

Social Resources and Environmental Justice Discipline Report

FINAL

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Submitted to:



City of Seattle
Department of Transportation
700 5th Avenue, Suite 3900
Seattle WA 98124

Prepared by:
Tetra Tech, Inc.



Elliott Bay Seawall Project

SOCIAL RESOURCES AND ENVIRONMENTAL JUSTICE DISCIPLINE REPORT

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This Discipline Report provides detailed background and analysis to support the City of Seattle's SEPA (Washington State Environmental Policy Act) Environmental Impact Statement for the Elliott Bay Seawall Project. This report also serves the same role to support the USACE's NEPA (National Environmental Policy Act) environmental analysis for the Elliott Bay Seawall Project. Thus, both SEPA and NEPA references and considerations are included.

To conduct this project, SDOT contracted with:

Tetra Tech, Inc.

1420 5th Avenue, Suite 550
Seattle WA 98101

In association with:

Anchor QEA
BergerABAM
Coast & Harbor
Envirolssues
Fehr & Peers
Floyd|Snider
GHD
JA Brennan
LPES
Magnusson Klemencic Associates
Mimi Sheridan
Nelson\Nygaard
Power Engineers
Risk Strategics
Shannon & Wilson
SWCA Environmental Consultants
Washington2 Advocates
William P. Ott Construction Consultants
ZGF Architects

City of Seattle
Social Resources and Environmental Justice Discipline Report

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ACRONYMS, ABBREVIATIONS, AND DEFINITIONS

AWV	Alaskan Way Viaduct
AWVSRP	Alaskan Way Viaduct and Seawall Replacement Program
BNSF	BNSF Railway
BSP	braced soldier pile
CFR	Code of Federal Regulations
City	City of Seattle
DPD	Department of Planning and Development
DSHS	Department of Social and Health Services
EBSP	Elliott Bay Seawall Project
EIS	Environmental Impact Statement
EO	Executive Order
FHWA	Federal Highway Administration
HHS	Department of Health and Human Services
MPA	Marine Protection Area
NEPA	National Environmental Policy Act
OFM	Office of Financial Management
NOAA	National Oceanic and Atmospheric Administration
PSRC	Puget Sound Regional Council
SDOT	Seattle Department of Transportation
SEPA	Washington State Environmental Policy Act
SKCCH	Seattle/King County Coalition on Homelessness
SMSA	Standard Metropolitan Statistical Area
SPU	Seattle Public Utilities
SR	State Route
USC	United States Code
USACE	United States Army Corps of Engineers
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation
WSF	Washington State Ferries

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EXECUTIVE SUMMARY

The Elliott Bay Seawall Project (EBSP) would reconstruct or replace the existing seawall. The seawall corridor (S. Washington Street to Broad Street) is located on the water's edge in downtown Seattle and adjacent to land used for businesses, residences, transportation facilities (streets, ferries, cruise ships, etc.), public services (fire station), City parks and other recreational elements. Construction of the new seawall may have effects (both beneficial and adverse) on social resources. This Discipline Report and the project's National Environmental Policy Act (NEPA) and Washington State Environmental Policy Act (SEPA) documents examine the effects of the project on these resources.

BUILD ALTERNATIVES

Three build alternatives have been developed to allow for a range of design ideas that potentially can be merged and/or combined in future design phases to reflect public, agency, technical and stakeholder input. The intent is to present a wide range of project design possibilities, associated impacts and proposed mitigation to sufficiently "bookend" the project; thus defining and capturing the range of options and associated impacts. It is anticipated that the preferred alternative ultimately adopted will fall somewhere between the two "bookend" alternatives documented in the Draft EIS.

In Alternative A, the seawall would be reconstructed more or less in its existing alignment, with some setback to facilitate construction without requiring the removal of the existing wall first. Alternative A proposes a soil improvement seawall structural option, but a braced soldier pile (BSP) structural option could be used and still maintain the wall location, habitat improvements and other proposed features.

In Alternative B, the seawall would be pulled back to the east of its existing alignment. Alternative B employs a BSP seawall structural option, but the soil improvement option or some combination of the BSP and soil improvement options could be used and still maintain the wall location, habitat improvements and other proposed features.

Alternative C is a true hybrid alternative, representing features from both Alternatives A and B. The construction method described for Alternative A (i.e., soil improvement) also applies to Alternative C.

CONSTRUCTION IMPACTS

The analysis of effects has been performed using the existing data collected and previously published reports. Any proposed changes in the project area have been thoroughly examined in order to illustrate the impacts—both adverse and beneficial—on community resources and social characteristics of the project area. Both temporary and permanent impacts on social resources have been discussed that may result from both the construction and operation of the project. Most of the project's effects are expected to be associated with construction and are therefore temporary (i.e., limited access, traffic, noise, and air quality effects), but those effects may be substantial. The extent of these effects will depend on the stage of construction and proximity to residents and businesses and will range from minor to substantial in some instances. The effects of the project on community resources, special housing, and gathering places are discussed in detail along with any proposed mitigation measures.

No construction is proposed for the No Action Alternative, thus there are no anticipated effects (see Section 6.1 for a discussion of operational effects and continued maintenance likely to occur for the No Action Alternative).

Construction activities for the three build alternatives could have several different types of adverse effects on social resources and environmental justice populations living in and near the construction zone and these effects could range from minor to substantial, but appropriate mitigation measures will be implemented. Construction traffic, road detours, light and glare, noise and dust will certainly affect residents living within approximately one to two blocks of the construction zone. In addition, residents living across the street or adjacent to potential construction staging areas will also be affected. Generally speaking, the specific impacts to adjacent social resources during construction will be similar under Alternatives A, B, and C, except for the increased duration of Alternative B construction.

Under Alternatives A and C, construction of the seawall and habitat improvements and restoration of the roadway will occur in stages over a number of years. The current project schedule assumes that no work would occur during the peak summer months (Memorial Day weekend through Labor Day weekend) to minimize impacts on businesses, visitors, and local residents. Under Alternative B, the larger wall pullback and the use of the BSP construction technique are anticipated to result in a longer overall construction period. Therefore, Central Seawall construction is expected to take three to four construction seasons depending on the alternative. During construction of the Central Seawall, a vehicular detour would be provided east of the existing surface street, with three lanes under the existing Alaskan Way Viaduct and a fourth lane just west of the Alaskan Way Viaduct structure. During this period, parking would be removed from under the Alaskan Way Viaduct and would not return until completion. This loss of parking will reduce the supply of available parking that serves visitors and residents along the waterfront.

The schedule analysis indicates that North Seawall construction for Alternative B would have an overall duration similar to Alternatives A and C (though it is expected to be slightly longer) of four construction seasons.

Construction effects of the project on minority and low-income populations include increased traffic congestion, travel delays, increased response time for emergency services, increased noise, and decreased parking. Construction activities and the associated noise, light and glare effects in the construction corridor could affect homeless persons living on downtown streets. Although construction would affect minority and low-income populations, these effects can be avoided, minimized, and mitigated. Discussions with service providers have identified potential solutions to many known and potential construction effects. The key to mitigating potential effects of the project is ongoing community outreach and communication efforts before, during, and after construction. Monitoring mitigation during the construction period will be important to ensure that the suggested measures are successful and to understand how they might be modified to be more effective.

OPERATIONAL IMPACTS

Under the No Action Alternative, the existing seawall will remain in place unless all or a portion of the seawall collapses as a result of tidal or seismic activity. Routine maintenance activities would continue

that could occasionally result in sidewalk and/or lane closures. Short-duration impacts, such as construction noise, dust and access restrictions could result from such activities.

When the EBSF is complete, the waterfront and study area will be very similar to what it is today. Therefore, all three of the build alternatives will have little or no effect on social resources and environmental justice populations in the study area. The operation of the proposed build alternatives will require workers to repair and maintain the seawall. Workers will be required for all of the build alternatives for operations and maintenance of the seawall. However, the number of employees will likely be small and already employed by SDOT, Seattle Public Utilities, Seattle City Light, and other private utility personnel. Any new jobs created (if any) likely will be hired from the regional labor force, as the types of new jobs will not likely require employees with highly specialized skills.

MITIGATION

Residents, visitors, and social resources within the project area will be adversely affected by the duration of construction activities, the physical extent of the project area and the accumulation of direct construction impacts. While these impacts will not be permanent, they will have a negative effect on social resources and environmental justice populations.

These effects will adversely affect those located in and near the study area during construction, but the effects would be mostly localized where construction is occurring and temporary while construction is in progress. These timeframes do not include the annual summer shutdowns anticipated in the schedule and construction sequencing.

The City will provide timely communications with social service agencies and providers as construction activities proceed in order to mitigate impacts. Details regarding detours, utility disruptions and other critical activities will be provided. The City will work with social service contacts concerning access issues during both the design and construction phases. Other potential mitigation to reduce adverse effects, such as hardships to the low-income resident and homeless populations in the project area during construction activities include the provision of constant communication regarding construction location and activities; maintaining optimal access for all transportation modes (pedestrian, bicycle, transit, passenger vehicle, freight, ferry and cruise, and marine cargo) to the project area, and implementing noise, dust and vibration mitigation during construction.

The intent of all the build alternatives is to restore the roadway, sidewalks, trails, and parking to original functionality. Therefore, there will be no permanent effects and no operational mitigation is necessary.

ENVIRONMENTAL JUSTICE DETERMINATION

For the environmental justice population analysis, the team examined existing data about minority, low-income and other special populations to determine whether or not disproportionately high impacts to any of these populations are expected to occur as a result of the project. Based on the analysis conducted for this Discipline Report, it is determined that the three build alternatives will not cause disproportionately high and adverse effects (adverse effects that are predominately borne by a minority and/or a low-income population; or will be suffered by the minority population and/or low-income

population, and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by others) on minority and low-income populations.

CHAPTER 1. PROJECT DESCRIPTION

1.1 PROJECT BACKGROUND

The City of Seattle Department of Transportation (SDOT) is proposing to construct the Elliott Bay Seawall Project (EBSP), which will replace the existing seawall along the shoreline of downtown Seattle. Extending from S. Washington Street to Broad Street, the seawall supports and protects the adjacent upland areas, which contain residences, commercial businesses and restaurants, parks and public facilities, transportation infrastructure (including sidewalks, streets, and a rail line), and a large number of utilities (Figure 1-1). The harbor area in Elliott Bay is used by ferries, cruise ships, and commercial vessels, as well as for recreation. Overall, the waterfront is an important center of commerce and recreation for the entire city and region.



Figure 1-1. Elliott Bay Seawall Project Area

The existing seawall includes three types of structures, all constructed between 1911 and 1936 and ranging in size from approximately 15 to 60 feet wide. Over time, these structures have deteriorated as a result of various natural and physical processes. The seawall's poor condition makes it vulnerable to significant damage during a major storm or seismic event. Therefore, the EBSP is a critical public safety project. The completed seawall will provide protection from coastal storm damages, seismic damages, and shoreline erosion, and will thereby contribute to the preservation of Seattle's downtown, the local economy, and the region's economic competitiveness and quality of life. Seawall replacement will also provide the foundation and structural support for the downtown Seattle waterfront, including improvements planned as part of Waterfront Seattle.

The project's purpose is to reduce the risks of coastal storm and seismic damages and to protect public safety, critical infrastructure, and associated economic activities along Seattle's central waterfront. Additionally, the project will improve the degraded ecosystem functions and processes of the Elliott Bay nearshore in the vicinity of the existing seawall.

Construction of a new seawall would have both beneficial and adverse effects on environmental resources. This discipline report will examine the effects of the project on social characteristics and environmental justice populations as part of the project's overall environmental documentation.

1.2 PROJECT AREA LIMITS AND ZONES

The project area for the EBSP extends from S. Washington Street to Broad Street, from the eastern edge of pavement below State Route (SR) 99 to the waters of Elliott Bay. The project has been divided into six zones. Zones 1 through 4 constitute the Central Seawall Study Area. The two remaining zones, Zones 5 and 6, make up the North Seawall Study Area. A delineation of the zones is provided in Figure 1-2 and concept plans are included at the end of this chapter.



Figure 1-2. Elliott Bay Seawall Zone Designations

Central Seawall Study Area (S. Washington Street to Virginia Street):

- Zone 1, the Pioneer Square/Washington Street Boat Landing Zone, runs from S. Washington Street to Yesler Way.
- Zone 2, the Ferry Terminal Zone, stretches from Yesler Way to Madison Street, and includes the Colman Dock ferry terminal and Fire Station No. 5.
- Zone 3, the Central Pier Zone, includes the historic waterfront piers (Piers 54 to 57) and runs from Madison Street to just north of University Street.
- Zone 4, the Park/Aquarium Zone, includes Waterfront Park, the Seattle Aquarium, and Piers 62/63. This zone runs from north of University Street to approximately Virginia Street.

North Seawall Study Area (Virginia Street to Broad Street):

- Zone 5, the Bell Harbor Zone, runs from Virginia Street to Battery Street. This zone includes the Bell Harbor Conference Center, Cruise Ship Terminal, and Marina.
- Zone 6, the North Pier Zone, stretches from Battery Street to Broad Street, and includes the Edgewater Hotel, Port of Seattle Offices, and Pier 70.

1.3 PROJECT ALTERNATIVES

The EBSP Environmental Impact Statement (EIS) evaluates a No Action Alternative and three build alternatives for the project. As required by the National Environmental Policy Act (NEPA) and the Washington State Environmental Policy Act (SEPA), the build alternatives represent different ways of accomplishing the project purpose. Evaluating alternatives allows SDOT decision-makers, with input from the public, agencies, and tribes, to consider environmental impacts in conjunction with other decision factors such as cost, schedule, and feasibility.

The build alternatives for the EBSP are:

- **Alternative A**, which would reconstruct the seawall as close to its existing alignment as possible. Jet grouting, a subsurface soil improvement, would be used to form the seawall's structural support. Habitat improvements would include the addition of shoreline enhancements, installation of a continuous habitat bench, and intermittent light-penetrating surfaces (LPS) at piers.
- **Alternative B**, which would move the seawall up to 75 feet landward of its current location. Braced soldier piles (BSP) would be used to build an underground wall structure. Moving the seawall inland would allow the construction of expanded habitat enhancements and mostly continuous LPS, in addition to the habitat improvements and continuous habitat bench described for Alternative A.
- **Alternative C**, which would move the seawall up to 15 feet landward of its current location. This alternative would use subsurface soil improvements (likely including both jet grouting and deep soil mixing) to provide structural support. Alternative C would provide a continuous habitat bench and continuous LPS, in addition to shoreline enhancements similar to Alternative B.

