1999).

Late Pacific Period (1,800/1,500 to 225 years ago)

The Late Pacific period is characterized by continued environmental stability and what researchers have suggested is cultural stasis, with generally consistent lifeways throughout the approximately 1,600 years of this period (Ames and Maschner 1999). It is probable that cultural practices observed archaeologically during this period are an early expression of ethnographically observed lifeways. However, the presumption of pre- and postcontact cultural continuity across western North America has been challenged (Lightfoot 1995; Martindale 2009). Analysis of faunal materials from numerous coastal and riverine sites in the south-central Pacific Northwest indicate that salmon remained an important, consistently exploited, resource in the region (Butler and Campbell 2004). There is a sharp increase in inferred warfare on a regional scale that is coupled with a peak regional population circa 1,000 years ago (Ames and Maschner 1999). Burial customs become highly variable during this period as well.

West Point (45KI428 and 45KI429) components 4 and 5 date to 1,450 to 700 years ago and 700 to 200 years ago, respectively, and appear to represent limited use of the site during the spring and summer (Larson and Lewarch 1995). The few modified bone and antler tools from this site indicate a continuance of woodworking and fishing activities at the site; this is perhaps a reflection of subsistence and land use similar to

observed ethnographic patterns. Additionally, Larson and Lewarch (1995) note that the large numbers of clams recovered from these components may be an early expression of historic clam-drying practices along Elliot Bay.

Riverine sites in the southern Puget Sound occupied within the last 1,500 years appear to closely reflect the ethnographically documented lifeways in the region. *Tualdad Altu* (45KI59) or "King Salmon's House," located in Renton, was a village that contained several nearly 60-foot-long houses, which were apparently occupied year-round, starting 1,500 years ago and ending just a few decades later (Chatters 1987). The site takes its name from a nearby Duwamish fishing location; its location on the Black River floodplain allowed occupants access to Chinook (*O. tshawytscha*) and steelhead (*O. mykiss*), which in typical Northwest Coast fashion they dried and preserved for winter consumption. The modified bone and antler assemblage from the site is much more elaborate than that from West Point (45KI428 and 45KI429) and includes multi-valve harpoon points, unilaterally barbed points, and zoomorphic effigies. Evidence for social differentiation at the site is observed in intra-site spatial distributions of faunal remains and artifacts. Other riverine sites in the general area suggest a similarly heavy use of salmon. *Sbabadid* (45KI51), also located on the Black River and occupied close to the same time as 45KI501, yielded evidence of heavy salmon use, but also many items of personal adornment and evidence of long-term occupation and social differentiation (Larson and Lewarch 1995).

Other sites in the Puget Sound region attest to the importance of salmon. The Renton High School site (45KI501) and the Allentown and White Lake sites (45KI438 and 45KI438A) were used within the last approximately 500 years and are ideally located for salmon exploitation and processing. These sites are dominated by salmon remains and reflect seasonally occupied fishing camps. These types of sites would have been necessary for the logistically organized inhabitants of the area and likely provided a great deal of the foodstuffs for the population, which peaked in the region during this late period (Chatters 1987).

Ethnographic Context

The land within and adjacent to the SR 520 corridor was originally a long sequence of bays, streams, and lakes inhabited by a group of

Duwamish people known to European pioneers as the Lakes people (Miller and Blukis Onat 2004). Other groups, who inhabited the broader Seattle area and also used these vital transportation corridors that linked Lake Washington to Puget Sound, include descendants of the Duwamish people who are now members of several federally recognized tribes, including the Muckleshoot Indian Tribe, Snoqualmie Tribe, Suquamish Tribe, and Tulalip Tribes, as well as the non-federally recognized Duwamish Tribe (see the 2009 *SR 520: I-5 to Medina Bridge Replacement and HOV Project Cultural Resources Discipline Report* in Attachment 7 to the Final EIS).

Although the assignment of ethnographically documented places to specific physical locations can be ambiguous, several settlements, both permanent and temporary, were located within the APE. Here, as well as the broader lake areas, the Lakes people cultivated and harvested the aquatic resources from the various basins and drainages. The marshes and adjoining woodlands were sources of abundant freshwater plants, freshwater animals, anadromous fish, terrestrial mammals, plants, aquatic birds, and migratory birds. Evidence of the size and time span of the occupation is seen in the number of named places that have been previously recorded (Blukis Onat and Kiers 2007). Waterman (1922) has identified eight named places that fall within the project corridor. These recorded place names included several transportation routes, collection areas, and settlements (Waterman 1922).

Historic Setting

The first European to enter Puget Sound was Captain George Vancouver, an officer in the British Royal Navy. In command of the ship *Discovery*, Vancouver embarked on an expedition to explore the Pacific region in 1791 with diplomatic, commercial, and scientific goals. Naming the body of water after his lieutenant, Vancouver explored Puget Sound in 1792 and named many other geographic features along the way (Bagley 1916). After Vancouver, the next to explore the area was Charles Wilkes in 1841. Wilkes, an American, surveyed the North American Pacific coast and is credited with naming Elliott Bay after his midshipman (Thomas 2004).

Within a few years, the fledging United States secured its claim on the Oregon Territory, encompassing the areas today known as the states of Oregon and Washington. Under the Oregon Treaty of 1846, settlement throughout the Pacific Northwest began in earnest, as Americans were

attracted to the green, expansive valleys (Hayes 1999). Immigration accelerated with the Donation Land Claim Act of 1850 and the Homestead Act of 1862, both of which lured settlers to the area with the promise of free land (McCarthy 2009). In the fall of 1851, a group of Midwestern settlers, led by Arthur Denny, arrived at what is now Alki Beach in West Seattle. Shortly thereafter, they moved eastward across Elliott Bay to a place called *Duwamps* or the Little Crossing-Over Place. Much preferring this second location to the windswept beach, the Denny party settled and renamed the community after the local Native American leader, Chief Seattle (Coman and Gibbs 1949; Thrush 2007).

Despite Denny's friendship with and respect for Chief Seattle, peaceful coexistence with the native peoples of Puget Sound was short-lived. After the establishment of the Washington Territory in 1853, the new territorial governor began drafting agreements that required the removal of the area's Native American populations to make the land available for further Euroamerican settlement. Enacted in three councils called the Medicine Creek Treaty (southern Puget Sound), the Point Elliot Treaty (northern and eastern Puget Sound, including Seattle), and the Point No Point Treaty (Hood Canal to the Strait of San Juan de Fuca), these agreements called for lands to be handed over to the state in exchange for rights to traditional gathering areas, money, and the relocation of native peoples to designated reservations (Buchanan 1859; Buerge 1989; Gates 1955; Klingle 2007; Pierce 1855; Slauson 2006).

With the signing of the treaties, an entirely new social system was devised for native peoples. Under these agreements, native peoples were to relocate to designated reservations that were placed close enough to industry so that entrepreneurs could still use natives for labor. Reservations were envisioned as a vehicle for Native Americans' assimilation into the Euroamerican society. However, in the absence of traditional social systems and subsistence, they replaced the natives' seasonally based lifestyle, centered on hunting and gathering, with a different roaming lifestyle based on seasonal wage labor to feed their families. As a result, Seattleites' frustration continued with Native Americans' perceived lack of stability. On the other hand, natives were not content with the reservation system either (Klingle 2007).

Many Native Americans living in Seattle refused to relocate to reservations. One possible reason for this unwillingness is that they would likely have to share the reservations with tribal rivals and were waiting in vain to be given a reservation of their own. On the streets of Seattle, native people begged for food and assistance, which they

believed they were due from the city, a practice which white residents despised (Klingle 2007). In 1855, native frustration over treaty agreements forcing them to leave their homelands to live on the alien soil of reservations exploded in the Yakima Indian War. Several regional tribes, including the Yakama and Wenatchee, united together and crossed the mountains. Warriors raided settlements along their route and even launched an attack on the city of Seattle itself (Buerge 1989). As Seattleites huddled under the protective defenses of the U.S. Navy sloop *Decatur's* cannon fire, their original goal of Native American assimilation faded (Klingle 2007). In 1865, Seattle passed an ordinance restricting Indian encampments to only the most outlying regions of the area, often next to muddy tideflats (Klingle 2007).

After the expulsion of native peoples, Seattle entered a decade of economic depression, but gradually reemerged as the land of opportunity due to its ample timber and coal supplies that brought new settlers to the area (Klingle 2007). As Seattle's population grew, the city began to face demanding challenges wrought by its topography, transportation needs, and periodic floods. To help alleviate these issues, Seattle embarked on a series of land alterations.

The first European to explore today's Lake Washington was Colonel Isaac N. Ebey. In 1850, Ebey ventured up the Duwamish River by canoe and explored the lake for several days, noting the thick forest and vegetation clinging to the shoreline. Ebey named the body of water Geneva, but it was also invariably called Dawamish or Duwamish on early government maps. In 1854, Thomas Mercer, an early pioneer of Seattle who later went on to become a county commissioner and judge, suggested the name Lake Washington (Bagley 1916; Rochester 1993).

Lake Washington's early image was not very attractive. Described by pioneers as "a sluggish body of water lined with sawmills and fit mostly for storing logs" (McDonald 1955a), Lake Washington was a shallow, flood-prone basin. Mercer first proposed the concept of a channel connecting Lake Washington to the Puget Sound in 1854 (McDonald 1955a). In the 1860s, Harvey Pike, who owned land along the portage route, was the first to attempt to dig a channel. Using only a pick, shovel, and wheel barrow, Pike believed that the lake would effectively dig the canal for him once a furrow was opened. However, Pike found the compact, dense soils resilient and his efforts never got beyond a small ditch (Droker 1977; Smith 2004).

In 1871, planners began to more clearly envision a larger canal as a solution to the lake's inundations. Government engineers slated Lake Washington as a potential freshwater moorage in an effort to provide further justification of the canal's expense (McDonald 1955a). The potential of the canal was not fully realized until increasing numbers of natural resources, including timber and coal, were harvested from the areas surrounding Lake Washington, requiring a transportation route to the Puget Sound in the 1880s.

Aiming to help with the flooding concerns and to provide a navigable route for transport of natural resources and farm produce, a shallow canal was first excavated in 1885 (Chrzastowski 1983). The shallow, 16-foot-wide excavation was intended to meet the need of the bustling timber and sawmill operations to pass logs between Union Bay on Lake Washington and Portage Bay on Lake Union. Known locally as the Portage Cut, this narrow canal took advantage of the natural difference in the water levels, which produced a current for transporting logs and small boats through the chute from the higher elevation of Lake Washington to Portage Bay. The effects of this shallow canal on water levels in Lake Washington are not known but were probably minor, perhaps approximately 2 to 3 feet. Exhibit 4-3 shows the location of the Portage Cut. Although a significant step forward, the Portage Cut was limited in its transportation capabilities and provided no flood protection, so it was not long before a more inclusive solution was sought.

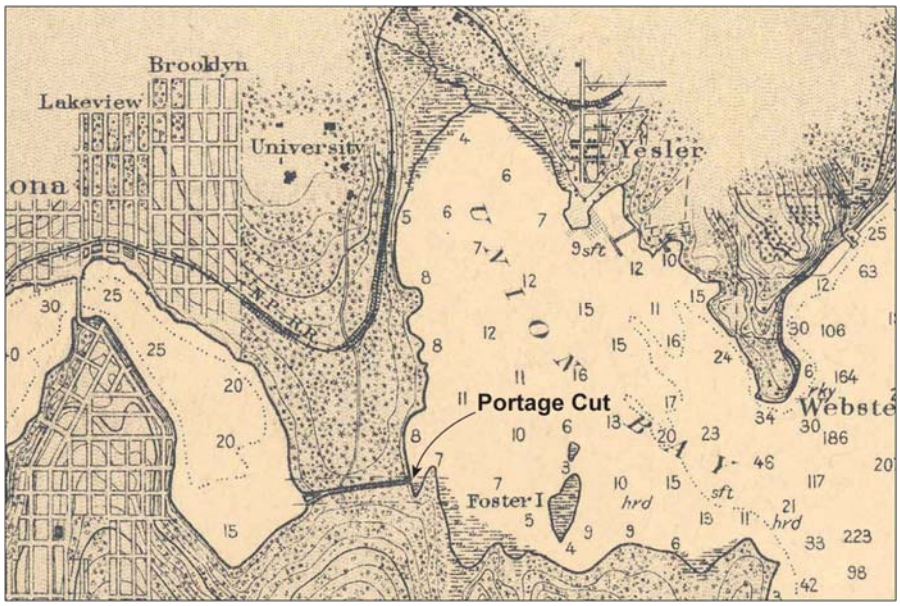

Exhibit 4-3. 1905 Geodetic Survey Map Showing Location of the 1885 Portage Cut and Lake Depth in Feet

(Coast and Geodetic Survey 1905; University of Washington Libraries Map Collection)

The city and population of Seattle grew with increased economic opportunities, stability, and transportation. By 1890, Seattle had become the second largest city on the west coast (Abbott 2008). A few years later, Seattle hosted the Alaska-Yukon-Pacific Exposition, an

international showcase of the city's achievements and economic potential (Diller 1915). By 1910, only 60 years after its founding, Seattle's population topped 230,000 (Giles 1914).