These three build alternatives encompass a range of design ideas to establish “bookends” for the project, thus capturing a suite of potential options, impacts, and effects. Features of the alternatives could be blended in future design phases to reflect public, agency, and stakeholder input.

The following section (Section 1.4) describes the No Action Alternative. Section 1.5 discusses the features that are common to the three build alternatives and Section 1.6 provides an overview of project construction. Section 1.7 provides additional detail on specific features that differ among the build alternatives.

1.4 NO ACTION ALTERNATIVE

NEPA, SEPA, and the City of Seattle's (City's) implementing regulations (Seattle Municipal Code [SMC] 25.05) require that a No Action Alternative is evaluated in addition to the build alternatives in the EIS. The No Action Alternative provides a baseline against which the potential effects of the build alternatives can be compared.

The No Action Alternative is projected over the next 50 years. Given the age and condition of the seawall, continued deterioration and some level of failure will likely occur within the 50-year timeframe. Because the existing seawall is vulnerable to various types of damage, the No Action Alternative must

anticipate the possibility of degrees of seawall failure. Therefore, three No Action scenarios have been evaluated:

1. **Minimal Damage:** This scenario would not require a significant repair of the seawall, and any needed repairs could be undertaken by the City. Small failures caused by tidal erosion (as are currently happening today) or minor seismic events would result in settlement of the wall or collapse of the roadway or sidewalk on Alaskan Way. This scenario assumes continued operation of the seawall with ongoing maintenance as needed.
2. **Loss of Functionality:** This scenario would result from sustained damage, and the seawall would no longer be considered safe for public access and could no longer perform the majority of its essential functions. As with the Minimal Damage scenario, this scenario could result from either tidal or seismic events.
3. **Collapse of the Seawall:** This scenario would occur only as a result of seismic damage; however, collapse resulting from a seismic event could trigger additional damage from tidal erosion. Seawall failure would have significant impacts on the public, Seattle, the Puget Sound region, Washington State, and the nation. Loss of the seawall's function would disrupt or destroy the critical transportation infrastructure that runs along the Seattle waterfront, potentially displacing hundreds of thousands of vehicles on roadways, 30,000 daily ferry passengers who use Colman Dock ferry terminal, and 24 freight trains and six passenger trains that run near the waterfront. It would also jeopardize critical utility corridors that serve downtown Seattle and the region, and would impair the viability of the waterfront as a major tourist destination and regional economic engine.

Conditions without the project were defined as part of a separate Elliott Bay Seawall Feasibility Study, conducted by the United States Army Corps of Engineers (USACE). The "without project" conditions serve a similar purpose in the feasibility study as does the No Action Alternative under SEPA. The without project conditions are summarized below to provide additional detail about the No Action scenarios.

- The City would continue to repair minimal damage failures unless three or more sections of the seawall fail in a single year, at which point the seawall is assumed to have lost its functionality.
- The City would stabilize the shoreline following seawall collapse to minimize erosion impacts. This stabilization would help to prevent the permanent loss of landward structures, utilities, and the Burlington Northern Santa Fe (BNSF) rail line to erosion.
- If functionality of the seawall were lost, the City would construct a trestle bridge to maintain access to Colman Dock Ferry Terminal and Fire Station No. 5.
- If functionality of the seawall were lost, the City would repair or relocate affected utilities.

1.5 DESIGN FEATURES COMMON TO THE BUILD ALTERNATIVES

If implemented, the EBSP would replace the failing seawall that runs along Elliott Bay and underneath Alaskan Way and would restore and enhance aquatic habitat along the seawall's new face. A new

seawall would reduce the risk of seismic damage and protect Seattle's downtown waterfront from wind-driven storm waves and erosive tidal forces; safeguard major public and private utilities, including power for downtown Seattle and the region, natural gas, and telecommunications; support SR 99, Colman Dock ferry terminal, and rail lines; and enhance habitat for juvenile salmon and other marine life. Additionally, the project would be compatible with future improvements currently being planned at and near the waterfront.

All build alternatives encompass three major categories of design features: the new seawall itself, improvements to aquatic habitat, and improvements to upland areas. Each of these categories is described briefly below.

1.5.1 Seawall

The primary function of the new seawall is to provide protection from storm and wave erosion, impacts from floating objects, and resistance from lateral pressures such as those caused by an earthquake. A new seawall face would generally be placed either close to or somewhat landward of its current position. Depending on the build alternative selected, the final location of the seawall face would vary from approximately 3 feet waterward to 75 feet landward of the existing alignment. It would be most efficient to leave the existing seawall in place during construction of the new seawall and to build the new structure either behind or in front of the existing face.

The new seawall would also reduce the risks related to seismic activity. How these risks are reduced would differ between the alternatives. Soil improvement in the form of jet grouting with or without deep soil mixing (Alternatives A and C) would minimize the risk of liquefaction by physically stabilizing liquefiable soils behind the seawall, while the BSP method (Alternative B) would not prevent liquefaction but rather would resist the lateral spreading and migration of soil that results from liquefaction. Both methods would stabilize the seawall during seismic events. The design life of the new seawall is 75 years.

1.5.2 Habitat Improvements

Rebuilding the seawall would provide the opportunity to improve adjacent aquatic habitat. Habitat improvement measures would be implemented as part of each build alternative. These measures would be designed to restore a functional intertidal migration corridor along the seawall for juvenile salmonids, and would also improve ecosystem productivity to enhance the marine nearshore food web. Figure 1-3 shows a conceptual rendering of the proposed habitat improvements.

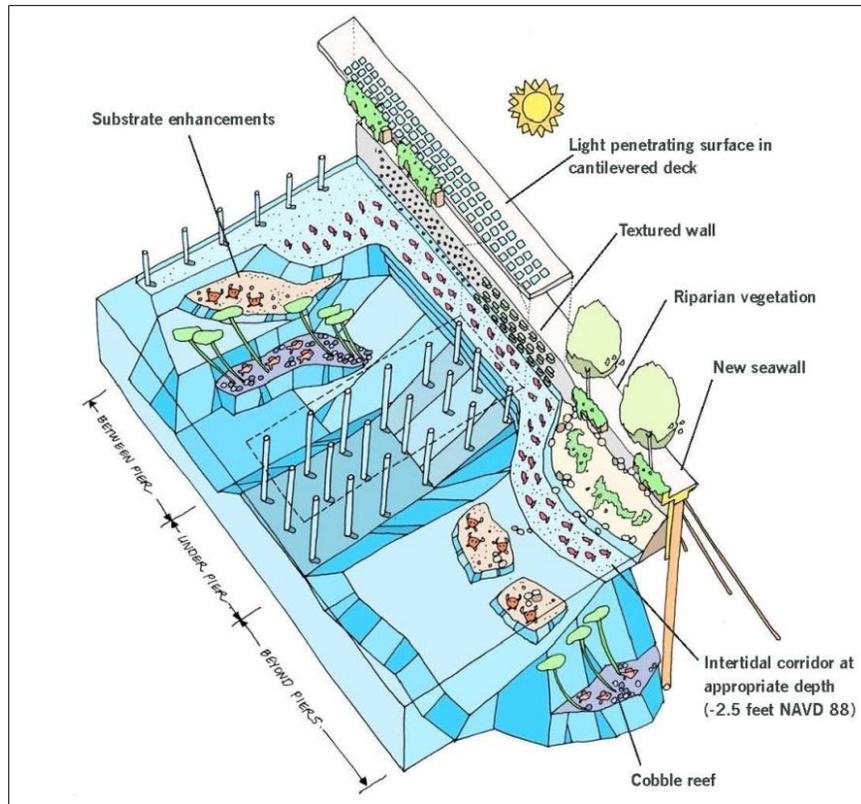


Figure 1-3. Conceptual Rendering of Proposed Habitat Improvements

The intertidal migration corridor for juvenile salmonids would be improved by:

- Modifying substrate depths to create a habitat bench and achieve appropriate intertidal and shallow-water habitat elevations;
- Improving the diversity of off-shore substrate by supplementing it with coarse substrate;
- Increasing textures on the seawall face to encourage the development of marine nearshore habitat and attachment of aquatic organisms;
- Adding riparian plants along the wall and sidewalk to provide food (insects and detritus) for migrating salmon; and
- Increasing daylight illumination of the habitat bench and other nearshore habitat by including LPS in a cantilevered or pile-supported sidewalk.

Enhanced ecosystem productivity would generally be accomplished by:

- Enhancing substrate by supplementing it with cobble, pea gravel, and shell hash; and
- Constructing the textured wall face, riparian plantings, LPS, and suitable bench substrate.

1.5.3 Upland Improvements

In addition to replacing the seawall and restoring aquatic habitat, the three build alternatives would provide a number of upland improvements. The existing Alaskan Way roadway, multi-use trail, and parking would be restored to their original function and capacity after construction. The restored

sidewalk along the waterfront would range from 15 to 30 feet in width and include a cantilevered portion with LPS that would benefit the marine habitat below. Viewing areas would be provided waterward of the sidewalk and would offer opportunities for public gathering space. New railings, formal and informal seating, bicycle racks, wayfinding elements, and other design amenities would also be included as project improvements. All build alternatives would restore the historic Washington Street Boat Landing, either maintaining its current location or moving it 15 feet waterward.

Currently, there are no water quality facilities for treating surface water runoff from Alaskan Way. Stormwater drainage pipes in the project area would be reconstructed and stormwater quality would be improved through the installation of treatment to meet code by removing the bulk of suspended solids, oils, and greases. These actions would improve water quality in the nearshore of the project area. It would be expected that new stormwater structures would initially require less maintenance than those currently in place and, as a result, have fewer detrimental impacts on the environment. As the project design moves forward, other stormwater management strategies could be identified that provide greater environmental benefit without increasing environmental impacts.

1.6 PROJECT CONSTRUCTION

1.6.1 Construction Schedule

Central Seawall construction is expected to begin in fall of 2013 and would progress from north to south, beginning in Zone 4 and ending in Zone 1. Based on current schedules, Central Seawall construction would last three to five construction seasons depending on the alternative, with construction seasons extending from approximately Labor Day to Memorial Day to avoid major disruption during the peak tourist season. The North Seawall would be built as a separate construction phase and would require an additional four construction seasons.

1.6.2 Temporary Roadway and Construction Work Zone

To accommodate construction activities during replacement of the seawall, the existing Alaskan Way roadway would be relocated beneath the Alaskan Way Viaduct. Three lanes of traffic would be maintained underneath the viaduct throughout construction. The resulting space along the waterfront would be used as a work zone during construction of the Central Seawall (Figure 1-4). During North Seawall construction, this dedicated construction work zone would not be available, and the temporary roadway would be accommodated in the available right-of-way.

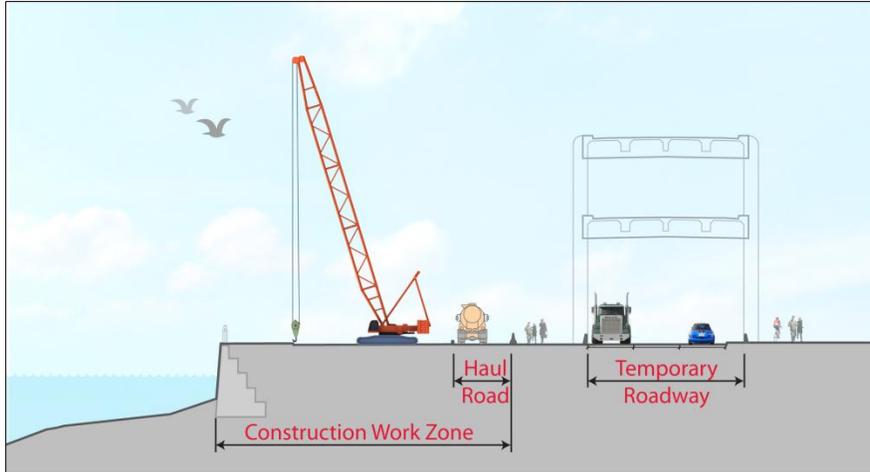


Figure 1-4. Construction Work Zone and Temporary Roadway

The construction work zone would extend from the western edge of the existing multi-use path on Alaskan Way to the water. Existing street trees would be removed to provide additional space within this area and would either be replaced as riparian plantings with the EBSP or replaced during future waterfront improvement projects. The existing streetcar tracks that run along Alaskan Way would also be removed during construction.

Construction would be staged from several locations within the work zone. Staging areas would vary in size and would be used for delivery and storage of construction materials and equipment. The staging areas would be sited to avoid disrupting access to piers, residences, and businesses along the waterfront. In addition to the upland staging areas, construction activities may also be staged from barges and tugs in Elliott Bay.

During Central Seawall construction, some temporary parking spaces could be provided as part of each construction stage. During the first stage of construction, parking could be provided on the existing Alaskan Way roadway south of the active work zone. During the later stages when construction has progressed to the southern portion of the project area, parking could be provided on the restored roadway to the north of active construction. During North Seawall construction, a similar program of temporary parking would be implemented, to the extent possible.

To the greatest extent possible, construction materials and personnel would be transported to the construction work zone and staging areas via freeways and arterials. However, other city streets could provide access to the site when needed. The eastern border of the construction work zone along Alaskan Way would serve as a haul road to channel truck traffic within the project area.

The existing multi-use trail would be maintained (with the potential for temporary detours), and access to the piers would be maintained throughout construction.

1.6.3 Construction Methods

The seawall would be replaced using soil improvement, BSP, or a combination of these two methods. A brief description of each method is provided below.

1.6.3.1 Soil Improvement

Soil improvement is a general term for a variety of techniques that are used to stabilize existing soils by improving their internal structure and strength. Two techniques that are being considered for the EBSP are jet grouting and deep soil mixing. Jet grouting consists of adding grout to existing soils to form a “block” of improved soil mass that extends down to the competent foundation below. This technique has been identified as a feasible way to strengthen the material underlying the project area, which includes an existing timber relieving platform, buried timber piles, utilities, and other potential obstructions.

Jet grouting creates circular columns of soil cement by means of a hollow drill pipe measuring a few inches in diameter that is inserted into the soil. Grout is then sprayed into the surrounding soil under high pressure through horizontal nozzles in the rotating drill pipe. This process cuts the existing soil and mixes the soil with the grout. The strength of the soil would be substantially improved through this process, thus greatly reducing the soil’s potential for liquefaction during an earthquake.

The grout columns would be constructed in a grid pattern to create a block of improved soil. The grid pattern would be installed between the timber piles of the existing seawall to eliminate the need to remove the existing piles. The finished arrangement of the grouted columns would create a “spine” for the new seawall. The grouting process generates spoils that would be disposed of using appropriate means, in accordance with applicable regulations.

Deep soil mixing, another technique that could be used for soil improvement, uses an auger that penetrates the ground surface to mix and consolidate the underlying soils to a depth of up to 20 feet. With deep soil mixing, no grout is applied under pressure and there are minimal spoils for disposal.

1.6.3.2 Braced Soldier Piles

BSP is an alternative structural stabilization method. This method would involve drilling large holes (approximately 8 feet in diameter) to a depth of approximately 75 feet below the present street level of Alaskan Way where the firm layer of glacial till is located. An oscillator, a specialized piece of drilling equipment, would install a steel casing as the drilling progresses to prevent the holes from collapsing and to contain the soils to be excavated. The leading edge of the casing would be equipped with cutting teeth to carve through the timber boards and piles of the existing relieving platform and into the soils below.

Once the holes have been drilled and excavated to the final depth, a steel reinforcing cage would be placed into the shaft casing and the casing would be filled with concrete. The casing would be extracted as the concrete is poured and would leave behind a reinforced concrete cylinder, or soldier pile. A line of these soldier piles would be constructed to form the spine of the seawall. Soil anchors would then be installed to brace or tie back these soldier piles.

1.6.4 Soil Dewatering and Spoils Disposal

Regardless of the construction method that is selected, excavations into soils in the construction zone would need to be dewatered, which generally involves disposing of the wastewater offsite or pumping

the excess water to a location where it can be settled and/or before discharge. Wet spoils from jet grouting or other soil improvement activities must be managed or disposed of as well. SDOT is currently exploring various methods for managing and disposing wastewater and jet grout spoils, which would be detailed in the project's dewatering and erosion control submittals required as part of the Clean Water Act Section 401 and National Pollutant Discharge Elimination System (NPDES) construction general stormwater permit processes, as well as by the City's standard construction specifications.

1.6.5 Utility Protection and/or Relocation

The project area contains a large number of utilities, including water, sanitary sewer, combined sewer, stormwater, electrical transmission and distribution, steam, gas, fire alarm, and numerous telecommunication systems. These utilities range from major transmission lines serving portions of Seattle and the region to individual connections serving adjacent properties. As shown in Figure 1-5, some of these utilities are directly beneath the Alaskan Way roadway and sidewalk and above the relieving platform of the existing seawall, while others extend through the seawall to the piers.

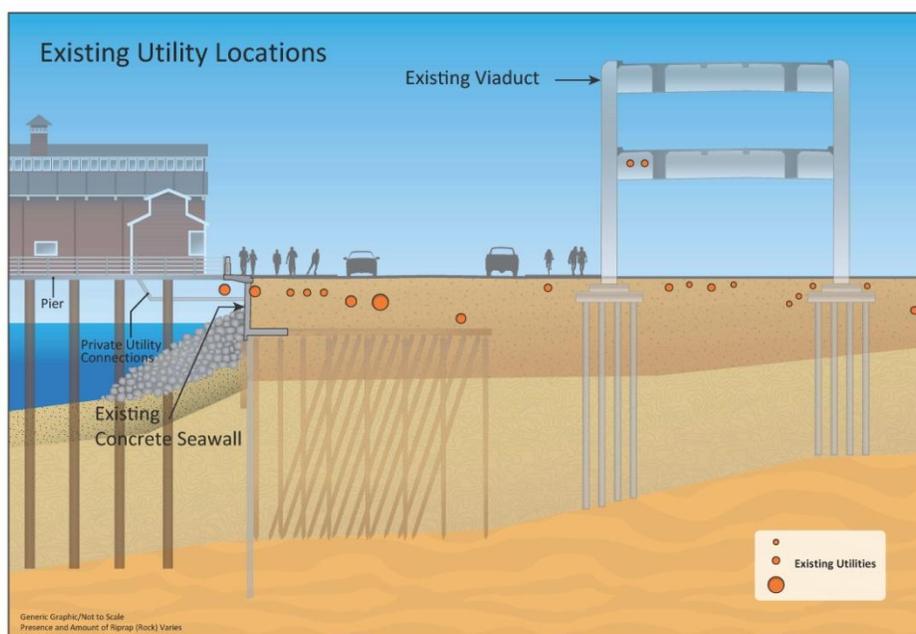


Figure 1-5. Representative Cross Section Showing Typical Existing Utility Locations within Project Limits

SDOT's objective will be to maintain utility service to the greatest extent possible during construction, although the means and methods for doing so would vary depending on the construction method used. Alternatives A and B assume that all soil overlying the relieving platform would need to be excavated. Excavation would require temporary or permanent relocation of the majority of existing utilities. Alternative C assumes that most soil improvement could be accomplished through small penetrations at street level, which would allow the majority of the utility lines above the relieving platform to remain in place during that construction activity. With either method, most individual service lines would be temporarily relocated and reinstalled in their final locations as seawall construction progresses. Final points of service to the waterfront piers would remain the same to alleviate the need to update the

facilities to the current Uniform Building Code. The final construction method chosen will not preclude the ability of utilities to provide future new services to the downtown waterfront area.

1.7 BUILD ALTERNATIVES

The preceding sections provided information on project elements that would be similar among the three build alternatives. The following discussion focuses on the primary differences among Alternatives A, B, and C in terms of the seawall's location, the configuration of Alaskan Way, habitat improvements, public amenities, and construction sequence and schedule. Table 1-1 (at the end of this chapter) compares key features of the alternatives.

1.7.1 Alternative A

Alternative A would reconstruct the seawall as close to its existing alignment as possible, with jet grouting forming the structural support. Habitat improvements would include the addition of shoreline enhancements and the installation of a continuous habitat bench and LPS at piers. Figures 1-18 and 1-19 at the end of this chapter depict Alternative A.

1.7.1.1 Seawall

In Alternative A, the new seawall would be reconstructed as close to the alignment of the existing seawall as possible, with only a minimal setback (as outlined in the bulleted list below). This placement would allow construction to proceed without requiring the removal of the existing wall first.

The approximate proposed location of the seawall face for Alternative A relative to the existing seawall face would be:

- Zone 1 – in place (no change),
- Zone 2 – 15 feet landward,
- Zone 3 – 3 feet waterward, and
- Zones 4, 5, and 6 – 10 feet landward.

In Zone 1, the seawall would be reconstructed in its existing location to minimize potential conflicts with construction of the SR 99 bored tunnel, which is being built as part of a separate project. In Zones 2, 4, 5, and 6, the new wall would be constructed behind (east of) the existing wall, and then the existing seawall west of the new seawall face would be demolished. In Zone 3, the new seawall structure would be constructed to the west of the existing wall, resulting in the new seawall face being set three feet waterward of its current location.

1.7.1.2 Roadway

The existing Alaskan Way is generally four lanes (two lanes in each direction), except in the vicinity of Colman Dock (Yesler Way to Spring Street), where it consists of one northbound lane and two southbound lanes. Alternative A would add a permanent northbound lane between S. Washington and

Madison Streets¹ to handle traffic in this segment headed to Colman Dock and through to other destinations. A temporary second northbound lane (constructed by the Washington State Department of Transportation [WSDOT]) is currently in place. Parking and loading zones in the finished configuration would be similar to today.

A sidewalk of approximately the same width as the existing sidewalk (15 to 20 feet) would be provided on the west side of the street. The sidewalk would be cantilevered or pile supported in Zones 2 through 6 and would extend back to the piers in all zones, with LPS provided where feasible. The mixed-use trail on the east side of Alaskan Way would be extended from its existing terminus north to Clay Street. At Clay Street, the trail would cross Alaskan Way and continue on the west side of Alaskan Way to Broad Street, where it would connect to the existing trail system that runs along Olympic Sculpture Park and Myrtle Edwards Park.

1.7.1.3 Habitat Improvements

Alternative A would provide an effective intertidal corridor along the seawall to support juvenile salmonid migration and would enhance ecosystem productivity. Habitat benches, a sidewalk with LPS, a textured wall face, subtidal substrate enhancements, cobble reefs, and riparian plants would be installed. No net loss of ecological function or intertidal elevation would occur.

1.7.1.4 Upland Improvements

Under Alternative A, public amenities would include the restored historic Washington Street Boat Landing, improved water-viewing opportunities at various locations, new or replaced railings, new sidewalks, waterfront planters, and street plantings. Reconstructed sidewalks would extend from the curb line of the restored Alaskan Way to the western edge of the existing sidewalk. These improvements would add variety to the waterfront by defining gathering spaces, viewing areas, and building entries.

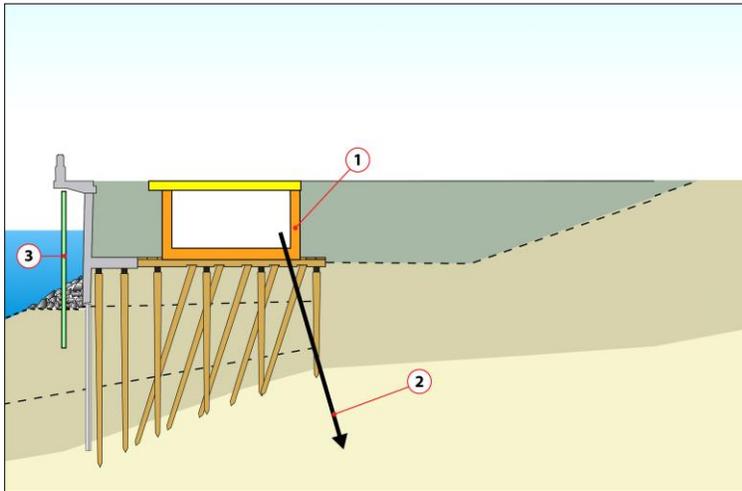
1.7.1.5 Construction and Schedule

Under Alternative A, the construction method proposed for the primary structural element of the seawall is soil improvement. With this method, construction of the Central Seawall would require approximately three construction seasons with two summer shutdown periods. Construction of the North Seawall would require an additional four construction seasons with three summer shutdown periods. The current plan for Alternative A is to begin construction of the Central Seawall in Zone 4, move southward to Zone 3, and then progress to Zones 2 and 1. The Central Seawall construction would be followed by the North Seawall construction in Zones 6 and 5.

The anticipated construction activities and probable sequence for Alternative A, using jet grouting for the soil improvement, are depicted in Figures 1-6 through 1-9. The figures describe four primary stages of work that would occur along the waterfront. The construction activities within each zone would vary

¹ The Elliott Bay Seawall Project would build the additional lane from S. Washington Street to Madison Street. The portion between S. King Street and S. Washington Street would be constructed as part of the Alaskan Way Viaduct Replacement Project.

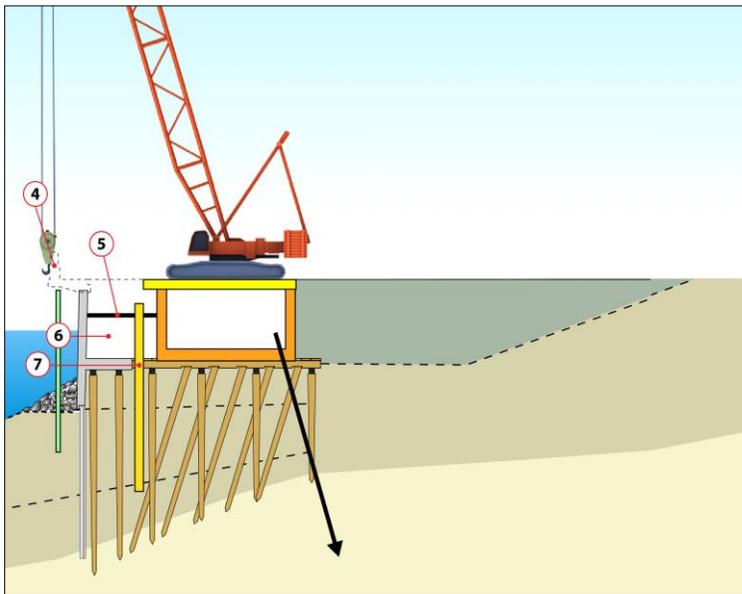
depending on the type of existing seawall. The figures depict the Type A seawall. (Type A seawall is a sheet-pile supported, reinforced, concrete face panel, which is tied back to a buried timber relieving platform supported by vertical and battered timber piles.) For Alternative A, it was assumed that the area above the existing relieving platform would be excavated before jet grouting begins.