In 1906, Hiram Chittenden became the new head engineer for the USACE, Seattle District. Arriving in the Pacific Northwest after completing his assignments to control flooding along the Ohio River and California's Central Valley, Chittenden immediately began to push for a solution to the flooding problems of Lake Washington (Klingle 2007). In 1911, construction began on a navigable ship canal between Lake Union and Lake Washington. The Montlake Cut is the water passage between the two lakes that was completed in 1916. To construct the canal, USACE dredged a straight channel between Lake Washington and the eastern edge of Union Bay. Dredging also continued in Union Bay after completion of the Montlake Cut, largely in soft mud and sand. Some of this dredged material was used to fill shallow water or marshes in lands surrounding the canal (Plummer 1991). Dredged material was also deposited in shallow water about 75 feet beyond the channel lines. Some of this dredged material was likely placed in shallow water north of the Arboretum or in the marshes that emerged in 1916 around Foster Island.

When the last barriers of soil and rock were removed between August and October 1916, Lake Washington was lowered 10 feet (3 meters) to the level of Lake Union (Galster and Laprade 1991). The lowering of Lake Washington eliminated the lake's outlet to the Black River, and the Cedar River was diverted into Lake Washington. A significant effect of the Montlake Cut was the lowering of the elevation of Lake Washington. It resulted in the exposure of wave-cut terraces where bathymetry was steeper, and wetlands where it was shallower. Marshes developed in the southern portion of Union Bay, and Foster Island significantly increased in size.

The lowering of Lake Washington exposed new waterfront property around the entire perimeter of the lake, creating expansive marshes in some cases (Eastside Heritage Center 2006; Klingle 2007). On the south side of Union Bay around Foster Island, several such marshes were created, and by the 1930s, at least two landfills were located in this area (UW 1935). One of them, the Miller Street Landfill, grew to envelop portions of the new marshland (Carroll 1935; UW 1935). The landfill serviced approximately 25 percent of the city and, in 1917, 10,000 cubic yards of material were deposited within its boundaries (Anderson Map Company 1911; Murray 1917; Seattle Engineering Department 1910,

1920). By 1934, the Miller Street Landfill measured approximately 1,000 feet north-south and 1,125 feet east-west (Department of Health and Sanitation 1934). The landfill was closed in 1936 (BOLA and Kiest 2003; City Comptroller 1936; Seavotto 1931; Winkenwerder 1936).

Significant cutting and filling also occurred during the original construction of SR 520. Major areas of cutting for SR 520 construction in Seattle occurred on North Capitol Hill, on the Roanoke Park plateau, and throughout the Montlake neighborhood. Major excavation also occurred along the route of the old portage canal. The old portage canal has mostly been filled, except for a segment still visible near the NOAA Northwest Fisheries Science Center and MOHAI. The Arboretum lost approximately 60 acres of lagoon area to the original SR 520 project in the 1960s. Parts of the marshes surrounding Foster Island were dredged prior to construction of the bridge footings to allow access for a pile driver. At least some of the dredged peat was cast to the side adjacent to the dredged areas. Dredging operations also removed some of the garbage fill material and underlying peat from the Miller Street Landfill site. Dredging extended up to the western and eastern edges of Foster Island. Exhibit 4-4 shows construction of SR 520 across Foster Island during the 1960s.

Exhibit 4-4. Aerial View West of SR 520 Construction across Foster Island, in Foreground (Seattle Post-Intelligencer Collection, Museum of History and Industry Negative No. 1986.5.7596).

Early Settlement and Neighborhood Development

As Seattle evolved and grew, neighborhoods were built and communities developed reflecting the area's diverse population and progress. An important spectrum of Seattle history is captured in the development, evolution, and challenges faced by the areas studied for this project.

Eastlake

In the late 1800s, the area around Lake Union emerged as one of Seattle's early industrial centers. A few scattered settlers and speculators developed the land around the lake during the 1870s, sparked by progress in the burgeoning coal industry. Prior to this time, vast quantities of high-quality coal were discovered near Newcastle, but a lack of transportation infrastructure made it too costly to mine and export from Seattle. This condition changed with the completion of the Seattle Coal and Transportation Company's transport system in 1871, which consisted of coal cars moved by both railroads and barges to Seattle's wharves. Almost overnight, a small city sprung up at an important junction in the system on the south end of the lake, located near current Westlake Avenue and Roy Street (Bagley 1916; Droker 1977; Goodyear 1887). Still, the system was unwieldy and expensive, requiring that coal be transferred many times between railroads and barges before it reached its final destination in Elliott Bay (Droker 1977; Goodyear 1887).

Industrial development in Seattle and around Lake Union continued to increase in the 1880s with the completion of the transcontinental railroad in 1883. The railroad fostered new investment in the city's infrastructure and intensive extraction of Seattle coal and timber resources. During this time, railroads, electric street cars, and boat launches made all of Lake Union accessible for the first time (Droker 1977). David Denny, one of Seattle's early founders, established the first electric street car company to provide service to the area now known as the Eastlake neighborhood, bounded by Lake Union to the west and north, on the east by the present-day I-5 freeway, and on the south by Mercer Street. Operated by the Rainier Power and Railway Company, the tracks extended north along Lake Union's eastern shore and across the lake on a wooden trestle, roughly where I-5 now crosses (Droker 1977).

By the 1890s, all of the land along Lake Union's shores was platted, and in 1891, the Eastlake neighborhood was annexed into the city of Seattle (Droker 1977). Starting in 1897, businesses in the area helped supply miners with everything they required for the journey to the goldfields during the Klondike Gold Rush. However, the timber industry still remained Eastlake's primary enterprise. Many sawmills, furniture manufacturers, box and barrel makers, and board and paper processors were established on Lake Union during this period (Droker 1977).

In 1911, construction began on the Lake Washington Ship Canal to connect Lake Union with Puget Sound, increasing Lake Union's prominence as an industrial center and bringing even more workers into the Eastlake neighborhood. Completion of the Montlake Cut in 1916 and the Salmon Bay locks in 1917 enabled uninhibited ship movements from Lake Washington to Puget Sound through Lake Union. This greater accessibility attracted even more industry to the Eastlake area. Soon thereafter, electricity plants, ship dry docks, and plane manufacturers appeared (Dorpat 1987; Droker 1977).

The heavy industrial development in the Lake Union area led to a high demand for labor. In response, residential growth in the Eastlake neighborhood expanded alongside the industry. Although many large, single-family homes were built in the northern sections of Eastlake, other areas consisted of primarily apartment homes and multifamily dwellings (Morrow 1994). When these housing sources filled up, Lake Union workers began to use houseboats for temporary shelter (Droker 1977). By the 1920s, apartment buildings were the primary form of housing in the area (Morrow 1994). As the number of vacant lots dwindled, older single-family dwellings were eventually subdivided into multifamily residences or torn down for the construction of new apartment buildings (Pryne 1992).

In the 1960s, the Eastlake neighborhood was disrupted by the construction of I-5. Completed in 1962, the highway route cut off Eastlake from the Roanoke and Capitol Hill neighborhoods to the east, effectively defining and partially isolating the community (Morrow 1994). Nevertheless, Eastlake's position close to downtown Seattle helped the neighborhood maintain a residential population. In the late twentieth century, industry around Lake Union declined and many of the former industrial developments were replaced or renovated to support marinas, upscale restaurants, and other business activities (Dorpat 1987).

Roanoke Park

The neighborhood that is now called Roanoke Park was originally platted under the partnership of David Denny and Henry Fuhrman in 1890 (DAHP 1998; O'Connor et al. 2009). Denny was one of Seattle's earliest settlers and Fuhrman, a native of Germany, was a successful businessman who had made his way across the United States until he settled with his family in Seattle in 1890. Together, Denny and Fuhrman

platted 160 acres along Lake Union (Crowley 1998; Lewis Publishing Company 1903).

The Roanoke Park neighborhood is bounded by East Shelby Street to the north, Harvard Avenue East to the west, East Roanoke Street to the south, and Tenth Avenue East to the east. The community is perched on a relatively flat plateau with precipitous drops on three sides and a steep upward slope to the south toward Capitol Hill. As a result, the neighborhood stands separate from the surrounding residential areas (DAHP 1998; O'Connor et al. 2009).

The first development in the area was an electric line built by Denny in 1891. A branch from the Eastlake line, the trolley line ran up Broadway, terminating at East Lynn Street (DAHP 1998). Shortly thereafter, in 1899, the first home was constructed in Roanoke Park. It was not until after the turn of the century that the area saw more significant development (O'Connor et al. 2009).

By 1910, two local improvements spurred the development of the Roanoke Park neighborhood: an electric trolley extension and the creation of Roanoke Park. In 1908, the trolley line was extended through the neighborhood and out to the north, connecting again with the Eastlake line and a line continuing northward toward the UW campus (DAHP 1998). Around this same time, Roanoke Park was established. The park was built on a lot once owned by corrupt City Treasurer Adolf Krug; it was seized and transferred to the City of Seattle in 1900. In turn, the City turned the parcel over to the Seattle Parks Department's jurisdiction in 1908. The 1903 Olmsted plan, a comprehensive plan outlining the future vision for all of Seattle's public parks, had envisioned Roanoke Park becoming the north end of Interlaken Park. Interlaken Park, located to the southeast in the Capitol Hill neighborhood, was to be connected to Roanoke's large, semi-circular area of walkways, entrance gates, shelters, and a Portage Bay overlook. This vision changed abruptly in 1910, when instead of a promenade of walkways and shelters, the Seattle Parks Department built only a few walks among broad lawns with flowers and shrubbery (Sherwood 1974c).

Attracted by the transportation options and elegant park, many homes were soon built in the Roanoke Park neighborhood. Often designed by notable local architects, the homes reflected a diverse collection of early twentieth century architecture. Roanoke Park emerged as an early street-car suburb of Seattle, attractive for its public spaces and

transportation links to downtown. Roanoke's successful development is also likely due in part to the fact that the neighborhood overlooked the 1909 Alaska-Yukon-Pacific Exposition, where Seattle proclaimed its achievements and demonstrated its potential to the world (Diller 1915; O'Connor et al. 2009).

In the 1960s, the setting of the Roanoke Park neighborhood was altered by construction of I-5 on the western edge of the district and then SR 520 just south of the district. Development in the 1960s and beyond continued to influence the neighborhood, including the construction of St. Patrick's Church in 1961. Despite these changes, the community experienced a period of rejuvenation after the 1970s.

Capitol Hill

The Capitol Hill neighborhood, located on a long ridge overlooking downtown, was named by the neighborhood's primary developer, James Moore, in 1901. Prior to this, the area had been known as Broadway Hill and was positioned around a wagon road cut through the forest to a cemetery at its peak, later named Lake View Cemetery (Williams 2001). Today, Capitol Hill is bounded by Fuhrman Avenue East on the north, I-5 on the west, East Pike Street on the south, and 24th Avenue East on the east.

Moore was a very successful developer and he marketed the exclusive character of the area to attract Seattle's elite to the neighborhood. By 1913, enough mansions lined 14th Avenue North to earn it the nickname "Millionaire's Row" (Williams 2001). Each estate was individually designed, primarily by well-known architects, in lavish grandeur and in a wide range of architectural styles, including Tudor Revival, Georgian Revival, Classic Revival, Queen Anne, English Cottage, Classic Box, and Craftsman (Williams 2001).

As transportation improved, the Capitol Hill neighborhood became accessible to Seattle residents and as a result, grew rapidly. The character of the neighborhood began to change from only grand single-family houses, to eventually include multifamily structures. Housing types were placed adjacent to one another, sometimes with grand houses next to new apartment dwellings. These apartments featured upscale designs and quality construction in an effort to attract the growing middle class, discourage poor tenants, and overcome the prejudice of surrounding mansion dwellers (Williams 2001).

A high percentage of Capitol Hill's residents during this period were Catholics. Served by numerous institutions, including the Holy Names Academy (1907) at 22nd Avenue and Aloha Street, St. Joseph's Church (1907) and School (1908) on 18th Avenue, and Saint Nicholas School (1910) on Broadway Avenue North, these families established an intimate community (Williams 2001). In the early part of the nineteenth century, the area north of St. Joseph's was one of the most heavily Catholic neighborhoods north of San Francisco and west of St. Paul, Minnesota (*Seattle Post-Intelligencer* 2010).

On Broadway Avenue, between Pike and Roy Streets, Capitol Hill's busiest cultural and commercial district developed. Here the Broadway High School—Seattle's first building constructed specifically to be a high school—opened on the corner of Broadway and East Pine Street in 1902 (Williams 2001). Between East Republican Street and East Harrison Street, a block-long Broadway Market was completed in 1928. With a collection of independently owned small shops, the Broadway Market was a progenitor of the modern-day supermarket, soon copied by the Safeway Corporation and other large companies. Within its 25,000 square feet, the market offered a wide variety of shopping opportunities, including dairy products, bakeries, meat markets, hair salons, flower shops, delicatessens, and a pharmacy. In later years, the composition of stores along Broadway Avenue changed (Williams 2001). To address increasing housing and retail needs, it was developed into a medium-density community.

Portage Bay

The neighborhood of Portage Bay extends along the western shore of Lake Union's eastern arm. This portion of the lake was named "Portage Bay" by the Seattle Port Commission in 1913 to prevent confusion with the more popularly known main portion of the lake. The Portage Bay neighborhood developed along the edge of this bay, occupying the lower topography of today's Fuhrman Avenue East and Boyer Avenue East (originally platted 12th Avenue East), east of I-5.

Like Roanoke Park, the area north of East Shelby Street was originally platted in the early 1890s under the partnership of David Denny and Henry Fuhrman (Baist 1905; Lewis Publishing Company 1903). The land located south of East Shelby Street, along Boyer Avenue East, west to 11th Avenue East and south to East Edgar Street, was first platted by Cheshiahud, a local Native American resident, also known as Lake Union John. The platted land, known as John's Addition, was originally

homesteaded by Cheshiahud, who lived on 5 acres of Lake Union shoreline until shortly after his wife's death in 1906. Thereafter, Cheshiahud joined the flight of many other Native Americans from the Seattle area, primarily caused by the disruptions that increasing settlement by non-natives had on traditional subsistence patterns, village locations, and social networks. Cheshiahud sold his land, making him one of the richest Native Americans in Puget Sound, and moved to the Port Madison Reservation (Kroll Map Co. 1920, 1924; Thrush 2007).

Although houses were built as early as 1900, this neighborhood's principal period of development occurred in the 1920s, with a second period of development in the 1950s. Relatively isolated on the far side of Capitol Hill, the Portage Bay neighborhood developed later than the neighboring, higher elevation areas. In 1912, only about 15 homes had been built in the Portage Bay neighborhood, accounting for approximately 8 percent of the available lots. In comparison, lots in neighboring areas were already approximately 75 percent occupied. The Portage Bay neighborhood's undeveloped character, however, quickly changed as infrastructure improvements increased the appeal of the area (King County Department of Assessments 2010).

The Portage Bay neighborhood experienced significant improvements and investments in infrastructure in the early 1900s. In 1905, only one, 6-inch water main existed in the area, running down East Hamlin Street (Baist 1905). By 1912, water mains had been installed for all streets, and sewers were in place for all streets except one (Baist 1912). Most roads were paved by 1920 except for a few small segments (Kroll Map Co. 1920). By 1924, residents began to flock to the area and the fledgling Portage Bay neighborhood lots were approximately 70 percent occupied with new homes (Kroll Map Co. 1924).

Through the 1930s and 1940s, residential development slowed in the Portage Bay neighborhood. Its empty lots, covering approximately 30 percent of the total, remained vacant well into the late 1930s. This drop in development is likely due to the impacts of the Great Depression followed by World War II, which drew attention and resources away from domestic building and construction (Gilbert 1989; Marsh 2005).

Shortly after the close of the war, a new wave of development began in the Portage Bay neighborhood. In the 1950s, many large, more modern residences were built in the neighborhood. These new homes were

primarily placed on empty lots that remained open from the first years of development. However, it is likely that older homes were also demolished and replaced by newer construction. The Portage Bay neighborhood has maintained its status as a quiet, primarily single-family residential area since the 1950s (Hooper 1947; Kraus 1985).

One important civic improvement in the Portage Bay area was made during the Great Depression. In 1929, local property owners petitioned the Seattle Board of Park Commissioners (Seattle Parks Board) to establish a playfield in the vicinity of the Montlake neighborhood to entertain the increasing youth population in the growing community. In response, the Seattle Parks Board and City Council selected a site on the southeastern corner of Portage Bay and began work in 1931. Dedicated in 1935, the Montlake Playfield included a recreation center, playfield, and archery range (Sherwood 1974a).

On the western side of the Montlake neighborhood, the Montlake Playfield area lies along the southern shore of contemporary Portage Bay. Filling in the 1930s created some of the original playfield area, and the playfield was again filled and expanded northward beginning in 1960. Fill-spreading continued until the late 1960s, as material was brought into the park from projects around the Seattle area, including the original SR 520 project. During the 1960s and 1970s, a series of improvements were made to the Montlake Playfield. Located on low topography, the playfield was plagued by swampy and marsh-like conditions, making it susceptible to vermin and mosquito infestations. In the 1960s, the Seattle Parks Department continued filling in the playfields. With the construction of I-5, additional fill from excavations was placed in the area, often haphazardly and intended for later spreading. This unsorted material put uneven pressure on the viscous peat below, estimated to be 20 feet deep, and portions of the playfield buckled and heaved (Sherwood 1974a). In 1966, more sand and gravels from the Ravenna Sewer Tunnel excavations were dumped in the park. Finally, in 1968 a bond measure passed that provided the funding necessary to begin restoration of the playfields. As part of the restoration, 30 lots to the west were added to the park. In 1975 and 1976, a baseball field, soccer and football field, track, and new recreation center were added to the Montlake Playfield's facilities (Gould 2000; Sherwood 1974a).

Montlake

The community now known as Montlake, extending from the Arboretum on the east, to Portage Bay on the west, to the Montlake Cut on the north, and to Interlaken Park and Interlaken Boulevard to the south, was first conceived by Harvey L. Pike. Lacking the funds to buy the property outright, Pike obtained the land in 1861 in exchange for his future labor to clear the land (Smith 2004). In the years following, Pike slowly began to improve the land, clearing it and unsuccessfully attempting to dig a canal. In 1869, Pike hired draftsman S.C. Harris to draft plans for what he called Union City. This plan, which was formalized on December 6, 1870, included a standard street grid configuration between East Miller Street and East Edgar Street with a large swath in the middle reserved for the envisioned canal between Lake Washington and Lake Union. The second addition, which Pike submitted in 1875, covered much of the land that makes up Montlake today, stretching to the south of his 1870 plat and today's SR 520. Despite his enthusiastic start, Pike sold his land and moved out of Seattle before his dream of Union City could be realized (Smith 2004).

After Pike's departure, the lands he originally platted changed hands many times. In 1909, they were again owned by one man, James M. Corner. Corner, in turn, hired Calvin and William Hagan to administer the architectural and real estate tasks needed to develop the land. The Hagan brothers replatted the area, changed the proposed street names, and renamed the community the Montlake Park Addition (Sherwood 1974a; Smith 2004). Over the following years, the Hagans planned and oversaw the installation of paved streets and utilities including water, sewer, gas, and electric, as well as the sale of the lots (Sherwood 1974a; Smith 2004).

In 1909, the same year that Montlake was platted, the Alaska-Yukon-Pacific Exposition, located just to the north at present day UW, brought marked transportation improvements to the area. Trolley car lines and a new road from Seattle along Interlaken Boulevard to Lake Washington made Montlake a convenient suburb of Seattle. Several years after the Exposition, the Montlake Cut connecting Lake Washington with Lake Union became a reality, resulting in the north end of the neighborhood becoming waterfront property (Sherwood 1974a).

The neighborhood south of SR 520, originally known as Interlaken, was developed separately from, though basically concurrently with, the northern part of the neighborhood. John Boyer of the Interlaken Land

Company filed his plat in December 1905. Bordered on the west by Interlaken Park and on the east by Washington Park, the plat featured 20 irregularly shaped blocks located on either side of 24th Avenue East to the north of East Galer Street. Boyer imposed restrictive covenants requiring that houses constructed east of 24th Avenue could cost not less than $3,000, and those west of 24th not less than $5,000, ensuring above-average construction values (Gould 2000; Smith 2010).

As the neighborhood lots were gradually filled in through the years, homes in Montlake developed into an eclectic, varied group. In some areas, developers attempted to bring uniformity to the area, reflected by clusters of a particular architectural style. However, most homes in Montlake were not designed by notable architects, but rather chosen from a pattern book. From mansions to small bungalows, Montlake houses include Tudor Revival, Craftsman, and Ranch styles, among others (Smith 2004).

One major change to the area in the second half of the twentieth century was the construction of SR 520. Finished in 1962, this freeway assumed the canal route outlined by Pike, as the actual canal was built farther to the north.

Madison Park

In 1864, Judge John J. McGilvra acquired 420 acres of land on the western shore of Lake Washington, including Foster Island. A New Yorker who had practiced law with Abraham Lincoln in Chicago, he was appointed as the U.S. Attorney for the Washington Territory when Lincoln became president. McGilvra and his wife, Elizabeth, built their home on the mainland to the southeast of Foster Island, in an area now known as Madison Park, and cut a trail from downtown Seattle through the wilderness to their front steps. In a short time, McGilvra's dock became a busy private landing as residents around Lake Washington traveled to Seattle for business by rowing or sailing across the lake and then continuing on using his established trail (Hines 1893; Grant 1891; Thomas 2004).

The McGilvras were the only residents in the area until the 1880s (Thomas 2004). They eventually began developing their property as a lakefront resort and entertainment center. To make it easier to reach the development, McGilvra negotiated an extension of the Madison Street Cable Railway from Capitol Hill to the waterfront. In exchange, McGilvra gave the company 21 acres of lakefront property and $50,000 to develop the area into picnic grounds (Thomas 2004).

McGilvra named his road from the city, as well as the waterfront park, in honor of the fourth president, James Madison (Sherwood 1974b).

By 1889, a new dock and ferry slip were completed at Madison Park and cable car service began along the new route. McGilvra's investments were successful and in 1890, he constructed a five turreted "Music Palace," capable of seating 500 people, as well as a baseball grandstand that could entertain as many as 1,200 fans (Sherwood 1974b; Thomas 2004). During this period, McGilvra began leasing small plots of his land and only allowed small summer cottages or tent houses to be built on them. It was not long before other Lake Washington residents wanted better access to Madison Park. In 1900, public ferry service was established between Kirkland and Madison Park with double-ended boats spacious enough for wagons and horses (Thomas 2004).

With the opening of the Montlake Cut in 1916, the water level dropped and overnight, many of the waterfront attractions were left high and dry. In the 1920s, the McGilvra estate released their property, resulting in the sale of the small lots, lifting their construction limitations, and transferring the management of the Madison Park to the Seattle Parks Department (Sherwood 1974b). As a result, Madison Park's characteristic streets of small cottages began to change. As families in the community sought to live in the area year-round, many of these small houses were remodeled or demolished altogether and replaced with much larger houses (Thomas 2004).

In 1940, the Lacey V. Murrow Bridge was built to the south from Seattle to Mercer Island. This development caused a decrease in ferry traffic and within 10 years, the Madison Park-Kirkland Ferry ceased operations. As a result, the number of Madison Park visitors began to decrease and the area developed into a quiet waterfront community with a small shopping district (Thomas 2004).

Washington Park Arboretum

The mainland area currently occupied by the Arboretum was purchased in 1864 by Jackson Pope and Frederic Talbot. Pope and Talbot owned a lumber and cattle empire in California and were looking to expand to the Pacific Northwest. Initially, the men bought an 80-acre tract from the government for $100. Later, they increased their holdings to more than 200 acres. In 1874, Pope and Talbot's timber interests in the Pacific Northwest were organized as the Puget Mill

Company, a subsidiary of the San Francisco–based Pope & Talbot Company (Bagley 1916; Kroll Map Co. 1920; Thomas 2004).

Starting in 1896, the Puget Mill Company began logging from 33rd and 37th Avenue North and from Union Bay south to East Valley Street. Envisioning a future for their land beyond timber but short on cash, the Puget Mill Company struck a deal with the City of Seattle to pave the way for real estate development on some of their acreage. The city agreed to construct a $35,000 water main to some parcels of the Puget Mill Company's land, and in return, the Puget Mill Company deeded 62 acres to the city (Thomas 2004). These 62 acres became the early beginnings of Washington Park (Bagley 1916).

A Board of Park Commissioners was established by ordinance in 1887 to oversee the development of a comprehensive Seattle park system. The city recognized the value of the spectacular Pacific Northwest natural landscape and the board was tasked with organizing a plan to celebrate, showcase, and protect the landscape, while providing access and opportunities for all citizens to experience and enjoy the natural environment (Friends of Seattle's Olmsted Parks 2009). The *Seattle Post-Intelligencer* began to publish editorial features in 1902 supporting and encouraging the ambitious goals of the new Board of Park Commissioners. The articles featured civic leaders calling for creation and full funding of more parks and boulevards. Professor Edmond Meany, a local leader, told the paper "the Queen City's great need is more beauty in streets, parks, public places and houses. Let us show the world that in the midst of our popular growth, we can produce the nation's most beautiful city." To that end, in 1903, the city hired the Olmsted Brothers' landscape architecture firm. John Charles Olmsted and Frederick Law Olmsted, Jr. came to Seattle to prepare a plan for a citywide park and boulevard system. This system was envisioned as a chain of parks and parkways linking existing parks, such as Washington Park, creating new parks, and stitching them together with park boulevards (Friends of Seattle's Olmsted Parks 2009, Takami and Keith 2003).

Begun in 1903, Washington Park was one of Seattle's first parks. More acreage was added in following years and, by 1916, the city owned a total of 165 acres (Bagley 1916). The city's last acquisitions of land for Washington Park took place with the 1917 purchase of Foster Island from the McGilvra Estate, and then several irregular-shaped lots comprising the southwest corner of the park in 1920 and 1921 (Easton 1989; City of Seattle 2008).