Alternative A, Stage 1

1. Excavate to the top of relieving platform, relocate utilities, and install shoring
2. Install soil anchors
3. Remove existing riprap and install temporary containment wall

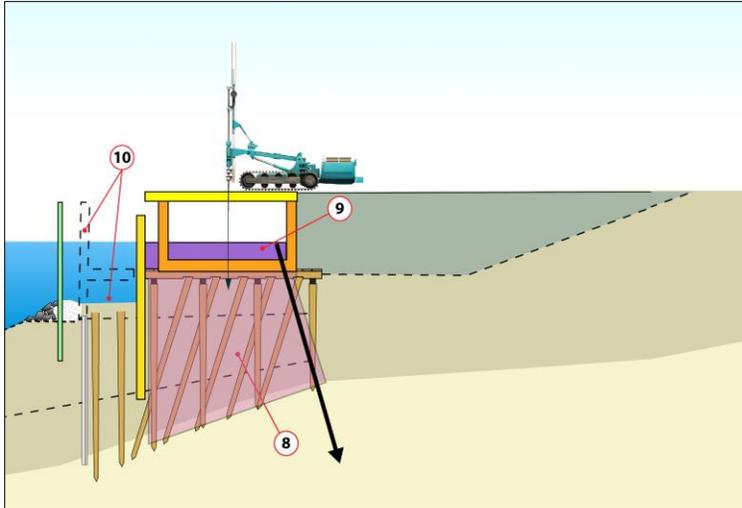
Figure 1-6. Alternative A, Stage 1



Alternative A, Stage 2

4. Remove existing cantilever sidewalk
5. Brace existing concrete face panel
6. Excavate remaining soil
7. Install concrete face panel

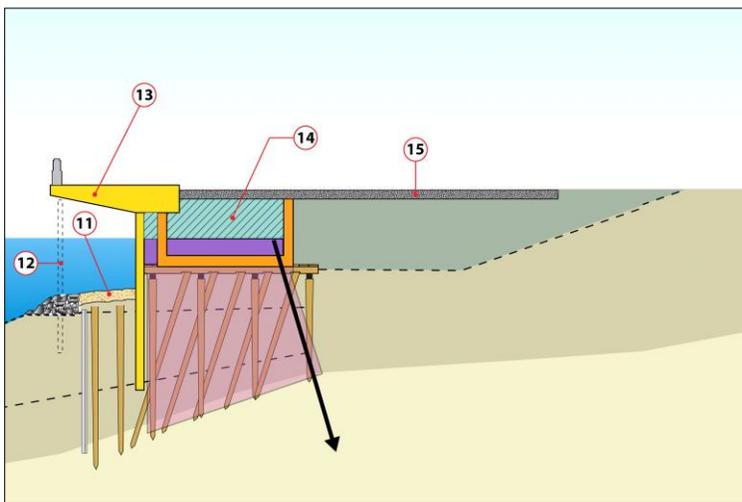
Figure 1-7. Alternative A, Stage 2



Alternative A, Stage 3

- 8. Install soil improvement (jet grouting)
- 9. Install anchor slab
- 10. Remove portion of existing wall

Figure 1-8. Alternative A, Stage 3



Alternative A, Stage 4

- 11. Place substrate
- 12. Remove temporary containment wall
- 13. Install sidewalk
- 14. Restore utilities and backfill
- 15. Complete restored roadway

Figure 1-9. Alternative A, Stage 4

1.7.2 Alternative B

Alternative B would move the seawall up to 75 feet landward of its current location, with BSP forming an underground wall structure to protect against coastal storm damage and seismic forces. In addition to the habitat improvements described for Alternative A, this alternative would construct a continuous habitat bench and continuous LPS at the piers. Figures 1-20, 1-21, and 1-22 at the end of this chapter depict Alternative B.

1.7.2.1 Seawall

Under Alternative B, the new seawall would be constructed up to 75 feet east of the existing seawall alignment and would provide a range of potential design opportunities. The approximate proposed location of the seawall face for Alternative B, relative to the existing seawall face, would be:

- Zone 1 – 0 to 15 feet landward,
- Zone 2 – 15 feet landward,
- Zone 3 – 30 feet landward,
- Zone 4 – 30 to 75 feet landward following the restored road curb alignment, and
- Zones 5 and 6 – 10 feet landward.

In Zones 1, 2, 5, and 6, the new wall would be constructed 10 to 15 feet east of the existing wall. In Zones 3 and 4, the new wall would be constructed 30 to 75 feet farther east, allowing greater flexibility for future habitat and public amenity spaces. This eastward realignment would largely reshape the downtown Seattle waterfront. After the new seawall was in place, the existing seawall would be demolished.

1.7.2.2 Roadway

Under Alternative B, the lane configuration of Alaskan Way would remain identical to the current configuration because of the confined space that would be available between the location of the seawall (eastward of the existing seawall) and the existing Alaskan Way Viaduct structure. A temporary northbound lane between Yesler Way and Spring Street has been installed by WSDOT, and it may be used during seawall construction.

Similar to the other build alternatives, the existing roadway, sidewalk, and multi-use trail would be restored to their original function and capacity after construction, with the multi-use trail connecting to the existing trail system that runs along Olympic Sculpture Park and Myrtle Edwards Park. However, due to space constraints, southbound parking and loading in Zone 3 may be restricted between University and Madison Streets.

1.7.2.3 Habitat Improvements

Alternative B would include the installation of habitat benches, a sidewalk with LPS, a textured wall face, subtidal substrate enhancements, cobble reefs, and riparian plants. However, the intertidal habitat

would be larger because the seawall would be set back farther east (landward). Alternative B would provide substantial enhancements within the new aquatic land available in Zones 1, 3, and 4.

Zone 1 would include an intertidal habitat bench and backshore that would be bordered by riparian plants, rocks, and drift logs. In Zone 3, the 30-foot seawall setback would allow the installation of a confined-substrate habitat bench with LPS installed above. In Zone 4, the 75-foot seawall setback would allow expanded upland riparian planting or increased intertidal habitat.

1.7.2.4 Upland Improvements

Alternative B would improve water viewing at various locations and provide additional public gathering spaces, as well as interpretive, recreational, and cultural opportunities. The new sidewalks would be enhanced with LPS and reconfigured with planters and new or replaced railings along the length of the seawall. These additional and enhanced gathering and overlook spaces would be provided in Zones 1, 3, 4, 5, and 6.

In Zone 1, Washington Street Boat Landing would be restored and reinstalled within the Washington Street right-of-way, west of its current location to improve its connection to the water. A new gangway and short-stay boat moorage could be created to restore the landing's historic connection with Elliott Bay. North of the boat landing, steps and a boardwalk (Option 1) or boulders (Option 2) could be added for seating and for physical access to or viewing of the new intertidal habitat bench.

Zones 3, 5, and 6 would include viewpoints between the piers. These viewpoints would create opportunities for public gathering, seating, and water viewing. The viewpoints would be parallel with the adjacent piers, thereby directing the view out to Elliott Bay. The viewpoints would include seating steps and stairs to bring people closer to the water.

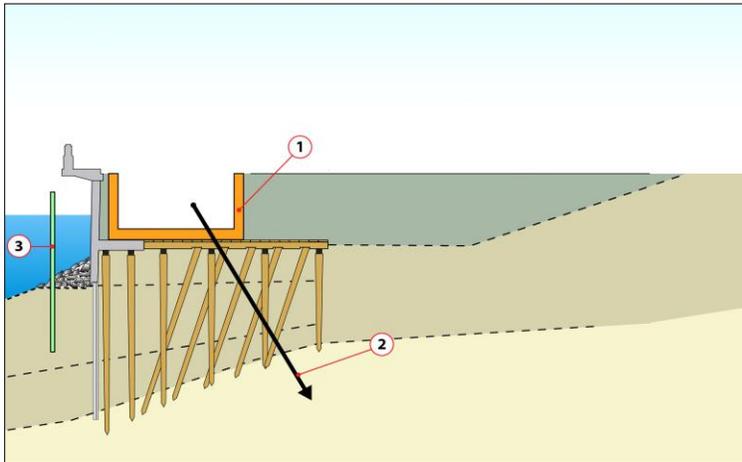
In Zone 4, the proposed seawall setback of 30 to 75 feet would provide two types of opportunities: a water plaza (Option 1) or a land plaza (Option 2). In Option 1, openings in the expansive plaza and walk would allow users to view tide pools and aquatic life below. In Option 2, raised planters would be filled with riparian plants, logs, and stones that would be reminiscent of Puget Sound shorelines.

1.7.2.5 Construction and Schedule

Under Alternative B, the design option proposed for the primary structural element of the seawall is BSP installed by means of a drilled-shaft construction method. With this method, construction of the Central Seawall would require approximately five construction seasons with four summer shutdown periods. Construction of the North Seawall would require an additional four construction seasons, similar to Alternatives A and C, although the duration may be slightly longer.

Access during construction would be more difficult than for either Alternatives A or C because the eastward setback of the seawall would restrict the construction staging areas to the project ends (i.e., north and south extents), instead of alongside the construction work zone. Under Alternative B, it would not be possible to maintain a continuous construction haul road because of the seawall setback in Zones 3 and 4. The construction of a land plaza or water plaza in Zone 4 would increase the duration of construction.

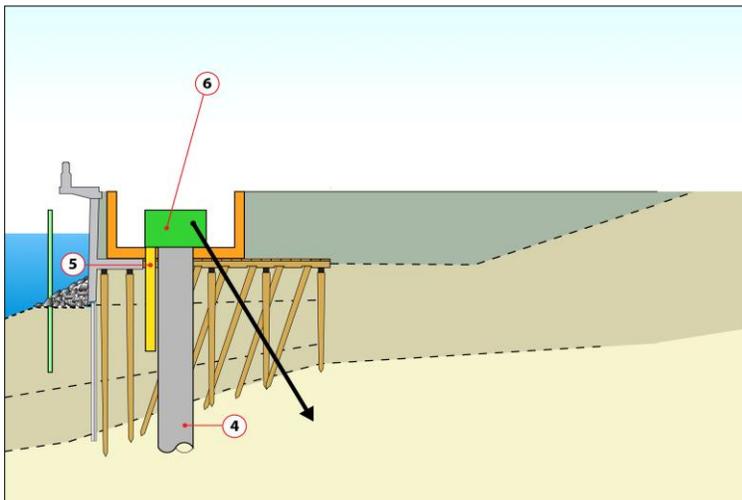
Construction of the Central Seawall would begin in Zone 4, move southward to Zone 3, and then progress to Zones 2 and 1. The Central Seawall construction would be followed by the North Seawall construction in Zones 6 and 5. The anticipated construction stages for Alternative B (assuming a Type A existing seawall) are shown in Figures 1-10 through 1-13.



Alternative B, Stage 1

1. Excavate to top of relieving platform, relocate utilities, and install shoring
2. Install soil anchors
3. Remove existing riprap and install temporary containment wall

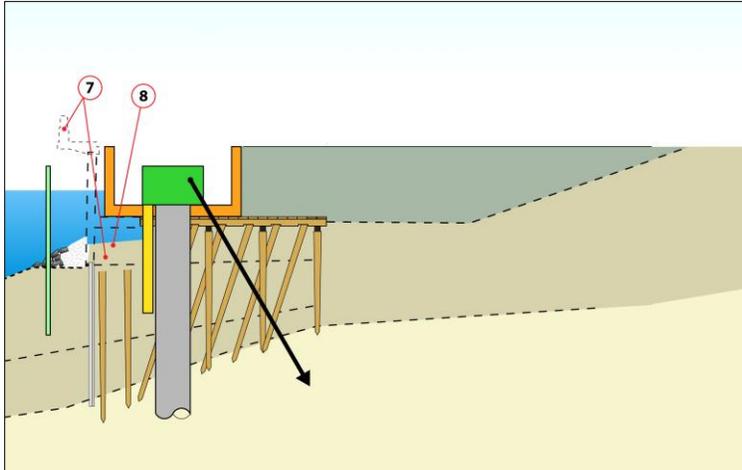
Figure 1-10. Alternative B, Stage 1



Alternative B, Stage 2

4. Drill shaft
5. Install concrete face panel
6. Cast concrete anchor cap

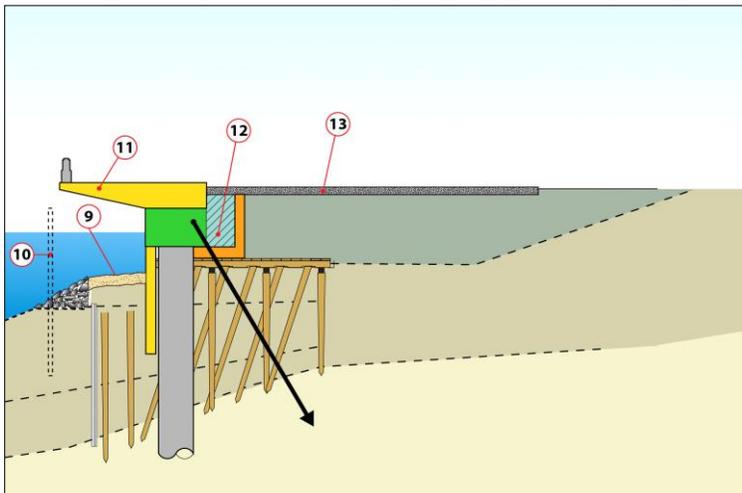
Figure 1-11. Alternative B, Stage 2



Alternative B, Stage 3

- 7. Remove existing cantilever sidewalk
- 8. Remove portion of existing wall

Figure 1-12. Alternative B, Stage 3



Alternative B, Stage 4

- 9. Place substrate
- 10. Remove temporary containment wall
- 11. Install sidewalk
- 12. Restore utilities and backfill
- 13. Complete restored roadway

Figure 1-13. Alternative B, Stage 4

1.7.3 Alternative C

Alternative C would move the seawall up to 15 feet landward of its current location and would use soil improvements (likely including both jet grouting and deep soil mixing) to provide structural support. Alternative C would also provide a continuous habitat bench and continuous LPS in addition to shoreline enhancements. Figures 1-23 and 1-24 at the end of this chapter depict Alternative C.

1.7.3.1 Seawall

Under Alternative C, the seawall would be constructed approximately 10 to 15 feet landward of the existing seawall alignment along its entire length. The setback proposed for Alternative C would allow soil improvements to proceed without first removing the existing seawall. The approximate proposed location of the seawall face for Alternative C relative to the existing seawall face would be:

- Zones 1 and 2 – 15 feet landward,
- Zone 3 – 10 to 15 feet landward, and
- Zones 4, 5, and 6 – 10 feet landward.

1.7.3.2 Roadway

The existing roadway is generally four lanes (two lanes in each direction), except in the vicinity of Colman Dock (Yesler Way to Spring Street), where it consists of one northbound lane and two southbound lanes. Alternative C would add a permanent northbound lane between S. Washington and Madison Streets² to support traffic bound for Colman Dock and other destinations. A temporary second northbound lane (constructed by WSDOT) is currently in place and could be used during seawall construction. Parking and loading zones would be similar to those present today.

A sidewalk of approximately the same width as the existing sidewalk (15 to 20 feet) would be provided on the west side of the street after construction. The sidewalk alignment would be cantilevered or pile supported and would extend back to the piers in all zones. The mixed-use trail on the east side of Alaskan Way would be extended north from its existing terminus to Clay Street, where it would cross Alaskan Way and continue on the west side of the street to Olympic Sculpture Park and Myrtle Edwards Park.

1.7.3.3 Habitat Improvements

Like Alternatives A and B, Alternative C would include a number of habitat improvements. These improvements would extend 10 to 45 feet from the face of the new seawall. An intertidal bench would be installed at the base of the seawall to form a shallow angle to the seafloor and provide shallower water for juvenile salmon migration. Installation of a textured seawall face panel would support the development of marine nearshore habitat. Restoration of riparian areas along the back beach area in Zone 1 would include species of riparian and beach shrubs native to Puget Sound.

² The Elliott Bay Seawall Project would build the additional lane from S. Washington Street to Madison Street. The portion between S. King Street and S. Washington Street would be constructed as part of the Alaskan Way Viaduct Replacement Project.