The Olmsteds, popular and revolutionary landscape designers, presented their first plan for Seattle's park system on October 19, 1903, to the Seattle City Council (Bagley 1916). The Olmsted plan created a greenbelt of 37 parks and boulevards stretching from Woodland Park, through what is now the university campus and along Lake Washington Boulevard, south to Seward Park (BOLA and Kiest 2003; Ott 2010; Takami and Keith 2003). The Olmsted philosophy focused not only on the physical beauty of the landscape, natural resources, and vistas, but also on the vital relationship between parks and people. Most of the parks and connecting boulevards designed by the Olmsted Brothers in Seattle were built by 1908. The Seattle system is one of the most fully realized and best preserved Olmsted park and boulevard systems in the United States (BOLA and Kiest 2003; Takami and Keith 2003).

For the early part of the twentieth century, the Olmsteds' Seattle-wide plan was generally followed for Washington Park. However, their vision of the park as an open, public space changed beginning in the mid-1930s. Since the 1920s, the UW had been looking for a suitable place to create a botanical garden. In 1934, the Seattle Parks Board answered the university's plea by signing an agreement to let it build an arboretum in Washington Park. Two years later, the UW Arboretum Foundation was formed and, together with the Seattle Garden Club, brought the Olmsted team back to Seattle to landscape the grounds (Klingle 2007). The firm drafted the plan for the new Arboretum, a "veritable jewel" of Seattle, in March 1936 (Boren 1936). J. Frederick Dawson, the chief designer, worked closely with the Seattle Parks and Recreation Department's staff landscape architect, Frederick Leissler. Between 1937 and 1942, Works Progress Administration (WPA) laborers completed much of the basic infrastructure, still present today, that was outlined in this 1936 plan (Institute of Forest Products et al. 1969; UW no date [n.d.]).

The undeveloped property north of SR 520 behind the houses facing East Hamlin Street is what remains of the "Canal Reserve Land," the location of the original log canal between Lake Union and Lake Washington. This portion of land was not included in the Olmsted plans for the park, but was one of the first areas formally planted. Frederick W. Leissler, Jr., who was appointed assistant director of the Arboretum in 1936, directed WPA crews in planting Yoshino cherry trees and incense cedars on the canal land during the winter of 1935 and 1936. The trees remained until the construction of SR 520 in 1961.

At that time, some of the cherry trees were relocated to the UW (BOLA and Kiest 2003). While various specimen trees remain, most of the surrounding land and plantings have been removed, and the introduction of SR 520 severely compromised this early landscape.

The area around Foster Island and along the shoreline was included in both the 1904 and 1936 Olmsted plans. Envisioned as a series of lagoons, this area was initially an extensive marshland that had developed after the lowering of Lake Washington (Boren 1936). By the 1930s, at least two landfills, one of which was the Miller Street Landfill, were also located here (UW 1935). Prior to the late 1960s, landfills were typically located within mainly steep ravines, low-lying swampy areas, former borrow pits, and tidal areas as a way to efficiently reclaim the land and beautify the city (Department of Health and Sanitation 1915; Phelps 1978). To develop the lagoons outlined in the Olmsted plan, dredge spoils were used to both raise the marshland adjacent to the lagoons and likely address these unsightly refuse deposits by covering the exposed trash (CH2M HILL 2009). Extensive dredging took place to excavate four lagoons (UW n.d.).

In 1939, plantings of 16 species of bamboo and 3,500 Japanese irises were added to the existing flowering cherry trees and Eastern dogwoods installed by WPA crews just a few years earlier (Arboretum Foundation 1940). Although various specimen trees remain, the introduction of SR 520 significantly changed this early landscape. Most of the original plantings are now gone and, as a result of significant cutting and filling, the Arboretum lost approximately 54 acres of lagoon from SR 520 construction (Institute of Forest Products et al. 1969; UW 1967). The Arboretum contains one NRHP-listed resource, the Arboretum Aqueduct, which contains sewer lines and a pedestrian bridge, and crosses Lake Washington Boulevard near East Lynn Street.

Lake Washington Boulevard

Lake Washington Boulevard, passing through or by fourteen parks, is the main link in Seattle's Olmsted legacy of citywide park boulevards. The boulevard was planned to reach from Washington Park in the north continuously to Seward Park, which encompasses the Bailey Peninsula, in the south. It was the first of the park boulevards to be built following the Olmsted plan (Friends of Seattle Olmsted Parks 2009).

In 1907, the Parks Department extended Lake Washington Boulevard from Washington Park to the south entrance of the Alaska-Yukon-

Pacific Exposition. This extension was called University Boulevard, in hopes of extending the boulevard system to the north, which never came to fruition. The extension was later folded into Lake Washington Boulevard, but today what was University Boulevard is now Montlake Boulevard (History Link 2010).

According to the National Association for Olmsted Parks, the Olmsted philosophy defined the "parkway" as "a wide urban greenway carrying several different modes of transportation (most important a smooth-surfaced drive reserved for private carriages) which connected parks and extended the benefits of public greenspace throughout the city" (Beveridge 2011).

The roadway through Washington Park was the first new road built from the Olmsted Brothers' plan, originally called Washington Park Boulevard. It was completed within a year of the Olmsted Report to the Board of Park Commissioners. The plan called for three roadways in the park. Of these, "the pleasure drive would be carried through the length of the park within its borders, but in such a way as not to unduly cut up the level or gently sloping land" (BOLA and Kiest 2003). Lake Washington Boulevard winds through the length of the Arboretum west of center and serves as the primary access to the park. It was designed by John C. Olmsted and constructed under the Parks Superintendent at the time, J.W. Thompson. The first 2,120 feet of the road, starting at East Madison Street, was completed in 1904. The rest of the roadway through the park was completed by 1906. The landscape design for the boulevard developed through 1907 (BOLA and Kiest 2003, DAHP 1969).

Evergreen Point Bridge

The Lacey V. Murrow Bridge, built in 1940, was first floating bridge span across Lake Washington. The second floating bridge across Lake Washington was the Evergreen Point Bridge, which was built 4 miles north of the Lacey V. Murrow Bridge. Construction began in 1960 and in August of 1963, the Evergreen Point Bridge was ceremoniously opened (Reynolds 1988). At the time, the Evergreen Point Bridge was the largest floating span in the world at 1.4 miles long. Exemplifying an engineering feat of outstanding proportions, the Evergreen Point Bridge was considered by some to be a "modern wonder of the world" (*Seattle Times* 1966). In 1988, the bridge was officially renamed the Governor Albert D. Rosellini Bridge—Evergreen Point after the former governor under whose administration the bridge was originally built.

Medina

Along the shores of Lake Washington, the thick, tall trees first drew lumbermen to the area that is today known as Medina, which stretches from Evergreen Point south to Meydenbauer Bay, west of Clyde Hill. During the 1880s, men worked to fell the great forests. Isaac Bechtel, an Ontario, Canada native, was responsible for logging most of Medina, Bellevue, and Mercer Island during this time (McDonald 1955b).

Much of the land along the shoreline was soon clear of timber, and berry farms and orchards were developed in the new open spaces (McDonald 1965). Drawn by the rural charm and excellent views, Seattle businessman Thomas Dabney became Medina's first permanent settler in 1886. In 1891, Dabney built a dock at Dabney's Landing, located near present-day Medina City Hall, attracting other residents to the area. The following year, the new community named its town Medina Heights after the second holiest Muslim city. Mrs. Samuel Belote, a local resident, picked out the name from geography books and chose it over Dabney's flowery title of "Flordeline" (Cornwall 2002; McDonald 1955b, 1965; Rochester 1993).

During the early 1900s, more lakeshore estates emerged in Medina Heights. This trend began in 1905 when Edward Webster, the secretary and general manager of Seattle's Independent Telephone Company, erected a home called "The Gables." Several similar houses followed and on February 18, 1914, Medina Heights was officially platted with large waterfront tracts. In the following years, the area was promoted as an exclusive residential area, located away from the bustle of city life but close enough to enable the trip to be made quickly (McDonald 1965; Rochester 1993). A 1913 newspaper advertisement claimed that Leschi Park, located on the west side of Lake Washington, could be reached by ferry from Medina within 10 minutes and the Smith Tower, a symbol for Seattle commercialism, could be reached within 25 minutes (Cornwall 2002).

In 1919, Medina's first marketing campaign characterized the area as "the heart of the charmed land" (Rochester 1993). Large, impressive houses built by Seattle's elite lined the shores of Lake Washington. Despite their elegance, many residences were intended as part-time summer homes and only occupied part of the year. When a golf club was organized and yachts were moored in front of the large estates, the area's abundant and lavish wealth earned it the nickname the Gold Coast (Corsaletti 1982; McDonald 1965).

In 1940, the Lacey V. Murrow Bridge was completed to the south, between Mercer Island and Seattle, opening the east side of Lake Washington to greater development (Cornwall 2002). Although much of this new development took place in Bellevue to the southeast, Medina Heights grew concerned that its large-lot residences, lack of commercial areas, and personalized public services would be threatened. As a result, on July 26, 1955, Medina Heights incorporated as Medina. The city implemented strict zoning regulations and was zoned completely residential with businesses only able to operate in existing stores with the exterior shell maintained as it was originally built (McDonald 1965; Woodward 1971).

Hunts Point

In 1871, Marshall Blinn acquired what is today known as Hunts Point, a finger of land stretching into Lake Washington just north of Medina and east of Clyde Hill (McDonald 1955b). Blinn, a master millwright, came to Seattle in 1854 and soon emerged as a successful lumbering and shipping magnate. Together with several partners, Blinn founded Seabeck, Washington, a lumbering town located about 20 miles west of Seattle and described in 1885 as "the liveliest place on Puget Sound" (*Seattle Times* 1958). After he left Seabeck, Blinn was involved in several other, less successful ventures in the Seattle area, including a run for Congress, a stock ranch east of the mountains, and an effort to ship ice into the city (Conover 1960; *Seattle Times* 1958). After Blinn's death in 1888, Leigh S.J. Hunt bought the property (McDonald 1955b).

Hunt, a high school principal from Iowa, came to Seattle in the 1880s. Joining up first with Jacob Furth, the head of the Seattle National Bank, Hunt soon became involved in real estate, mines, street railways, and banks. He was an optimistic man and people gravitated to him. In 1886, Hunt bought the *Seattle Post-Intelligencer* and, with no prior newspaper experience, brought his dynamic force to the newspaper. Shortly thereafter, Hunt bought land along the eastern shore of Lake Washington, including the areas today known as Hunts Point and Yarrow Point (Bagley 1916; Conover 1948; Cornwall 2002). In 1888, Hunt built a large, 14-room mansion on the shore of the lake, complete with lawns, barns, gardens, the Yarrow Point fountain, and a park with deer (Knauss 2003; *Seattle Times* 1937). Hunt named his estate "Yarrow" after a poem by William Wordsworth describing a glorious estate. Thereafter, the finger of land was known as Yarrow Point (Cornwall 2002).

Hunt's interest in Hunts Point, his namesake finger of land, appears to have been limited. At one point, Hunt logged portions of the area to pursue a better view from his mansion on Yarrow Point (Cornwall 2002). Later, he deeded portions of the point to Jacob Firth and Bailey Gatzert (McDonald 1955b, 1965).

In 1892, Francis Boddy purchased Hunts Point (McDonald 1955b). Boddy, a pioneer landscape architect and gardener from England, designed and supervised the construction of many Seattle outdoor spaces including Kinnear Park, Leschi Park, and the Central Seattle Public Library grounds, as well as the grounds of prominent Seattleites including Henry Yesler, Judge Thomas Burke, and Frank Waterhouse. Prior to coming to Seattle in 1889, Boddy worked on the Westlake Park in downtown Los Angeles, California (*Seattle Times* 1941). On Hunts Point, Boddy began a dairy and greenhouse business, building a sawmill to supply himself with lumber and selling some of the excess (McDonald 1955b).

Although still maintaining a rural character spotted with orchards and gardens, after the turn of the century, Hunts Point saw more residential development (Eastside Heritage Center 2006). In 1904, James Brewster purchased the tip of Hunts Point, and within 2 years, built a large house. William Meydenbauer, for whom Meydenbauer Bay is named, built a vacation cottage on Hunts Point in 1906 (McDonald 1955b). The area soon became known for its elite residences. Interest in developing Hunts Point increased with the completion of the Lacey V. Murrow Bridge (1940) and the planned Evergreen Point Bridge (1963) because of the easier access the bridges afforded the area. In 1955, Hunts Point incorporated in an effort to protect the community from encroaching development (Cornwall 2002). Today, the town remains an exclusive community housing an upper class population (*Seattle Times* 2006).

Clyde Hill

Patrick Downey homesteaded much of the land that now makes up Clyde Hill in 1881. Born in Ireland, Downey came to the United States in 1860 and followed the Gold Rush to California. Eventually, Downey settled in the Seattle area, taking up a claim on a ridge on the eastern shore of Lake Washington and building a log cabin. In 1890, President Benjamin Harrison signed a land grant to Downey, assuring his claim in the area (Brazier 1969; *Seattle Times* 1960, 1983).

In the early years, Downey named a local dock on Meydenbauer Bay "Clyde Landing" after the Clyde River in Scotland. This name was later

adopted by the community of Clyde Hill that grew around him. Downey married an Iowa native, Victoria, and brought her to the new home in 1892. After he cleared the land, Downey started a strawberry farm and large dairy with 30 to 40 cows. As the family grew, eventually having a total of 13 children, the Downeys built a new house in August 1903, which still stands today (Brazier 1969; McDonald 1955c; Seattle Times 1960, 1983).

With the growth of the Downey family and the arrival of more settlers, public services were needed in the area. The first school in the area had an enrollment of nine children and was started in 1886 in one of the Downey's berry field outbuildings. By 1900, the school had moved to a one-room building on Bellevue's main street and local enrollment had reached 70 students (McDonald 1955c).

Next to arrive in the area were religious services. Starting in 1910, the Downeys opened up their home to the community and a priest visiting from Kirkland would say mass (Brazier 1969; *Seattle Times* 1983). Later, Downey donated land on which the first Sacred Heart Catholic Church was built by the Seattle Archdiocese (Brazier 1969).

Like many other cities along the Gold Coast in the mid 1900s, Clyde Hill sought incorporation as a way to maintain its community's way of life. Touted as a way "to avoid becoming a city" (*Seattle Times* 1953), Clyde Hill was incorporated in 1955 (Woodward 1971). The city's first actions were to institute zoning regulations calling for lots to be at least 0.5 acre in size. Clyde Hill was also made exclusively an all-residential area, and in 1971, only two businesses were present in the area (Woodward 1971). In the process of incorporating, Clyde Hill turned down Bellevue's annexation request. Unsure of the direction the new Bellevue government would take, Clyde Hill opted for self government (*Seattle Times* 1953).

Yarrow Point

In 1888, Leigh S.J. Hunt also bought land on the shores of Lake Washington for his estate, Yarrow. Thereafter, the finger of land was known as Yarrow Point (Cornwall 2002; McDonald 1955b). Around 1888, Hunt deeded some land at the base of Yarrow Point to his friend, Jacob Furth, the founder of the Puget Sound National Bank. Furth developed the land, including some of the present-day Wetherill Nature Preserve, into a country summer estate complete with fruit orchards, vegetable gardens, strawberry fields, and pastures of milk

cows and sheep. Furth's wife named the home Barnabee, after her favorite Shakespearean actor, Henry Clay Barnabee (Knauss 2003).

In about 1902, Edward P. Temper brought a different kind of elite agriculture to Yarrow Point. Trading some land on Bainbridge Island for 300 feet of waterfront, Temper began planting English holly on his Yarrow Point property. Waiting 18 years for the holly to mature, Temper planted strawberries between the rows before the holly plants were fully developed. By 1920, the Temper ranch was finally producing holly and was one of the largest such establishments in the United States. The family continued until just after World War II, when tax rates increased to the point that the holly operation was no longer profitable. In 1960, the Tempers sold the land for real estate development (Knauss 2003).

George F. Meacham, a Scotsman, filed the first plat for real estate development on Yarrow Point in 1907 (Knauss 2003). Giving the streets Scottish names, Meacham's development began the community's trend toward suburban living. Although small agricultural operations existed on Yarrow Point in the early nineteenth century, rising costs and land values led many residents to sell their property for real estate development (Knauss 2003).

Interest in developing Yarrow Point only increased with the completion of the Lacey V. Murrow Bridge (1940) and the planned Evergreen Point Bridge (1963). In June of 1959, Yarrow Point incorporated to have more control over local zoning and a strong influence in its local government (Knauss 2003). After its incorporation, Yarrow Point established zoning regulations outlining the minimum lot size and only permitting single-family dwellings (Knauss 2003).

Port of Olympia and Port of Tacoma

Port of Olympia

The area that became the Port of Olympia began as a peninsula known as *Cheet-woot*, which means "bear" in the Nisqually dialect of the Lushootseed language, because it resembled the shape of a bear at high tide. This spit of land was used by the Nisqually, Duwamish, and Squaxin Island tribes as a place to trade, gather shellfish, and camp in the winter. It was not until the mid-nineteenth century that Euroamerican settlers came to inhabit the area (Stevenson 1989; Wilma 2003).

In 1831, the Hudson's Bay Company established an outpost in the nearby settlement of Nisqually, sparking interest in the area. In 1846, Americans Levi Lathrop Smith and Edmund Sylvester claimed the beaches of *Cheet-woot* and named the area Smithfield. Together, the two men built the area's first wharf (Newell 1985; Stevenson 1989, Wilma 2003).

The first Puget Sound Collection District and Custom House was established at Smithfield in February of 1851. The Custom House required that all ships entering Puget Sound come down to Smithfield, which brought considerable prestige to the growing community. By 1852, shipments out of Smithfield (which is now Olympia) expanded to include coal, lumber, and fish. In the years following, steamship travel out of Olympia increased, the wharfs were expanded, and shipbuilding flourished (Stevenson 1989).

Along with increasing commerce, the growing population of settlers and immigrants rapidly pushed the area's native peoples from their lands. On December 26, 1854, the Treaty of Medicine Creek was signed by many tribes in the Puget Sound area, including those that had traditionally used *Cheet-woot*. With the treaty, the tribes were able to maintain permanent rights of access to traditional hunting and fishing grounds, but were confined to designated reservations and surrendered most of their lands in exchange for $32,500 (Crowley 2003).

By the 1870s, the lack of a railroad terminus and ever-present dredging needs drew the attention of Olympia residents. Passed up by the Northern Pacific Railroad for nearby Tacoma in 1873, Olympians came together to build their own railroad spur to the port, supplying everything from land and money to labor and provisions for workers (Miller 1921). In 1878, Olympia successfully connected the spur to the mainline railroad in Tenino. However, the shallow harbor with its famously extensive mudflats made the connection between the new rail line and the port facilities inefficient. Following an 1885 survey, the city hired a dredge and constructed a long wharf, measuring 4,798 feet and requiring 927 piles, to connect the port to deep water (Stevenson 1989). The USACE continued dredging efforts from 1909 to1911. Excavated soils were used to reclaim tidelands in the vicinity and resulted in the creation of an additional 29 blocks for development, including much of what is now downtown Olympia (Stevenson 1989).

A countywide vote established the Port District in Olympia on November 7, 1922. The new Port of Olympia facilitated additional

expansions of the existing port facilities, including improvements for better navigation of the harbor, which attracted a growing amount of ship traffic (Stevenson 1989). During the years following the establishment of the Port District, Olympia emerged as a significant exporter of materials to locations around the world.

The sudden growth in cargo loads during World War II demanded additional facilities. During the 1940s, channel dredging continued, rail lines were expanded, and new buildings erected, including what is now the Port of Olympia administration building, a cold storage facility, and an improved shipping wharf (Stevenson 1989).

Port of Tacoma

British and American settlement in the southern Puget Sound region near Tacoma had drastically affected local Native American groups by the mid-nineteenth century. Many area tribes were relocated during this period. In 1854, the Treaty of Medicine Creek called for the abandonment of most southern Puget Sound villages and required Native Americans to relocate to the Puyallup, Muckleshoot, or Squaxin Island reservations (Ruby and Brown 1992). The Puyallup Reservation included the area now encompassed by the Port of Tacoma and the CTC facility.

Tacoma emerged as a prominent center for commerce and industry in the late nineteenth century, during which time much of the reservation land previously assigned to the Puyallup Tribe was encroached upon by the community's urban and industrial growth. In 1873, the Northern Pacific Railroad (then the Milwaukee Railroad and Union Pacific Railroad) extended the region's first transcontinental railroad line into Tacoma. Terminating at Commencement Bay near the foot of present-day Division Avenue, the railroad line directly connected Tacoma with the Great Lakes region and initiated a period of economic growth in the city. Tacoma grew around this focal point of trade and distribution on Commencement Bay, which served as a transfer point for goods from the railroad to steamships (Fairbanks and Martinez 1981).

At the time of the railroad's arrival, much of the Port of Tacoma as it exists today was not yet developed. The mouths of Wapato and Hylebos creeks were located to the north and south of what is now the CTC facility, and areas to the west and northwest of East 11th Street still remained under the waters of Commencement Bay. Beginning in 1889, the Thea Foss Waterway (formerly City Waterway) was the first waterway in the former tideflats of Commencement Bay to be dredged

for increasing the accessibility to industries established around the terminus of the railroad line. Eight waterways have been dredged in the former tideflats since that time, significantly changing the landforms in the area (Morgan 1979).

By the turn of the twentieth century, much of the northern portion of the tideflats had been filled in with dredged materials. Privately owned docks were constructed over the remaining tideflats to reach the bay's deeper waters. Private development of the bay continued until the Port of Tacoma was established in November 1918 by a countywide referendum. The port was established during a period of economic prosperity, largely sustained by the local timber industry. Other industries on the Tacoma waterfront included lumber and shingle mills, shipyards, flour mills, and electrometallurgical and electrochemical plants (Fairbanks and Martinez 1981).

The Port of Tacoma began developing 240 acres of the Commencement Bay tideflats in 1919. At this time, dredged materials from the enlarged waterways were redeposited on top of wetland areas to provide suitable land for development (Long 2003). This and subsequent dredging activities have created an artificial cap of imported fill material between at least 5 and 10 feet thick across most of the port's property (Cultural Resource Consultants 2008). The Blair Waterway extended to East 11th Street when it was first constructed. Both the Blair and Hylebos waterways were dredged several times between the 1930s and 1960s, extending both farther southeast.

The existing Hylebos Waterway Bridge was constructed in 1939, and this bridge, coupled with a wood trestle bridge erected across the Blair Waterway farther south on East 11th Street, provided northeast Tacoma residents with a direct link to the city center (Miller and Bowden 2006). The wood-trestle East 11th Street Bridge was removed in 1951, and the Blair Waterway was deepened and further extended. A new bridge, the Port Industrial Waterway Bridge, was constructed in 1951 to provide increased access for vessels to pass through the waterway, while maintaining the important north-south linkage; this bridge was demolished in January 1997 (Long 2008).

The port served as a major center of wartime industry, focusing on shipbuilding and chemical production, between 1939 and the end of World War II. Port development has continued; the port remains a principal shipping hub in the region and is known as the major distribution point for goods being shipped through Alaska.

5. Archaeological Resources Results and Recommendations

Since the initiation of the environmental review process for SR 520 in 2005, extensive research and archaeological investigations have occurred in the APE, focusing on the limits of construction within the APE (see Exhibit 1-8). However, both the APE and limits of construction have undergone several alterations since the initiation of the project. This chapter describes the status of archaeological research and investigations performed within the limits of construction for the Preferred Alternative.

Due to changes and alterations to the project APE, some areas previously investigated for this project fall outside of the current APE, or outside of the current limits of construction. The results of archaeological investigations of areas that are located completely outside of the current APE are not discussed in this chapter.

Preliminary research and archaeological investigations (Blukis Onat et al. 2006; Blukis Onat and Kiers 2007; Blukis Onat et al. 2007) of the proposed SR 520 limits of construction resulted in the need for supplemental analysis of the Miller Street Landfill (Schneyder et al. 2010) and Foster Island (Goodman et al. 2008; Schneyder et al. 2009; Hodges 2010; Elder et al. 2010a, 2010b). Subsequent to these archaeological investigations, analysis of the newly available WSAPM prompted additional research within the current limits of construction to assess whether all areas that have the potential to contain archaeological deposits have been previously identified.

The results presented in this chapter are organized by the study areas contained in the limits of construction. Results are presented chronologically for each study area and are followed by a series of recommendations. Within the Seattle study area, the results are presented in the four geographical segments (Roanoke/I-5, Portage Bay, Montlake, and West Approach).

Research and Field Investigations

Seattle Study Area

I-5/Roanoke Segment

Research

BOAS conducted an ethnographic place study and researched the land use history of the I 5/Roanoke segment to assess archaeological sensitivity, determining that there is "no evidence of the cultural significance of this area and it does not appear to retain any culturally important locations" (Blukis Onat and Kiers 2007).

The APE is located within the existing SR 520 right-of way in the I-5/Roanoke segment, which cuts through glacial deposits on Capitol Hill. Because of extensive cutting associated with the construction of the existing SR 520 in this segment during the 1960s, any archaeological sites that may have once existed in this location have been removed. BOAS further cites mass wasting (landslides, slumps, and slope failures) along the eastern flank of Capitol Hill, which resulted in the removal of formerly flat land surface, as an additional example of land removal within the I-5/Roanoke segment (Blukis Onat and Kiers 2007).

As a result of this research, BOAS did not identify any Probability Areas within the I-5/Roanoke segment of the APE.

Field Investigations

Because no Probability Areas were identified in the I-5/Roanoke segment, no archaeological investigations were conducted.

Supplemental Field Visit and Research

Subsequent to the investigations listed above, additional data from the WSAPM was provided by DAHP. This information, which was not available at the time of BOAS' original research and fieldwork, made it necessary to revisit and research as-built engineering plans and LiDAR images of the limits of construction to confirm that all areas with the potential to contain archaeological deposits had been identified.

As-built plans for I-5 and SR 520 within the I-5/Roanoke segment detail extensive sediment removal (cut) and subsequent imported sediment deposition (fill) activities conducted for the original construction of both I-5 and SR 520 (Andrews 1960, 1961). As-built plans for the I-5 corridor from Lakeview Boulevard to Shelby Street indicate extensive cutting and removal of sediment to construct I-5. Nearly 30 vertical feet of sediment was removed to build the freeway through this area.