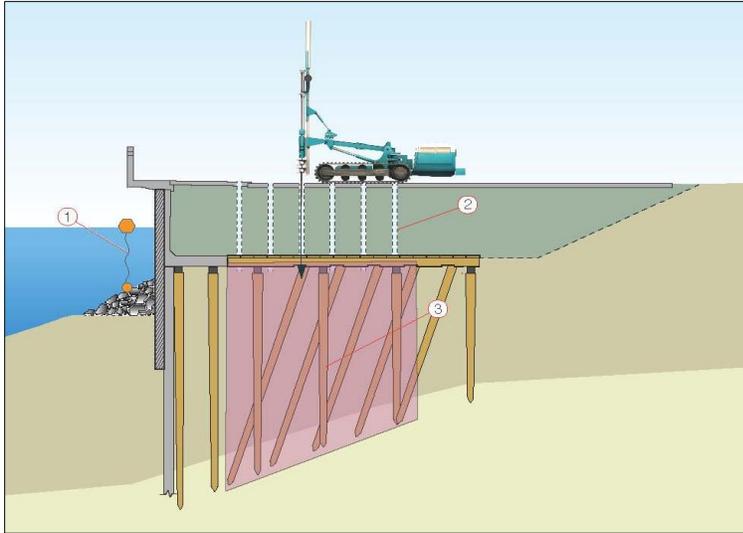
1.7.3.4 Upland Improvements

Under Alternative C, the restored sidewalk space would be enhanced with LPS and include new or upgraded railings, historic elements, wayfinding features, and lighting. Water-viewing opportunities would be preserved or enhanced at various locations, and additional viewing opportunities would be included at Spring and University Streets in Zone 3. In Zone 1, the Washington Street Boat Landing would be restored and reinstalled within the S. Washington Street right-of-way.

1.7.3.5 Construction and Schedule

For Alternative C, the construction method proposed for the primary structural element of the seawall is soil improvement. Alternative C assumes that the soil improvement would be accomplished from street level, without excavating the soils over the relieving platform. After seawall stabilization, the area above the relieving platform would be excavated to allow for installation of the new seawall face and sidewalk. With this method, construction of the Central Seawall would require approximately three construction seasons with two summer shutdown periods. Subsequent construction of the North Seawall would require an additional four construction seasons.

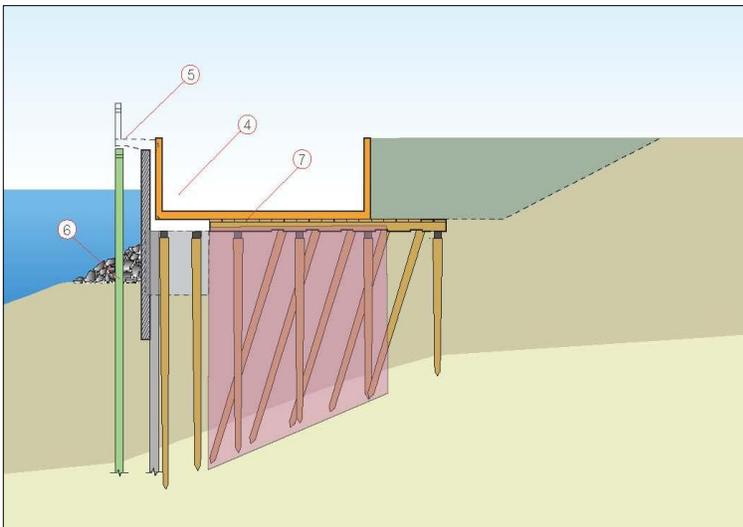
The anticipated construction activities and probable sequence for Alternative C, using soil improvement, are depicted below. The figures describe four primary stages of work that would occur along the waterfront. The activities within each zone would vary depending on the type of existing seawall present. Figures 1-14 through 1-17 are representative of the expected Alternative C construction sequence and depict the Type A seawall.



Alternative C, Stage 1

1. Place in-water containment curtain
2. Pre-drill and fill existing voids beneath timber relieving platform
3. Install soil improvement (jet grout)

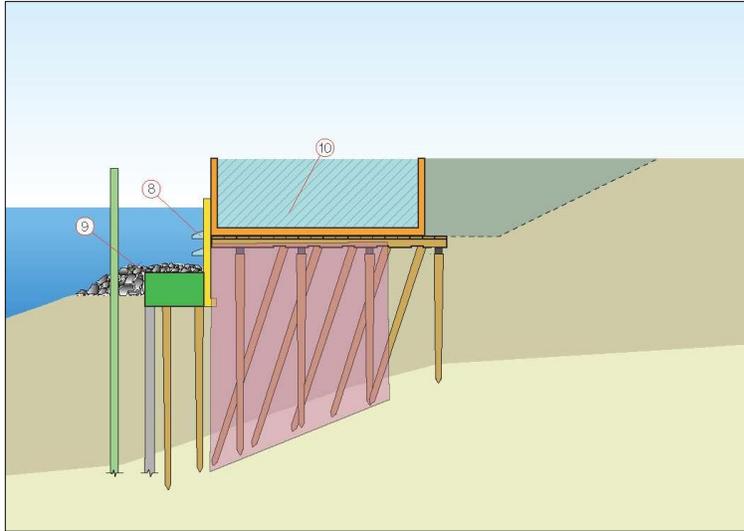
Figure 1-14. Alternative C, Stage 1



Alternative C, Stage 2

4. Relocate utilities
5. Remove existing sidewalk and pavement
6. Install temporary containment wall
7. Excavate to timber relieving platform

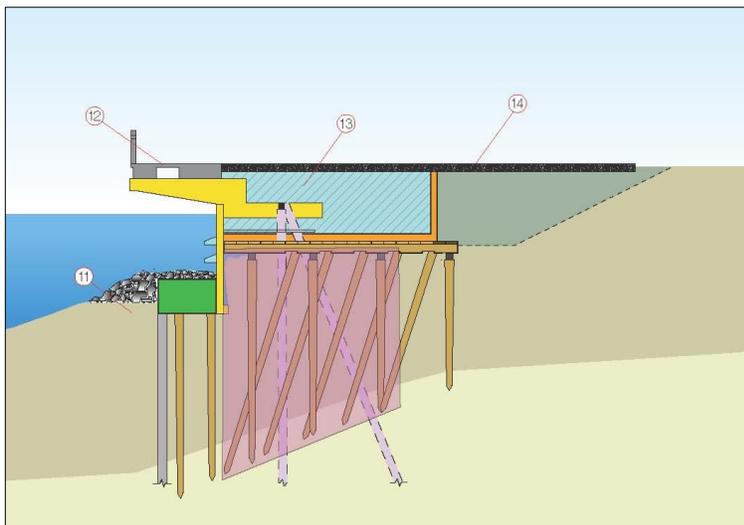
Figure 1-15. Alternative C, Stage 2



Alternative C, Stage 3

- 8. Remove portion of existing wall and install new face panels and habitat shelves
- 9. Place habitat bench

Figure 1-16. Alternative C, Stage 3



Alternative C, Stage 4

- 11. Remove temporary containment wall
- 12. Install cantilevered sidewalk with light penetrating surface
- 13. Restore utilities
- 14. Restore roadway for local traffic

Figure 1-17. Alternative C, Stage 4

TABLE 1-1. COMPARISON OF FEATURES OF THE THREE ELLIOTT BAY SEAWALL PROJECT BUILD ALTERNATIVES

Project Feature	Alternative A	Alternative B	Alternative C
Construction Method	Soil improvement	Braced soldier piles	Soil improvement
Central Seawall Construction Duration	3 construction seasons	5 construction seasons	3 construction seasons
North Seawall Construction Duration	4 construction seasons	4 construction seasons	4 construction seasons
Zone 1			
Face of Seawall Location	Existing location	0 to 15 feet landward	15 feet landward
Habitat Improvements	<ul style="list-style-type: none"> Riparian plantings Substrate enhancement Cobble reef Textured seawall face 	<ul style="list-style-type: none"> Riparian plantings Substrate enhancement Cobble reef Expanded habitat bench and backshore 	<ul style="list-style-type: none"> Riparian plantings Substrate enhancement Expanded habitat bench and backshore
Upland Improvements	<ul style="list-style-type: none"> Washington Street Boat Landing restoration New or restored railings 	<ul style="list-style-type: none"> Washington Street Boat Landing restoration (up to 15 feet waterward of existing location) Steps, boardwalk, and overlook (Option 1) Short-stay boat moorage New or restored railings 	<ul style="list-style-type: none"> Washington Street Boat Landing restoration (up to 15 feet waterward of existing location) New or restored railings
Transportation Features	<ul style="list-style-type: none"> Restored sidewalk Restored multi-use trail Restored roadway with additional northbound lane from S. Washington to Madison Street 	<ul style="list-style-type: none"> Restored sidewalk Restored multi-use trail Restored roadway 	<ul style="list-style-type: none"> Restored sidewalk Restored multi-use trail Restored roadway with additional northbound lane from S. Washington to Madison Street
Zone 2			
Face of Seawall Location	15 feet landward	15 feet landward	15 feet landward
Habitat Improvements	<ul style="list-style-type: none"> Confined substrate habitat bench Textured seawall face Intermittent LPS 	<ul style="list-style-type: none"> Confined substrate habitat bench Textured seawall face Continuous LPS 	<ul style="list-style-type: none"> Confined substrate habitat bench Textured seawall face Continuous LPS
Upland Improvements	<ul style="list-style-type: none"> Same as existing 	<ul style="list-style-type: none"> Same as existing 	<ul style="list-style-type: none"> Same as existing
Transportation Features	<ul style="list-style-type: none"> Restored sidewalk Restored multi-use trail Restored roadway with additional northbound lane from S. Washington to Madison Street 	<ul style="list-style-type: none"> Restored sidewalk Restored multi-use trail Restored roadway 	<ul style="list-style-type: none"> Restored sidewalk Restored multi-use trail Restored roadway with additional northbound lane from S. Washington to Madison Street

Project Feature	Alternative A	Alternative B	Alternative C
Zone 3			
Face of Seawall Location	3 feet waterward	30 feet landward	10 to 15 feet landward
Habitat Improvements	<ul style="list-style-type: none"> • Confined substrate habitat bench and expanded habitat bench • Textured seawall face • Intermittent LPS at piers • Riparian plantings 	<ul style="list-style-type: none"> • Confined substrate habitat bench and expanded habitat bench • Textured seawall face • Continuous LPS • Riparian plantings 	<ul style="list-style-type: none"> • Confined substrate habitat bench and expanded habitat bench • Textured seawall face • Continuous LPS
Upland Improvements	<ul style="list-style-type: none"> • New or restored railings • Street plantings • Viewing area 	<ul style="list-style-type: none"> • New or restored railings • Street plantings • Enhanced viewpoints with seating 	<ul style="list-style-type: none"> • New or restored railings • Street plantings • Enhanced viewpoints
Transportation Features	<ul style="list-style-type: none"> • Restored sidewalk • Restored multi-use trail • Restored roadway 	<ul style="list-style-type: none"> • Restored sidewalk • Restored multi-use trail • Restored roadway 	<ul style="list-style-type: none"> • Restored sidewalk • Restored multi-use trail • Restored roadway
Zone 4			
Face of Seawall Location	10 feet landward	30 to 75 feet landward	10 feet landward
Habitat Improvements	<ul style="list-style-type: none"> • Confined substrate habitat bench and expanded habitat bench • Substrate enhancements • Textured seawall face • Intermittent LPS at piers • Cobble reefs • Riparian plantings 	<ul style="list-style-type: none"> • Confined substrate habitat bench and expanded habitat bench • Substrate enhancements • Textured seawall face • Continuous LPS • Cobble reefs • Riparian plantings • Daylighting of water plaza 	<ul style="list-style-type: none"> • Confined substrate habitat bench and expanded habitat bench • Substrate enhancements • Textured seawall face • Continuous LPS • Daylighting of portions of cantilevered sidewalk
Upland Improvements	<ul style="list-style-type: none"> • New or restored railings • Street plantings • Viewing area 	<ul style="list-style-type: none"> • New or restored railings • Street plantings • Creation of a land or water plaza • Enhanced viewpoints 	<ul style="list-style-type: none"> • New or restored railings • Street plantings
Transportation Features	<ul style="list-style-type: none"> • Restored sidewalk • Restored multi-use trail • Restored roadway 	<ul style="list-style-type: none"> • Restored sidewalk • Restored multi-use trail • Restored roadway 	<ul style="list-style-type: none"> • Restored sidewalk • Restored multi-use trail • Restored roadway

Project Feature	Alternative A	Alternative B	Alternative C
Zone 5			
Face of Seawall Location	10 feet landward	10 feet landward	10 feet landward
Habitat Improvements	<ul style="list-style-type: none"> • Confined substrate habitat bench • Riparian plantings • Textured seawall face 	<ul style="list-style-type: none"> • Confined substrate habitat bench • Riparian plantings • Textured seawall face 	<ul style="list-style-type: none"> • Confined substrate habitat bench • Riparian plantings • Textured seawall face • Continuous LPS
Upland Improvements	<ul style="list-style-type: none"> • New or restored railings • Street plantings • Viewing area 	<ul style="list-style-type: none"> • New or restored railings • Street plantings • Expanded viewpoints 	<ul style="list-style-type: none"> • New or restored railings • Street plantings • Enhanced viewpoints
Transportation Features	<ul style="list-style-type: none"> • Restored sidewalk • Restored multi-use trail • Restored roadway 	<ul style="list-style-type: none"> • Restored sidewalk • Restored multi-use trail • Restored roadway 	<ul style="list-style-type: none"> • Restored sidewalk • Restored multi-use trail • Restored roadway
Zone 6			
Face of Seawall Location	10 feet landward	10 feet landward	10 feet landward
Habitat Improvements	<ul style="list-style-type: none"> • Confined substrate habitat bench and expanded habitat bench • Substrate enhancement • Textured seawall face • Riparian plantings • Intermittent LPS at piers • Cobble reefs 	<ul style="list-style-type: none"> • Confined substrate habitat bench and expanded habitat bench • Substrate enhancement • Textured seawall face • Riparian plantings • Intermittent LPS at piers • Cobble reefs 	<ul style="list-style-type: none"> • Confined substrate habitat bench and expanded habitat bench • Substrate enhancement • Textured seawall face • Riparian plantings • Continuous LPS
Upland Improvements	<ul style="list-style-type: none"> • Restored or new railings • Viewing area 	<ul style="list-style-type: none"> • Restored or new railings • Enhanced viewpoints 	<ul style="list-style-type: none"> • Restored or new railings • Enhanced viewpoints
Transportation Features	<ul style="list-style-type: none"> • Restored sidewalk • Extended multi-use trail • Restored roadway 	<ul style="list-style-type: none"> • Restored sidewalk • Extended multi-use trail • Restored roadway 	<ul style="list-style-type: none"> • Restored sidewalk • Extended multi-use trail • Restored roadway

Note: LPS – light-penetrating surfaces

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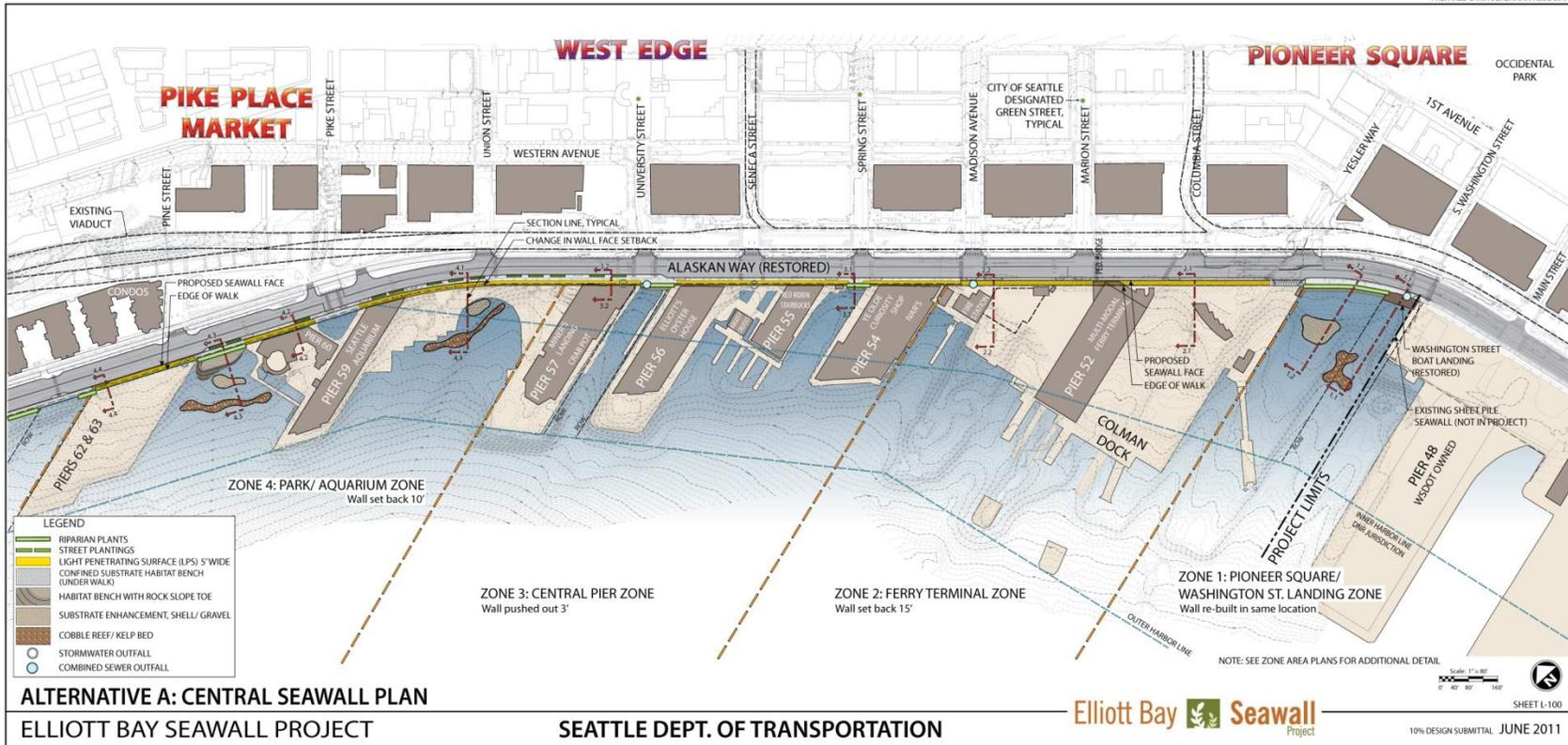