Extensive sediment removal also occurred along SR 520, between east of I-5 and Delmar Drive East, where nearly 60 vertical feet of sediment was removed during the construction of the highway. LiDAR imagery of the area confirms the extensive cut activities detailed in the as-built plans (Puget Sound LiDAR Consortium 2000).

On October 28, 2010, ICF archaeologists visited the I-5/Roanoke segment to determine if accessible areas with the potential to contain intact Holocene-aged sediments and soils were present. Along both I-5 and SR 520, sediments were removed during earlier construction of the highways. Because the roads deeply incise a glacial till plain, no additional investigations are necessary in these areas.

Recommendations

Supplemental research and field visits to the I-5/Roanoke segment revealed two previously unsurveyed, yet accessible, locations within the limits of construction where ground disturbance is proposed. It is recommended that additional archaeological investigations occur in these areas to determine whether intact Holocene-aged surfaces are present.

Within the I-5/Roanoke segment, the paved surface along East Roanoke Street, 10th Avenue East, and Delmar Drive East is currently inaccessible, with no available evidence to assess the extent of ground disturbance. Therefore, it is recommended that these areas be investigated, once accessible, to determine whether intact Holocene-aged surfaces are present. Project activities in the I-5/Roanoke segment north of the Harvard Avenue East intersection with East Gwinn Place include road restriping that will not extend below the paved ground. No additional archaeological investigations are recommended at this location. However, if design plans change, and ground disturbance extends below paved ground, this area should be evaluated, once accessible, for the presence or absence of Holocene-aged sediments to determine appropriate monitoring procedures.

Portage Bay Segment

Research

In 2006, BOAS conducted an ethnographic place study and researched the land use history of the Portage Bay segment to assess archaeological sensitivity. The Portage Bay segment consists of the land directly adjacent to, and south of, Portage Bay. This study demonstrated the importance of Portage Bay to the Lakes people and their neighbors. Two Native American homesteads associated with ethnographic place

names were identified as having been located on either side of Portage Bay. The Cheshiahud settlement was located on the southern part of Portage Bay on a property identified as a marsh or wetland (Blukis Onat and Kiers 2007), within the previously defined APE. BOAS did not discuss the extent to which historic and modern activities modified this segment, although the ground-disturbing activities in the segment were thought to be considerable (Blukis Onat and Kiers 2007).

BOAS also determined that the marshes located on the southern shore of Portage Bay were referenced by Waterman (1922) (Blukis Onat and Kiers 2007). This segment was referred to as *Spa'Lxad* "marsh," "wet flats" (Waterman 1922). These marshes would have been an ideal source for a variety of plants, birds, fish, and mammals. The segment was specifically known for the extensive wapato harvest that occurred there. BOAS determined that any archaeological remains located in the Portage Bay segment would be associated with the harvesting of these resources (Blukis Onat and Kiers 2007).

From this research, BOAS defined a single archaeological Probability Area in the Portage Bay portion of the APE.

Field Investigations

In April and May of 2006, BOAS conducted archaeological investigations in the Probability Area, which is located on the eastern shore of Portage Bay. This Probability Area in the Portage Bay segment was thought to be heavily disturbed due to the construction of SR 520 in the 1960s.

Four SPs were excavated in the Probability Area, reaching an average depth of 141 centimeters below surface. Three SPs were excavated south of SR 520 within the right-of-way, and one was excavated north of the right-of-way. Stratigraphy in SPs within the investigated Probability Area included fill in all of the SPs up to 135 centimeters deep, with gray sand beneath the fill. One SP contained a peat layer at 140 centimeters below surface and another was terminated at 38 centimeters as a result of the presence of electrical wires. Historic debris was recovered from the fill, but no intact archaeological deposits were identified in any of the SPs (Blukis Onat et al. 2007).

According to BOAS (Blukis Onat et al. 2007), the stratigraphy of the Probability Area in the Portage Bay segment "represents massive fill with recent debris above lacustrine/wetland deposits."

Supplemental Field Visit and Research

Subsequent to the investigations described above, additional data from the WSAPM was provided by DAHP. This information, which was not available at the time of BOAS' original research and fieldwork, made it necessary to confirm that all areas with the potential to contain archaeological deposits had been identified.

On October 28 2010, ICF archaeologists visited the Portage Bay segment to determine whether additional areas were present that had the potential to contain intact Holocene-aged sediments and soils. Two previously unsurveyed, yet accessible, locations were identified during this research.

Recommendations

The Montlake Playfield, located just inside the southern margin of the Portage Bay segment, is also currently accessible and has not been subject to previous archaeological investigations. However, project activities in this area would be limited to pile-driving. Because no sediments would be visible during this process, no additional archaeological investigations are recommended. However, archaeological monitoring is recommended if the project design changes to include additional work that would result in the excavation of sediments (e.g., trench and pier shaft excavation) in this area.

Montlake Segment

Research

In 2006, BOAS conducted an ethnographic place study and researched the land use history of the Montlake segment to assess archaeological sensitivity (Blukis Onat and Kiers 2007). The study demonstrated that the land between Portage Bay and Union Bay was an important place to the Lakes people and their neighbors. However, activities that occurred in and adjacent to the segment, including excavation associated with the construction of SR 520 to the south during the 1960s, indicate that it is likely that this segment was extensively modified (Blukis Onat and Kiers 2007). Other construction activities that likely modified the landscape include the construction of buildings and streets, the placement of buried utilities, and associated grading. From this research, BOAS defined two archaeological Probability Areas within the Montlake segment of the APE.

Field Investigations

In April and May of 2006, BOAS conducted archaeological investigations at one of the Probability Areas in the Montlake segment,

located within the McCurdy Park property north of SR 520 between Montlake Boulevard and 24th Avenue East. Eight SPs were excavated in the area, reaching an average depth of 230 centimeters below surface. SPs in this area revealed that a weak A-horizon had formed over glacial drift, with deep fill at the surface in some areas. Historic debris was recovered from fill, but no buried relict A-horizon soils or intact archaeological deposits were identified (Blukis Onat et al. 2007).

Analysis of previous geotechnical data within the other Probability Area in the Montlake Probability segment suggested extensive filling in the vicinity, and no archaeological investigations were conducted in this area (Blukis Onat et al. 2007).

Supplemental Field Visit and Research

Subsequent to the investigations described above, additional data from the WSAPM was provided by DAHP. This information, which was not available at the time of BOAS' original research and fieldwork, made it necessary to revisit and research as-built plans and LiDAR images of the APE to confirm that all areas with the potential to contain archaeological deposits had been identified.

The original SR 520 as-built engineering plans that cover the Montlake segment detail extensive sediment removal (cut) and imported sediment deposition (fill) for the original construction of SR 520 (Morse 1961). Approximately 300 linear feet was filled to an average depth of 10 feet to reach grade for the alignment east of the proposed Montlake overpass. Approximately 815 linear feet of cut activities occurred from west of the Montlake overpass to just east of 24th Avenue East. The cut depth in these areas ranged from 10 to 20 feet below the original ground surface (Morse 1961). The LiDAR imagery of this area confirmed the extensive cut activities detailed in the as-built plans (Puget Sound LiDAR Consortium 2000).

On October 28, 2010, ICF archaeologists conducted a field visit of the Montlake segment. The ground surface along Montlake Boulevard East and East Montlake Place are paved. The open spaces adjacent to these roads contain buried utility boxes, indicating substantial ground disturbance in this area. It is unlikely that an undisturbed, naturally deposited, previously exposed surface is present below the road. However, given that topsoil removal is a common practice for road and building construction, there is no evidence to assess the extent of previous ground disturbance.

Along SR 520 and the lands directly adjacent, sediments were removed during construction of the highway. Because these deposits deeply incise a Pleistocene-aged glacial till plain, no additional investigations are necessary in this area.

Recommendations

BOAS' ethnographic research and analysis of the landscape modifications produced a single Probability Area in the Montlake segment interpreted as having the potential to contain archaeological deposits. No buried relict A-horizon soils or intact archaeological deposits were identified during field testing. No further investigations are recommended in this area.

Extensive cutting and filling occurred within the SR 520 right-of-way during the construction of the highway in the 1960s. These substantially altered areas have a low probability for containing intact archaeological deposits. Therefore, no additional archaeological investigations are necessary in these areas.

There is no evidence to assess the extent of previous road construction and utility ground disturbance along Montlake Boulevard East and East Montlake Place, although such disturbance is likely. Therefore, these areas should be investigated, once accessible, for the presence of Holocene-aged sediments. No further monitoring is recommended if there is clear evidence that Holocene-aged sediments and soils have been previously removed across this segment.

West Approach Segment

The West Approach segment encompasses the eastern portion of the Montlake peninsula, Union Bay, and Foster Island. This segment covers three ethnographic study areas defined by BOAS (Montlake, Union Bay, and Foster Island). Results of the analysis of each BOAS study area are summarized below. There are six probability areas in the West Approach segment.

Research

Montlake

Although previously mentioned under the Montlake segment, BOAS' ethnographic study of Montlake included areas that fall within the West Approach segment. The study showed that the land between Portage Bay and Union Bay was an important place to the Lakes people and their neighbors. A canoe portage, which was controlled by a local group known as the *hloo-weelh-AHBSH*, was located just south of the

present-day Montlake Cut. This portage likely extended across both the Montlake segment and the West Approach segment, resulting in several possible locations associated with this portage. In addition to portaging, traditional cultural activities took place along the nearby shorelines, stream outlets, and prairies. Historically documented land use activities that occurred adjacent to the area, including the deposition of dredge spoils from construction of the Montlake Cut to the northwest and excavation associated with the original construction of SR 520 directly south, indicate that the area has been extensively modified since the mid-1800s (Blukis Onat and Kiers 2007).

Although extensive ground disturbance has occurred in the general vicinity, BOAS defined three Probability Areas within the east Montlake portion of the West Approach segment where ground disturbance may have been less severe.

Union Bay

Prior to the historic era, the southern shoreline was a marsh that contained abundant natural resources, including plants, birds, mammals, and fish (Blukis Onat and Kiers 2007). After Lake Washington was lowered in 1916, these marshes became exposed and desiccated. These newly exposed areas were used to deposit dredge spoils generated during the construction of the Montlake Cut. In addition to the area being a convenient location for depositing dredge spoils, it was also used as a municipal landfill (Miller Street Landfill) between 1912 and 1936. Additional portions of the marsh were dredged during the development of the Arboretum and during the original construction of SR 520 (Blukis Onat and Kiers 2007; Blukis Onat et al. 2006).

Foster Island

Since 1917, Foster Island has functioned as a park or arboretum, which likely resulted in minimal ground disturbance to the island (Blukis Onat and Kiers 2007). However, construction of SR 520 in the 1960s across the island resulted in extensive landscape modification within the road corridor and 10 to 20 meters north and south of the alignment. Marshes were also removed on the east and west sides of the island (Blukis Onat and Kiers 2007). Since the APE extends north and south of areas with extensive landscape modification, BOAS defined two Probability Areas within the Foster Island portion of the West Approach. In addition, BOAS recommended that Foster Island be evaluated as a TCP.

Field Investigations

During April, May, and August of 2006, BOAS conducted archaeological investigations at four Probability Areas within the West Approach segment. The other two Probability Areas in the West Approach segment were not investigated because, at the time of the survey, no ground disturbance was planned for the area (Blukis Onat et al. 2007). A summary of the results from the BOAS field investigations is provided below for each Probability Area within the West Approach segment.

Thirteen SPs and two backhoe trenches were excavated in the first Probability Area in the West Approach segment. Stratigraphy from these excavations revealed deep deposits of pebbly sand and silt fill with occasional pieces of lumber, plywood, asphalt chunks, and sewer pipe fragments. Fill deposits were underlain by lacustrine wetland deposits and glacial drift. No intact archaeological deposits were identified (Blukis Onat et al. 2007). Descriptions of the excavated SPs were not sufficient to provide a clear assessment of the depth of undisturbed soils and sediments, and consequently the potential for archaeological deposits to be located below the fill.

Nineteen SPs, four backhoe trenches, and a single block excavation unit were excavated in the next Probability Area in the West Approach segment. The excavation showed both structured and unstructured landfill deposits, fill unassociated with the landfill at the north end, and lacustrine deposits. Seven SPs contained thick deposits of historic domestic refuse, including bottle glass, ceramics, brick and tile, mammal bone (sawn and unmodified), chicken bone, Mason jar lids, and scrap metal (Blukis Onat et al. 2007). Two SPs extended below landfill deposits and into Holocene-aged lacustrine deposits, while five SPs were terminated within landfill deposits (Blukis Onat et al. 2007).

A single human patella, determined to be more than 50 years old by the King County Medical Examiner, was recovered from one of the SPs (Blukis Onat et al. 2007). This discovery prompted the excavation of a single 2x2 block excavation unit, with each 1x1 segment numbered separately. A datum was used to track vertical depth in the excavation unit. Stratified historic deposits with occasional interbeds of sterile clay were encountered during block excavations. Sterile clay interbeds were interpreted as capping events from earlier periods of landfilling. No clear indications of naturally deposited sediments were encountered, so there is the potential for additional landfill deposits below 245

centimeters below datum. Although the primary purpose of the block excavation unit was to further evaluate the context from which the human bone was recovered and to determine whether additional human remains were located in the vicinity, no additional human remains were recovered (Blukis Onat et al. 2007).