Figure 1-18. Alternative A: Central Seawall Plan

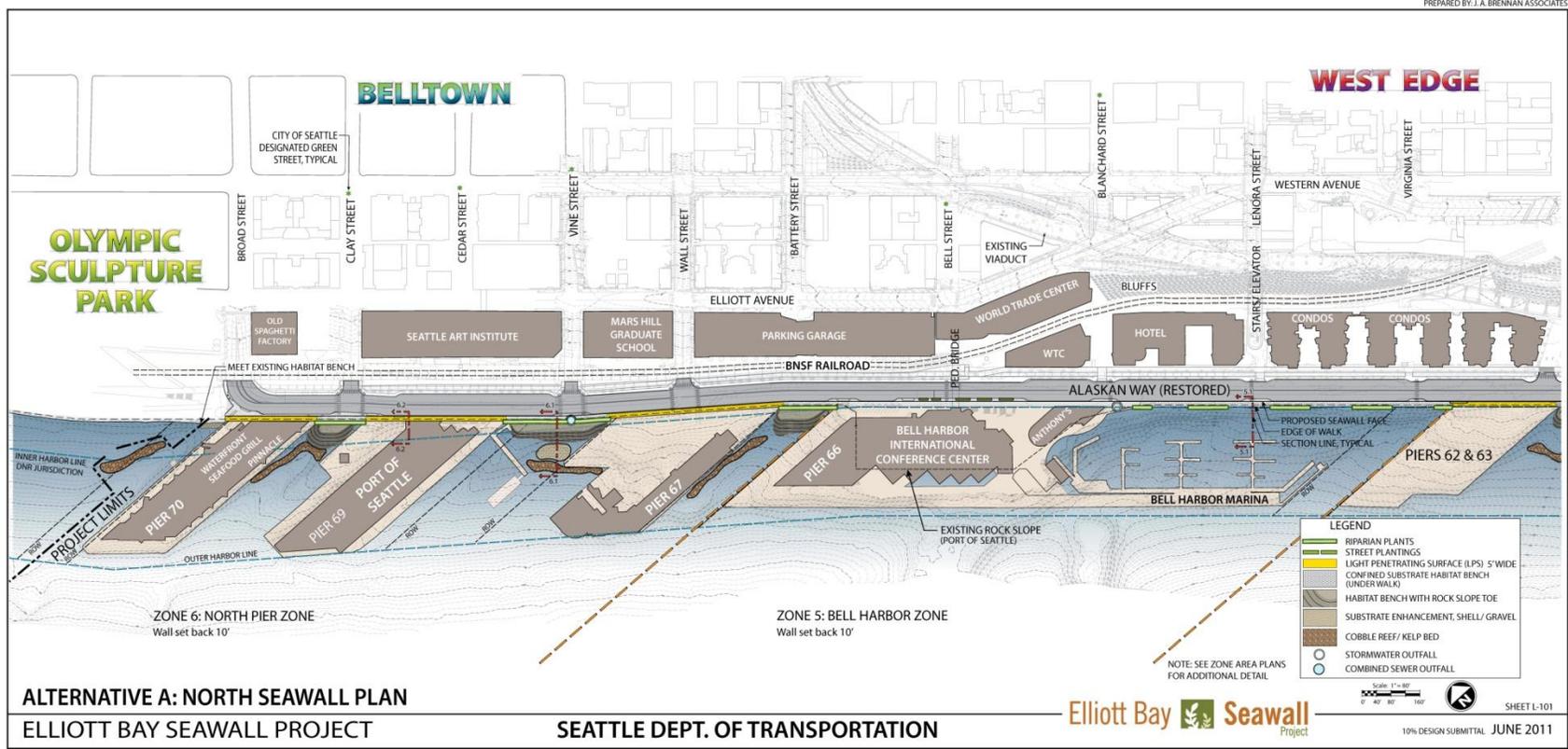


Figure 1-19. Alternative A: North Seawall Plan

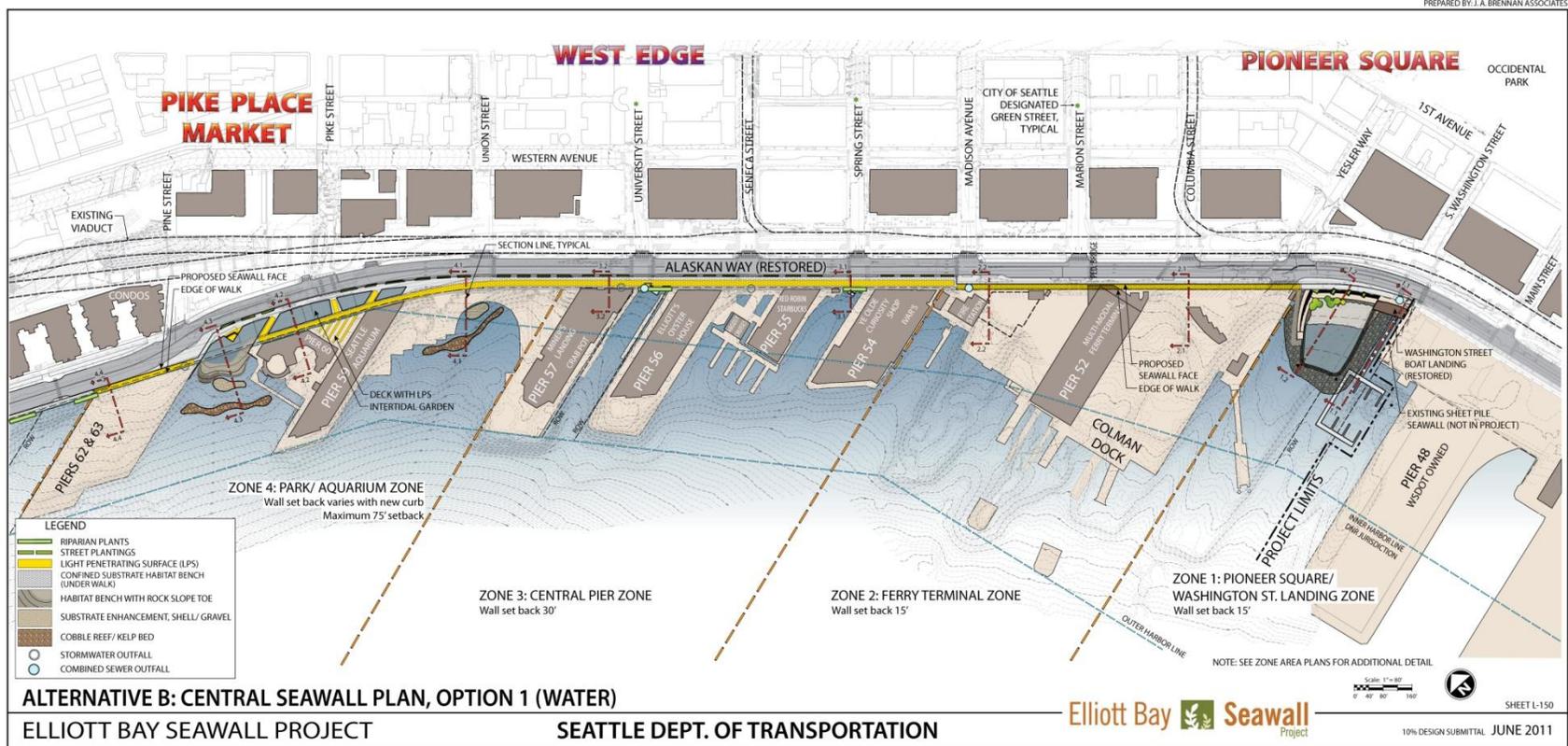


Figure 1-20. Alternative B: Central Seawall Plan, Option 1

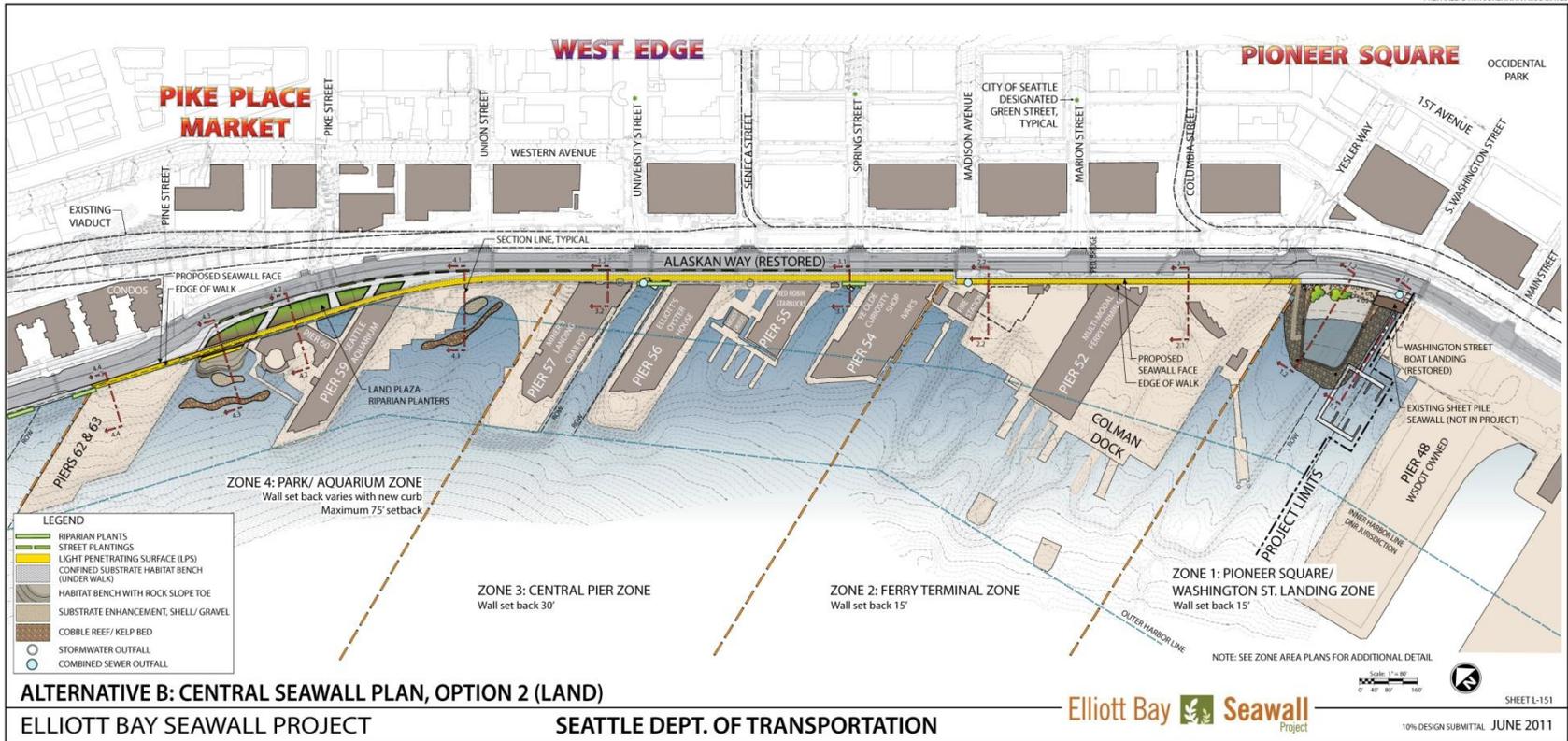


Figure 1-21. Alternative B: Central Seawall Plan, Option 2

PREPARED BY: J. A. BRENNAN ASSOCIATES

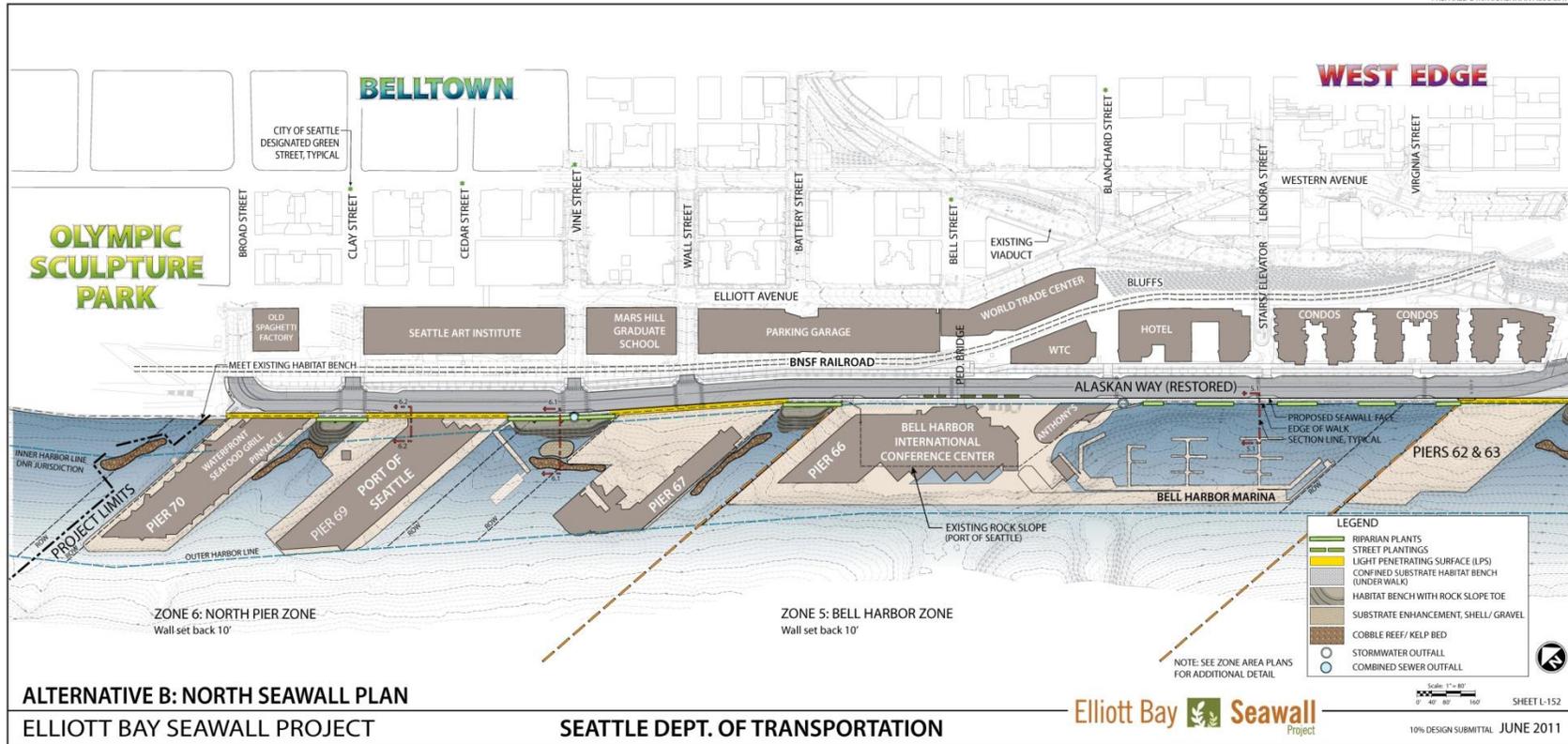


Figure 1-22. Alternative B: North Seawall Plan

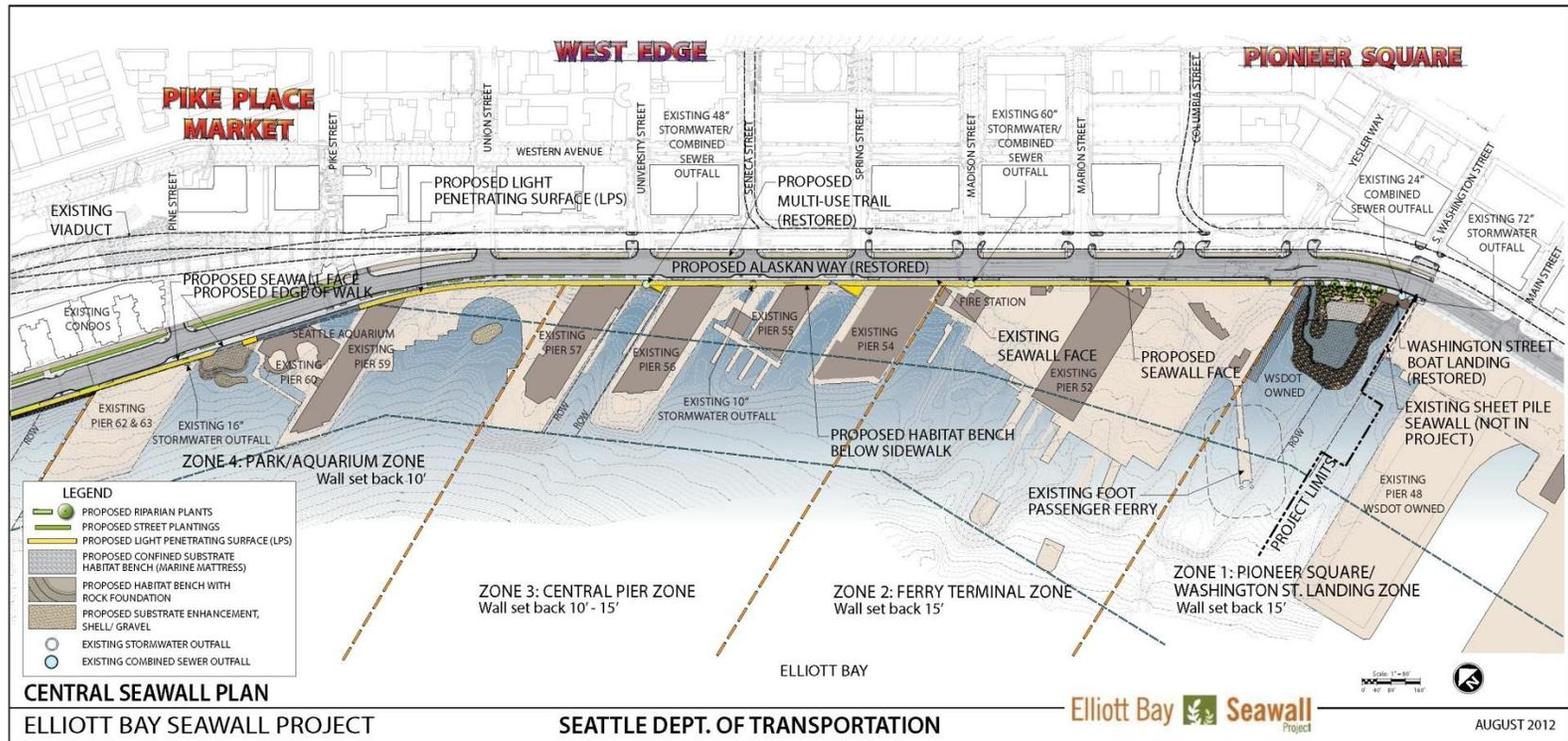


Figure 1-23. Alternative C: Central Seawall Plan

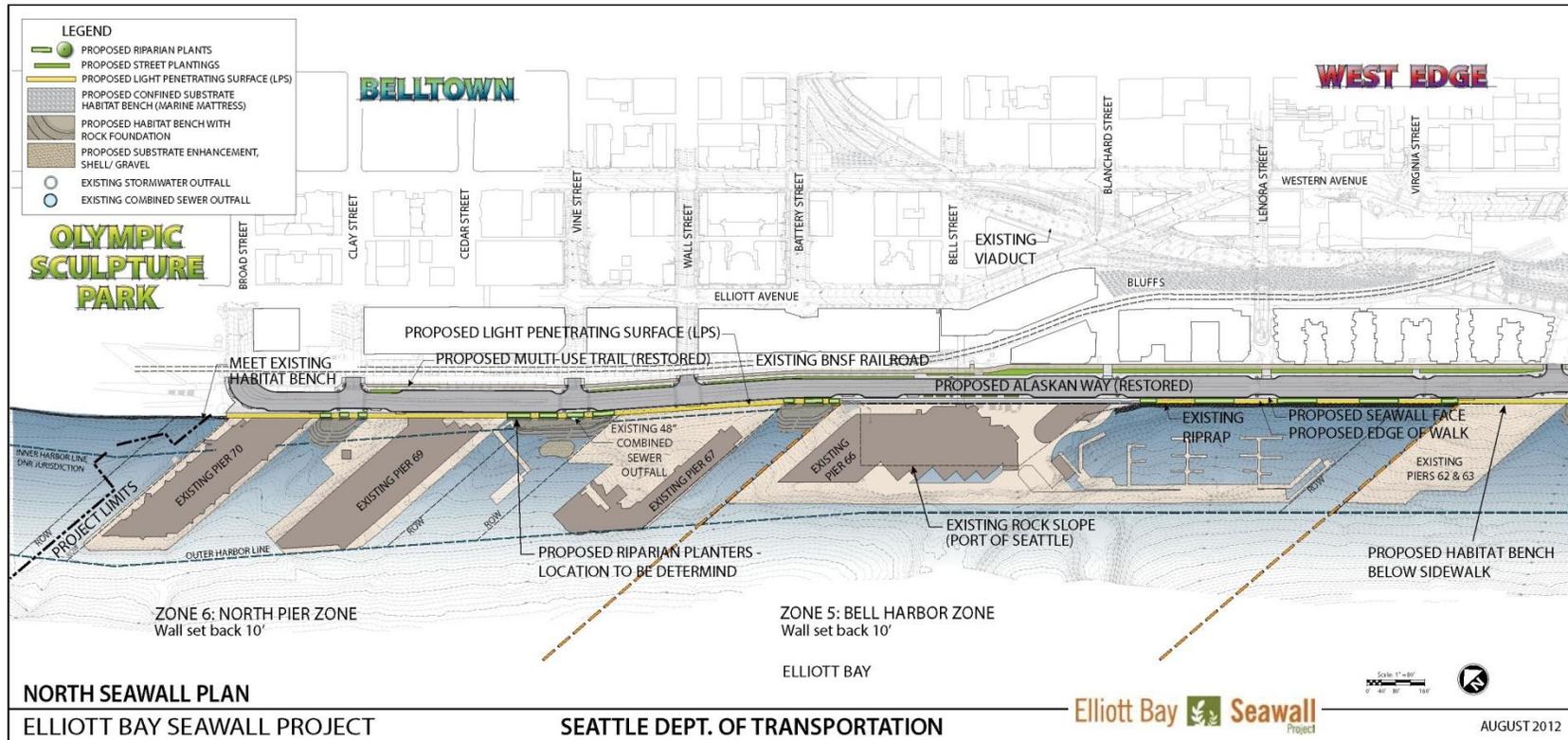


Figure 1-24. Alternative C: North Seawall Plan

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CHAPTER 2. METHODOLOGY

The final *Elliott Bay Seawall Project Social Resources and Environmental Justice Methodology Technical Memorandum* (SDOT 2010) contains a detailed description of the methodology used for this Discipline Report. The following sections summarize the methodology used to assess direct and secondary (indirect) project effects on social resources and environmental justice populations, as well as the cumulative effects of the EBSP on those resources when added to the impacts of other projects.

2.1 SOCIAL RESOURCES

This Discipline Report presents a wide variety of data in order to define the existing condition of the study area including identifying neighborhoods, gathering places, community facilities, demographics of the study area, etc. The affected environment discussion is based largely on an update of material initially prepared for the *Existing Conditions Report, Alaskan Way Seawall Replacement Project Feasibility Study* (USACE 2008). The updating process included gathering current data on population characteristics (i.e., race, age, language spoken at home, poverty status and median household income); household characteristics (i.e., owner-occupied versus rental housing, number of persons per household and subsidized/special needs/emergency housing); community facilities and gathering places (i.e., churches, schools, community centers and senior centers); and social and public employment services. A number of maps depicting this information have been included in this report.

The analysis of effects has been performed using the existing demographic data collected and previously published reports. Any proposed changes in the area have been thoroughly examined in order to illustrate the impacts—both adverse and beneficial—on community resources and social characteristics of the project area. Both temporary and permanent impacts on social resources have been discussed that may result from both the construction and operation of the project. Most of the project's effects are expected to be associated with construction and are therefore temporary (i.e., limited access, traffic, noise and air quality effects). Long-term effects could include any business, community, or residential displacements deemed necessary due to right-of-way acquisition, but these effects are expected to be rare and minor. The effects on community resources, special housing, and gathering places are discussed in detail along with any proposed mitigation measures.