No additional archaeological deposits aside from the landfill were identified within this Probability Area. Shovel probes and mechanically excavated trenches that extended below landfill deposits encountered lacustrine silts, clays, and peats. Two trenches extended below lacustrine deposits and into sediments interpreted as having been deposited through glacial processes during the Pleistocene epoch. The presence of lacustrine deposits underlying fill and landfill deposits in several SPs and trenches indicates the widespread presence of buried Holocene-aged sediments. These deposits, in turn, have the potential to contain archaeological deposits. Although it is unlikely that lacustrine sediments contain archaeological deposits associated with habitation areas, they may contain deposits, features, or isolated artifacts related to resource exploitation.

Fourteen SPs and two trenches were excavated in the next Probability Area in the West Approach segment. Stratigraphy from these units exhibited both structured and unstructured landfill deposits, with marsh and lacustrine deposits encountered where probes and trenches were able to penetrate below the landfill (Blukis Onat et al. 2007).

Clearly discernable terminal depths of landfill deposits ranged from 90 to 320 centimeters below ground surface, but several SPs and one trench were terminated prior to encountering the maximum vertical extent of the landfill deposits. Landfill deposits extended at least 4.6 meters below ground surface in one trench. Landfill deposit depths varied across this Probability Area, leaving no indication of the underlying natural topography.

With the exception of landfill deposits, no additional archaeological deposits were identified within this Probability Area (Blukis Onat et al. 2007). Peat was identified in two SPs; however, no glacially deposited sediments were identified in any SPs or backhoe trenches. The presence of peat below the landfill deposits, combined with the paucity of SPs and backhoe trenches that extended below the landfill deposits, indicate that there is potential for widespread Holocene-aged lacustrine sediments within this Probability Area. These sediments have the potential to contain archaeological deposits. Although it is unlikely that

lacustrine sediments contain archaeological deposits associated with habitation areas, they may contain deposits, features, or isolated artifacts related to resource exploitation.

A single SP was excavated in the last Probability Area in the West Approach segment, revealing historic fill overlying glacial drift. No buried surfaces or Holocene sediments were identified, indicating that all sediments with the potential to contain archaeological deposits have been removed (Blukis Onat et al. 2007).

Supplemental Field Visit and Research

In response to redesign and alteration of the project alternatives and changes to the limits of construction boundary, supplemental studies were conducted in support of the Section 106 process. These additional studies included GPR, geomorphological investigation, and historic map analysis of the Foster Island historic shoreline; ethnographic research; archival research on the Miller Street Landfill; and subsequent archaeological studies of Foster Island. The results of these additional studies are presented in this section.

Miller Street Landfill Investigations

WSDOT retained ICF in 2010 to evaluate the eligibility of the Miller Street Landfill (45KI760) for listing in the NRHP. Because of its lack of integrity and compromised data potential, WSDOT recommended that the Miller Street Landfill be determined not eligible for listing in the NRHP. The SHPO concurred with this determination on September 2, 2010. The discussion below summarizes the findings from the NRHP Evaluation Report for the Miller Street Landfill (Schneyder et al. 2010).

BOAS identified the presence of historic-period deposits associated with the Miller Street Landfill during the 2006 investigations of the APE, and had initially suggested that the site may potentially be eligible for listing in the NRHP (Blukis Onat and Kiers 2007; Blukis Onat et al. 2007). However, BOAS did not formally evaluate the landfill for NRHP eligibility during their project work. The subsequent evaluation of 45KI760 by ICF focused on archival research and the background information, data, and artifacts collected during the BOAS investigations. ICF archaeologists researched and described the historical context for refuse disposal practices in the United States, in the city of Seattle, and at the Miller Street Landfill in the late 1800s and early to mid-1900s. ICF also reviewed the background information, data, and artifacts collected during the BOAS investigations. Artifacts included a large quantity of domestic, personal, and structural

materials dating between 1900 and 1930. ICF conducted an independent analysis of the artifacts recovered by BOAS, and classified and analyzed them to determine if the assemblage could contribute significant data to historical research questions.

Historical documentation shows that the Miller Street Landfill received refuse from a population of residents as diverse as the city itself and that the majority of the refuse was presorted prior to being deposited at the landfill. The landfill contained a sorter's shelter, a refuse sorting area, an area for waste incineration, and a salvage storage area (Department of Health and Sanitation 1934). Typical twentieth-century Seattle refuse disposal practices included extensive presorting and salvage operations prior to deposition in a landfill. Municipal employees brought all the unsorted refuse to a central transfer station where the refuse was dumped, and another team hauled the refuse directly to the landfill (Hering and Greeley 1921; Lee 1921; Seattle Engineering Department 1920). At the landfill, so-called "dump men" continued to rake and cover exposed trash. These landfill workers, who often occupied a small cabin on the property, would reclaim paper, rags, metal, and other materials to pay for their wages and help offset the costs of refuse disposal (Murray 1917).

To assess the significance of the Miller Street Landfill, data from archaeological investigations, archival research, and comparative archaeological studies were used. The data potential of the Miller Street Landfill was evaluated against NRHP Criteria A, B, C, and D and an assessment of the integrity of the archaeological site. The examination of integrity focused on the three aspects most relevant to archaeological deposits: location, materials, and association.

According to the historical research on the Miller Street Landfill operations and the City's waste management practices, off-site sorting, recycling, and salvage were standard treatment for household refuse collected during the early twentieth century. The presence of a sorter's shelter, a refuse sorting area, an area for waste incineration, and a salvage storage area at the Miller Street Landfill indicates that the refuse at the landfill was heavily sorted and culled prior to deposition; the refuse deposits identified within 45KI760 are not discrete representative samples of the materials discarded by individuals, households, or businesses in this particular collection district. The contextual relationships between materials were destroyed by sorting and culling prior to being sealed in the landfill deposit. The associations of the refuse deposit that originated at the household level were

compromised by historical waste management practices at the time of deposition, and the archaeological relationships between refuse and household or district no longer exist.

Archaeological site 45KI760, the remains of the Miller Street Landfill, was determined to be not eligible for listing in the NRHP. The site lacks data potential because of the historical waste management practices and, consequently, no associations with specific communities, neighborhoods, institutions, or ethnic groups are evident. Site 45KI760 has been salvaged throughout its history, and the archaeological deposit is not a representative sample of even the large-scale community that created it. Significant research questions applicable to a municipal refuse disposal site type are not addressable by 45KI760 because of the substantial modifications to the landfill over time by historical waste management practices and more recent dredging, grading, and land-filling activities (Schneyder et al. 2010).

Foster Island Investigations

The following summarizes the results of a TCP assessment, relict shoreline delineation and geomorphic analysis, and archaeological investigations on Foster Island.

WSDOT and FHWA, in consultation with the tribes, have determined that Foster Island is eligible for listing in the NRHP as a TCP (WSDOT 2010c). The Preferred Alternative would diminish the integrity of the Foster Island TCP and contribute to the project's adverse effect on historic properties. The effects on the Foster Island TCP will be resolved through stipulations provided in the Foster Island Treatment Plan discussed in greater detail in Chapter 8 of this Cultural Resources Assessment Discipline Report.

Ground-Penetrating Radar Survey

Geophysical Archaeometry Laboratory Inc. was contracted by WSDOT to conduct a GPR survey of Foster Island. The purpose of this survey was to delineate soils that were a part of the original island, as opposed to lake bed deposits, before the Montlake Cut lowered water levels in Lake Washington. The goal of the GPR survey was to identify the location of the historic shoreline (pre-Montlake Cut) and topographic contours of the island (Goodman et al. 2008).

Between July 23 and 26, 2008, a total of 22,346 linear meters of the Foster Island ground surface was surveyed using GPR. From this survey, 748 radiogram profiles were generated, reaching a maximum estimated depth of 368 centimeters when using a 270-MHz antenna,

and 219 centimeters when using a 400-MHz antenna (Goodman et al. 2008). Analysis of these radiogram profiles revealed that there was no unequivocal evidence that helped to delineate the original shoreline or topographic contours of the island. As a result, Goodman et al. (2008) recommended that the results of the survey be compared with available historic topography contours of the island to assist in interpreting the results of the GPR analysis, and that further mapping was necessary in areas that were inaccessible at the time of the survey.

Historic Shoreline Map Research and Analysis

In 2009, ICF conducted extensive cartographic and archival research to supplement the previous analysis of the Foster Island shoreline. This research resulted in the collection of numerous historic maps and photographs, which were scanned and converted to georeferenced spatial layers. These layers were uploaded into the ArcGIS program and analyzed (Schneyder et al. 2009).

Several historic maps that pre- and post-date the completion of the Montlake Cut show variation and evolution of Foster Island over the last 150 years. Prior to the completion of the Montlake Cut, Foster Island consisted of two islands separated by a low spot that was submerged under Lake Washington. Once the Montlake Cut was completed and lake levels lowered, the previously submerged low spot was exposed, and the two islands became one contiguous island. The SR 520, I-5 to Medina project would most closely intersect the previously submerged area between the two islands prior to the completion of the Montlake Cut (Schneyder et al. 2009).

Geomorphic Investigations

Pacific Geoarchaeological Services, with field support from ICF, conducted subsurface excavations and created map profiles and three-dimensional topographic maps of inferred historic shorelines to ground-truth previous GPR investigations of north Foster Island. Pacific Geoarchaeological Services also developed a geomorphic history for Foster Island (Hodges 2010).

From April 5 to April 14, 2010, 25 hand-excavated trenches, 11 SPs, and 26 narrow-diameter soil probes were excavated throughout areas previously investigated with GPR. In addition to macroscopic analysis of soils and stratigraphy, micromorphological analysis of a single soil profile collected from an excavation trench was conducted. Stratigraphic exposures revealed no clear evidence for a relict shoreline within the area previously surveyed with GPR (Hodges 2010).

Additional analysis of landform history determined that Foster Island occupies a landform composed of molded Vashon till overlain by glaciolacustrine clays and silts deposited by glacial Lake Russell. Results of the micromorphological analysis of the single soil profile were inconclusive regarding whether the modern A-horizon was formed prior to the lowering of Lake Washington in 1916, or subsequent to the lowering of the lake.

Archaeological Investigations

WSDOT retained ICF to conduct archaeological investigations of Foster Island within the proposed areas of ground disturbance associated with the construction of SR 520. Archaeological investigations were conducted in two phases. Phase 1 archaeological investigations were conducted between August 2 and August 10, 2010, and involved excavating 115 1x1 TUs. Phase 2 archaeological investigations were conducted between August 9 and September 22, 2010, and involved excavating an additional 497 1x1 TUs. At the completion of both phases of archaeological investigation, a total of 612 1x1 TUs were excavated, representing 100 percent of the area of planned construction ground disturbance on the island.

Given the context in which all the historic artifacts were found, they do not appear to represent the historic activities that are documented to have occurred near Foster Island (logging, sawmill, landfill, etc.). It is more likely that these items were brought in with fill and disturbed during subsequent construction activities, as evidenced by the modern materials found in the same context. Since the historic artifacts were recovered from disturbed sedimentary context in association with modern cultural materials, these artifacts do not represent part of an intact archaeological site, and do not comprise or suggest the presence of a property eligible for listing in the NRHP (Elder et al. 2010a, 2010b).

Two prehistoric isolated artifacts were identified during Phase 1 and Phase 2 archaeological investigations. The first was found near the surface in a disturbed context and adjacent to a paved footpath. Three additional TUs were excavated around the artifact, but none produced cultural materials, indicating that this is an isolated find (Elder et al. 2010a). The second was found in disturbed context during Phase 2 investigations. The artifact was clearly recovered in fill composed of glacial till, overlying a concentration of modern nails, likely associated with the construction of the Evergreen Point Bridge. Since the artifact was within an obviously disturbed sedimentary context, no additional

TUs were excavated outside of the existing 2x2 TU in which it was recovered (Elder et al. 2010b).

The excavations showed that much of the ground surface was extensively modified during construction of SR 520 in the 1960s. Surface modifications include the scraping and removal of topsoil and glaciolacustrine clays, as well as the deposition of imported fill. Isolated, patchy remnants of in-situ topsoil and peat deposits, which would ordinarily have the potential to contain cultural resources, were identified along the eastern and western margins of Foster Island. All such deposits located within TUs were completely screened and sampled during Phase 1 and Phase 2 archaeological investigations (Elder et al. 2010a, 2010b).

ICF identified no NRHP-eligible archaeological resources during the Phase 1 or Phase 2 investigations. As a result, no additional archaeological investigations were recommended, unless the proposed construction footprint on Foster Island is altered to include areas that have not been previously investigated.

West Approach Investigations

Subsequent to the investigations listed above, additional data from the WSAPM was provided by DAHP. This information, which was not available at the time of the original BOAS research and fieldwork, made it necessary to revisit and research as-built plans and LiDAR images of the APE to confirm that all areas with the potential to contain archaeological deposits had been identified.

Analysis of the original SR 520 as-built engineering plans that cover the West Approach segment detail moderate amounts of sediment removal (cut) and imported sediment deposition (fill) activities conducted for the original construction of SR 520 (Morse 1961). Two cut areas ranging in depth from 8 to 12 feet separated by a fill area of approximately 5 feet deep are detailed on the western end of the West Approach segment. Two additional areas of cut and fill are located on Foster Island. The western margin of Foster Island was moderately filled from 5 to 8 feet where the bridge structure meets the island and approximately 3 to 5 feet of cut depth occurred immediately east of the West Approach fill. The area east of the cut was filled to a depth range of 3 to 6 feet (Morse 1961). The LiDAR imagery of this area provides visual evidence of the cut activities detailed in the as-built plans (Puget Sound LiDAR Consortium 2000).

On October 28, 2010, ICF archaeologists visited the West Approach segment to identify additional accessible areas with the potential to contain Holocene-aged sediments and soils.

Recommendations

Probability Areas

No archaeological deposits were identified in the first Probability Area. However, a lack of sedimentary context information makes it impossible to determine whether the potential for buried archaeological deposits still exists, or if all sediments with the potential for archaeological deposits have been removed. Additional archaeological investigations are recommended for this Probability Area prior to ground disturbance activities associated with the construction of SR 520. These investigations should primarily focus on determining whether undisturbed Holocene-aged soils or sediments are present in this area.

Archaeological investigations of two other Probability Areas produced evidence of the Miller Street Landfill. The site was determined to be not eligible for listing in the NRHP. As a result, no additional archaeological investigations are recommended for any deposits associated with the Miller Street Landfill. In areas where only pile-driving is expected to occur, no additional archaeological investigations are recommended, since planned activities do not include the excavation and removal of sediment.

ICF identified no NRHP-eligible archaeological resources during the Phase 1 or Phase 2 investigations of Foster Island. As a result, no additional archaeological investigations are recommended, unless the proposed construction footprint on Foster Island is altered to include areas that were not previously investigated.

No archaeological deposits or buried surfaces were identified in the final Probability Area. An SP from this area revealed the presence of historic fill overlying glacial drift; no additional archaeological investigations are recommended.

Other Areas

The ground surface along East Lake Washington Boulevard and within the MOHAI parking lot is paved. Therefore, there is no way to assess the extent of previous ground disturbance. It is recommended that these areas be evaluated, once accessible, for the presence of Holocene-aged sediments to determine appropriate investigations. Analysis of geotechnical monitoring data may be used to determine if Holocene-

aged sediments are present. No further investigations are recommended if there is clear evidence that Holocene-aged sediments and soils have been previously removed across this segment.

Lake Washington Study Area

Research

In 2006, BOAS conducted an ethnographic place study and researched the land use history of the entire APE to assess archaeological sensitivity of the area to the east of Lake Washington (Blukis Onat and Kiers 2007). However, activities that occurred in and adjacent to the area, including the excavation associated with the original construction of SR 520, indicate that the area was extensively modified (Blukis Onat and Kiers 2007). Other construction activities that likely modified the landscape include the lowering of Lake Washington, timber harvesting, and later farm and residential development (Blukis Onat and Kiers 2007).

BOAS determined that it is unlikely that the location of the "Fingers" area (also called the Points, including Evergreen Point, Hunt's Point, and Yarrow Point) on the Eastside of Lake Washington retains "historic significance" because of extensive ground disturbance and landform modifications associated with the construction of the Montlake canal and SR 520 (Blukis Onat et al. 2007; Blukis Onat and Kiers 2007). However, BOAS concluded that the potential for previously undisturbed archaeological deposits still existed and that subsurface investigations were necessary to determine if the project will affect significant historic properties (Blukis Onat and Kiers 2007).

From this research, BOAS defined three archaeological Probability Areas within the Lake Washington portion of the APE.

Field Investigations

In April and May of 2006, BOAS conducted archaeological investigations in three Probability Areas. This section summarizes the results of the BOAS field investigations.

Two SPs were excavated in the first Probability Area, reaching an average depth of 198 centimeters below surface. SPs in this area showed a weak A-horizon had formed over glacial drift, with fill originating from the eroding bluff at the surface. No buried relict A-horizon soils or intact archaeological deposits were identified (Blukis Onat et al. 2007).

Five SPs were excavated in the second Probability Area, reaching an average depth of 130 centimeters below surface. SPs in this area revealed that intact A- and B-horizons had formed to an average depth of 62 centimeters below surface over glacial drift. No buried relict A-horizon soils or intact archaeological deposits were identified (Blukis Onat et al. 2007).

No SPs were excavated in the third Probability Area. This area was significantly affected by the original construction of SR 520 and, as a result, BOAS determined that subsurface investigations were unnecessary (Blukis Onat et al. 2007)

Supplemental Field Visit and Research

Subsequent to the investigations described above, two additional data sources were consulted to confirm that all areas within the limits of construction having the potential to contain archaeological deposits had been identified. These data sources were several submerged resource studies within the APE and additional data from the WSAPM. The results of these additional studies are presented below.

Submerged Investigations

Two studies have been conducted to identify submerged resources in the APE. The first study, conducted by Golder & Associates in 2003, included a side scan sonar study of the APE and historic research regarding the use of water vessels in Lake Washington. The second study, conducted by Advanced Commercial Divers in 2003, focused on areas of interest identified during the side scan sonar study. As a result of these studies, three submerged resources were found within the limits of construction in the Lake Washington study area. These resources, discussed in more detail below, are 45KI761 (wooden steamer or schooner), 45KI762 (barge), and 45KI763 (barge).

Site 45KI761 is a large wooden schooner or steamer located at the bottom of Lake Washington. When observed by divers in October, November, and December of 2003, the shipwreck was found in poor condition. Prior to sinking, the vessel was stripped of machinery, decking, attachments, and other hardware. All cargo was also removed except for some beams, metal fragments, and automobile tires. Physical damage was also evident to the vessel; notably the stern was missing, the structure was heavily rotted, and fire damage had been sustained to the bow and beams within the hull (Calvit and Bard 2005a). Because of the vessel's poor condition, loss of integrity, and lack of identifying features, WSDOT, with concurrence from the SHPO, determined that

45KI761 was not eligible for listing in the NRHP (Calvit and Bard 2006a).

Site 45KI762 is an early 1900s wooden barge located at the bottom of Lake Washington. When observed by divers in October of 2003, the shipwreck was found in poor condition. Major damage was evident to the bow, the northwest side of the vessel, and the decking, of which 30 percent was missing. No machinery, cargo, or other distinctive hardware was present (Calvit and Bard 2005b). Because of the vessel's poor condition, loss of integrity, and lack of identifying features, WSDOT, with concurrence from the SHPO, determined that 45KI762 was not eligible for listing in the NRHP (Calvit and Bard 2006b).

Site 45KI763 is a wooden barge located at the bottom of Lake Washington. The vessel was identified by markings as the Forest No. 15, a barge built in 1924 and berthed in Aberdeen, Washington. When observed by divers in October of 2003, the shipwreck was found in fair to poor condition. No machinery, cargo, or other distinctive hardware was present. Although 35 percent of the decking was missing, 40 percent of the remaining wooden structure appeared to be intact (Calvit and Bard 2005c). Calvit and Bard (2006c) conducted additional research on the barges in order to better understand the major functions, potential vessel types, and role of these ships in Washington historical events. However, they found limited information, concluding that these vessels were commonplace. As a result, they could not place the role of the Forest No. 15 within any important historical events during its period of significance from 1870 to 1950. These factors, combined with the vessel's fair to poor condition and loss of integrity, led to WSDOT's determination, with concurrence from the SHPO, that 45KI763 was not eligible for listing in the NRHP (Calvit and Bard 2006c).

Supplemental Field Visit and Research

Subsequent to the investigations described above, additional data from the WSAPM was provided by DAHP. This information, which was not available at the time of the original BOAS research and fieldwork, made it necessary to research as-built plans and LiDAR images to confirm that all areas with the potential to contain archaeological deposits had been identified.

The SR 520 as-built engineering plans that cover the Lake Washington study area show moderate grading and imported sediment deposition (fill) from the original construction of SR 520 (McKay 1963). The east

approach for the Evergreen Point Bridge was filled to depths of 5 to 10 feet to accommodate the bridge-to-road transition at the steep bluff on the east side of Lake Washington (McKay 1963). The LiDAR imagery of this area is consistent with the grading and filling detailed in the as-built plans (Puget Sound LiDAR Consortium 2000).

ICF archaeologists visited the Lake Washington study area on October 28, 2010, to identify any additional areas with the potential to contain intact Holocene-era sediments and soils. The adjoining areas were previously surveyed by BOAS and glacial till was encountered at the ground surface (Blukis Onat et al. 2007). Therefore, no additional archaeological investigations are recommended in previously surveyed areas.

Along SR 520 and the lands directly adjacent, sediments were removed during construction of the highway. No additional investigations were recommended.

Recommendations

Ethnographic research and landscape analysis by BOAS generated three Probability Areas, having the potential to contain archaeological deposits. Archaeological investigations of two of these Probability Areas identified no buried relict A-horizon soils or intact archaeological deposits. Visual inspection of the third Probability Area revealed extensive ground disturbance associated with the construction of SR 520 in the 1960s. No further investigations are recommended in previously surveyed areas.

Golder & Associates (2003) identified three possible submerged resources within the APE. Subsequent diving investigations conducted by Advanced Commercial Divers (2003) of these areas identified no additional submerged NRHP-eligible resources within the APE. No further investigations are recommended for submerged resources.

A subsequent field visit to the eastern shoreline of the Lake Washington study area identified several small, previously unsurveyed locations within WSDOT's right-of-way on either side of SR 520. Additional archaeological investigations are recommended in those areas that have not been previously surveyed.

Eastside Transition Study Area

Research

The entire Eastside transition study area and eastern margin of the Lake Washington shoreline are located in the eastern portion of the Lake Washington ethnographic study area researched by BOAS (Blukis Onat and Kiers 2007). In many cases, a named ethnographic locality can be an indicator of archaeological potential. However, it is likely that the area has been extensively modified by the initial SR 520 construction activities, which is likely to have destroyed any intact archaeological deposits. Other activities that likely modified the landscape include the lowering of Lake Washington, timber harvesting, and later farm and residential development (Blukis Onat and Kiers 2007).

BOAS identified three Probability Areas in this study area, none of which are located within the current limits of construction. Only one Probability Area is discussed below, because it is located within the current APE although it is outside the limits of construction.

Field Investigations

In April and May of 2006, BOAS conducted archaeological investigations of one Probability Area within the Eastside transition study area. A total of 20 SPs were excavated. Six of the SPs contained gray silty clay and peaty material, indicating a lacustrine depositional environment below sediments interpreted as fill, which contained modern debris. The remainder of the SPs' clean silt or sand—which according to Blukis Onat et al. (2007) did not resemble fill—possibly represented undisturbed glacial drift. Stratigraphy in SPs revealed the area consists of massive fill that contained modern debris. No archaeological resources were found in this Probability Area.

Supplemental Field Visit and Research

SR 520 as-built engineering plans covering the Eastside transition study area detail cut and fill activities conducted for the original construction of SR 520 (McKay 1963). The east approach for the Evergreen Point Bridge within the Eastside transition study area was filled to accommodate the bridge-to-road transition. The areas between the Evergreen Point Road overpass to 92nd Avenue NE were alternately cut and filled to accommodate SR 520 through the undulating Eastside landscape. The Evergreen Point Road area was cut to depths from 10 to 25 feet to accommodate the undercrossing. The area between 80th Avenue NE and south of Fairweather Bay was filled from 5 to 25 feet.

The approach and undercrossing at 84th Avenue NE was cut to depths ranging from 10 to 25 feet. The alignment east of 86th Avenue NE to NE 32nd Street was filled to depths ranging from 5 to 27 feet. The approach and undercrossing at 92nd Avenue NE were cut to depths ranging from 10 to 20 feet (McKay 1963). The LiDAR imagery of this area is consistent with the extensive cut and fill activities detailed in the as-built plans (Puget Sound LiDAR Consortium 2000).

ICF archaeologists visited the Eastside transition study area on October 28, 2010, to identify any additional areas with the potential to contain intact Holocene-era sediments and soils. Two areas contain deep deposits of fill—east of Hunts Point Park (with fill depth of 8 to 10 feet) and just south of Fairweather Bay on the north side of SR 520 (with fill depth of 10 to 15 feet).

Along SR 520 and the lands directly adjacent, sediments were removed during construction of the highway. No additional investigations are recommended in this area because these deposits deeply incise a Pleistocene-aged glacial till plain.

Recommendations

Project activities in the Eastside transition study area include road restriping and will not extend below the paved ground surface. As a result, no additional archaeological investigations are recommended in these areas.

Pontoon Production Sites

The APE was revised in 2010 to include the Port of Olympia and Port of Tacoma as potential pontoon production sites. Archaeological monitoring of geotechnical investigations was conducted at both alternative sites in August and September 2010. Up until December of 2010, WSDOT was actively considering and evaluating the two port sites, but the Port of Olympia site is no longer being considered. The pontoon production sites will be selected by the contractor. If the Port of Olympia site is selected by the contractor, the appropriate environmental compliance processes, including Section 106, will be reinitiated.