There will be short-term effects on local access and accessibility (i.e., construction detours, longer travels times, changes to access and traffic patterns) as a result of construction. These adverse effects have been discussed in detail along with any proposed mitigation measures.

2.2 ENVIRONMENTAL JUSTICE

Projects with a federal nexus such as those receiving federal funds are required under Environmental Justice Presidential Executive Order 12898 to evaluate potential 'equity effects' of a proposal. Protection of the community's civil rights and the fair distribution of a project's burdens and benefits lie at the heart of the issue. An environmental justice analysis looks at potential disproportionate impacts of project alternatives on federally protected groups which include:

- Minorities (Black, Hispanic, Asian, Pacific Islander, American Indian or Alaskan Native), and
- Low-income (households below the federally designated poverty level as defined the United States Health and Human Services).

Special classes also evaluated in an environmental justice analysis include:

- Transit dependent populations,
- Populations over 65 years old,
- Persons with disabilities, and
- Limited English Proficiency (LEP) populations.

While an environmental justice analysis is not required under SEPA regulations, one has been included here. This analysis meets and exceeds requirements of the City’s Race and Social Justice Initiative (RSJI) and SDOT’s RSJI Annual Work Plan to complete equity analyses of SDOT projects, programs and policies. RSJI seeks to build racial equity within City government, through the provision of City goods and services, and throughout Seattle’s communities.

The affected environment discussion is based largely on an update of material initially prepared for the *Existing Conditions Report, Alaskan Way Seawall Replacement Project Feasibility Study* (USACE 2008). For the environmental justice analysis, the team examined existing data about minority, low-income and other special populations to determine whether disproportionately high impacts are expected to occur to any of these populations as a result of the project. This includes an evaluation of effects on tribal and subsistence fishing. Under Title VI, each federal agency is required to ensure that “no person on the grounds of race, color, or national origin, is excluded from participation in, denied the benefits of, or subjected to discrimination under any program or activity receiving Federal financial assistance.”

The analysis discusses whether or not the project will cause “disproportionately high and adverse” effects on minority and low-income populations, which means adverse effects that are predominately borne by a minority and/or a low-income population; or will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by others.

Both temporary and permanent impacts on environmental justice populations have been discussed that may result from both the construction and operation of the project. This analysis will use demographic information such as race, median household income, poverty status, and limited English proficiency for the travelshed and will consider both adverse and beneficial effects and any proposed mitigation measures. Outreach efforts to minority and low-income populations and related service organizations is described, including how such groups were/are involved in the decision-making process

2.3 INDIRECT IMPACTS METHODOLOGY

The analysis of secondary or indirect effects has been performed using the existing demographic data collected and previously published reports. Any proposed changes in the study area have been thoroughly examined in order to illustrate the “reasonable and foreseeable” indirect impacts—both

adverse and beneficial—on community resources and social characteristics that may occur in the future as a result of the project.

2.4 MITIGATION MEASURES

Mitigation measures have been proposed for unavoidable direct and indirect adverse impacts on social resources and environmental justice populations that result from the project, including disturbances during construction (i.e., construction impacts that may affect local neighborhoods and access). Mitigation for any displacements and relocations are consistent with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended. Best Management Practices (BMPs) are among the mitigation measures that will be considered to minimize potential impacts on social resources resulting from construction or operation of the project.

Strategies for avoiding and minimizing disproportional adverse effects to minority and/or low-income populations due to construction are proposed, as well as strategies for avoiding or minimizing any permanent effects. Project benefits to environmental justice communities are also covered.

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CHAPTER 3. COORDINATION AND INFORMATION SOURCES

3.1 INFORMATION SOURCES

The following regulations (federal, state, and local) and guidelines have been consulted during the preparation of the Social Resources and Environmental Justice Discipline Report:

- Age Discrimination Act of 1975;
- Americans with Disabilities Act of 1990;
- Executive Order (EO) 12898: Federal Actions to Address Environmental Justice to Minority Populations and Low-Income Populations;
- Executive Order 13166: Improving Access to Services for Persons with Limited English Proficiency;
- National Environmental Policy Act of 1969 (NEPA);
- Title 42 USC Section 4601, Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended;
- Title VI of the Civil Rights Act of 1964;
- USACE Procedures for Implementing NEPA;
- Washington Relocation Assistance and Real Property Acquisition Policy; and
- WSDOT Environmental Procedures Manual.

This Social Resources and Environmental Justice Discipline Report includes a large amount of data on a number of topics. Much of the data are available in reports that have been prepared for other projects in and around the study area. The data have been updated wherever possible and supplemented by additional data collection if necessary. A major source of data for demographic information is the 2010 United States Census (U.S. Census) and the Census' 2006–2010 American Community Survey datasets. A wide variety of sources have been consulted to help the team identify places where people gather and important community facilities. Information has been collected from the public involvement team that has been tasked with identifying likely changes in community characteristics as a result of the project. A review of public involvement activities has been conducted in order to analyze the potential effects on community cohesion, neighborhoods, and environmental justice populations. Existing information and data have been collected from a variety of federal, state, and local sources including:

- Alaskan Way Viaduct and Seawall Replacement Project Social Resources Technical Memoranda (2004, 2006 and 2010);
- City of Seattle Office of Economic Development and Department of Planning and Development;
- City of Seattle Comprehensive, Neighborhood, and Implementation Plans;
- Port of Seattle;
- Puget Sound Regional Council;
- United States Bureau of Economic Analysis;

- United States Census Bureau;
- Uniform Relocation Act as amended (if there are permanent or temporary relocations);
- Washington State Department of Revenue;
- Washington State Employment Security Department; and
- Washington State Ferries.

The data sources listed above have been supplemented with an inventory of local businesses and by interviews conducted with local business owners along the waterfront in the fall of 2010. General descriptions of the economies of the City of Seattle and the Puget Sound Region have been evaluated. The impacts—both adverse and beneficial—have been broken down into construction impacts, operational impacts, and secondary (indirect) impacts. The Social Resources and Environmental Justice discipline lead has coordinated with the Fish, Wildlife, and Vegetation; Transportation; Noise and Vibration; and Air Quality discipline leads concerning baseline information, impacts, and mitigation. The work done for the Alaskan Way Viaduct and Seawall Replacement Project (AWVSRP) Social Resources technical memoranda and discipline report (FHWA et al. 2004, 2006, and 2010) have been reviewed and field visits have been conducted as necessary to confirm existing economic conditions. The team has worked closely with SDOT to obtain the latest information for incorporation into this Discipline Report.

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, was issued in 1994. Its purpose is to focus attention on the environmental and human health effects of federal actions on minority and low-income populations with the goal of achieving environmental protection for communities. Effects on fishing are also considered.

EO 12898 directs federal agencies to identify and address the disproportionately high- and adverse-human-health or environmental effects of their actions on minority and low-income populations, to the greatest extent practicable and permitted by law. The order also directs each agency to develop a strategy for implementing environmental justice considerations. The order is intended to promote nondiscrimination in federal programs that affect human health and the environment, as well as provide access to public information and public participation to minority and low-income communities.

The work done for the AWVSRP Social Resources technical memoranda and discipline report (FHWA et al. 2004, 2006, and 2010) has been reviewed and the City, working closely with the SDOT and USACE, has held meetings with social service agency providers serving the project area. The purpose of these meetings was to identify the services available to low-income and minority populations in the study area, to inform these services and groups of the project, receive input as to potential effects of the project on their operations and clientele, and discuss appropriate ways to disseminate information about the project to the populations they serve before and during construction.

3.2 COORDINATION

The consultant team received a list of planned development projects in or near the project area that are in permit and/or design review, recently permitted or under construction from the Seattle Department of Planning and Development (DPD). The report author also coordinated with other discipline authors

concerning both impact analysis and the development of mitigation measures to insure a consistent approach to both topics.

3.3 PUBLIC INVOLVEMENT ACTIVITIES

The environmental justice evaluation for this Discipline Report is based on public outreach conducted for the project. Public outreach activities for the project are ongoing, and special efforts have been made on an ongoing basis to include minority and low-income populations throughout the study area. Outreach has been conducted to ensure that the study area's diverse populations, including populations with limited English proficiency, are involved in the decision-making process. These activities have included those listed in Table 3-1.

TABLE 3-1. PUBLIC INVOLVEMENT ACTIVITIES CONDUCTED FOR THE ELLIOTT BAY SEAWALL PROJECT

Date	Name of Event	Type of Outreach
6/7/2010	City Council Briefing	Briefing
6/16/2010	Scoping Meeting	Public Meeting
6/17/2010	Pioneer Square Community Briefing	Briefing
6/21/2010	City Council Briefing - Waterfront Special Committee	Briefing
7/20/2010	Stakeholder Subgroup Meeting #1	Stakeholder Subgroup Meeting
8/24/2010	Stakeholder Subgroup Meeting #2	Stakeholder Subgroup Meeting
9/11/2010	"Walking Tour"/Public Meeting	Public event
9/15–9/28/2010	Local business interviews	Interview
9/28/2010	Stakeholder Subgroup Meeting #3	Stakeholder Subgroup Meeting
10/7/2010	Design Commission Briefing	Briefing
10/12/2010	Mayor McGinn and USACE Colonel Wright Briefing	Briefing
10/14/2010	Planning Commission Briefing	Briefing
10/19/2010	Stakeholder Subgroup Meeting #4	Stakeholder Subgroup Meeting
10/20/2010	Pioneer Square Preservation Board Briefing	Briefing
10/21/2010	Seattle Aquarium: Smart Seawalls	Public event
10/25/2010	Seattle Aquarium Strategic Planning Group Briefing	Briefing
11/16/2010	Stakeholder Subgroup Meeting #5	Stakeholder Subgroup Meeting
11/19/2010	Port of Seattle Working Meeting	Briefing

Date	Name of Event	Type of Outreach
12/1/2010	Pioneer Square Preservation Board Briefing	Briefing
12/2/2010	Seattle Design Commission Briefing	Briefing
12/9/2010	Downtown District Council Briefing	Briefing
12/14/2010	Downtown Seattle Association Briefing	Briefing
12/16/2010	Planning Commission Briefing	Briefing
1/6/2011	Seattle Youth Commission Briefing	Briefing
1/19/2011	EBSP Public Comment Period begins	Public event
1/19/2011	EBSP Public Meeting/Open House	Public Meeting
1/20/2011	Design Commission Update Briefing	Briefing
1/20/2011	Seattle Chamber Transportation Committee Briefing	Briefing
1/26/2011	Southeast District Council Briefing	Briefing
1/27/2011	Full Central Waterfront Stakeholders Group Meeting #1	Central Waterfront Stakeholder
1/28/2011	Landmarks Board: Architectural Review Committee	Briefing
2/2/2011	Southwest District Council Briefing	Briefing
2/3/2011	Seattle Design Commission	Briefing
2/8/2011	EBSP Public Comment Period ends	Public event
2/17/2011	Waterfront Seattle Public Meeting	Public Meeting
3/3/2011	Central Waterfront Stakeholders Group Meeting #2	Central Waterfront Stakeholder
3/14/2011	Magnolia/Queen Anne District Council	Briefing
3/17/2011	Seattle Chamber Transportation and Land Use Committee	Briefing
3/17/2011	Seattle Design Commission Briefing	Briefing
3/22/2011	Central Waterfront Stakeholders Group Meeting #3	Central Waterfront Stakeholder
4/4/2011	Lake Union District Council	Briefing
4/6/2011	Pioneer Square Preservation Board Briefing	Briefing
4/6/2011	Distributing flyers to local businesses for geoarchaeological work	Field Visit
4/7/2011	Seattle Design Commission Briefing	Briefing

Date	Name of Event	Type of Outreach
4/14/2011	Distributing flyers to local businesses for geoarchaeological work	Field Visit
4/14/2011	Alaskan Way Viaduct Program Oversight Committee Briefing	Briefing
4/20/2011	Delridge District Council Briefing	Briefing
4/21/2011	Seattle Chamber Transportation and Land Use Committee	Briefing
4/21/2011	Distributing flyers to local businesses for geoarchaeology work	Field Visit
4/25/2011	Seattle City Council Briefing	Briefing
4/26/2011	Waterfront Landings Briefing	Briefing
5/12/2011	Central Waterfront Stakeholders Group Meeting #4	Central Waterfront Stakeholder
5/14/2011	Port of Seattle Maritime Festival	Public Event
5/19/2011	Waterfront Seattle Public Event: "Toward a Great Waterfront"	Public Event
5/20/2011	Union Station 100th Anniversary	Public Event
5/24/2011	Social Services Planning Workshop	Briefing
5/27/11	Boeing Bluebills Briefing	Briefing
6/18–6/19/2011	Port of Seattle Classic Weekend	Public Event
6/24/11	Federal Delegation Staff Walking Tour	Briefing
7/9-10/2011	Chinatown-International District Dragon Fest	Public Event
7/10/2011	U.S. Naval Sea Cadet Corps Briefing	Briefing
7/14/2011	SAM Picnic in the Park	Public Event
7/18/2011	Vashon Maury Island Community Council Briefing	Briefing
7/26/11	Joint Design and Planning Commission Briefing	Briefing
7/26/2011	Central Waterfront Stakeholders Group Meeting #5	Central Waterfront Stakeholder
8/2/2011	City of Issaquah Public Works Dept. Briefing	Briefing
8/4/2011	First Thursday Pioneer Square Art Walks	Public Event
8/6–7/2011	Seafair Fleet Parade	Public Event
8/11/2011	SAM Picnic in the Park	Public Event

Date	Name of Event	Type of Outreach
9/16/2011	Salmon Family Return Festival	Public Event
9/17/2011	Fisherman's Fall Festival	Public Event
10/15/2011	Georgetown Farmers Market	Fairs & Festivals
10/19/2011	Columbia City Farmers Market	Fairs & Festivals
12/1/2011	Magnolia Rotary Club	Briefing
7/9-7/10/2011	Chinatown-International District Dragon Fest	Public Event
7/10/2011	U.S. Naval Sea Cadet Corps Briefing	Briefing
7/14/2011	SAM Picnic in the Park	Public Event
7/18/2011	Vashon Maury Island Community Council Briefing	Briefing
7/26/11	Joint Design and Planning Commission Briefing	Briefing
7/26/2011	Central Waterfront Stakeholders Group Meeting #5	Central Waterfront Stakeholders Meeting
8/3/2011	City of Issaquah Public Works Dept. Briefing	Briefing
8/4/2011	First Thursday Pioneer Square Art Walks	Public Event
8/6-8/7/2011	Seafair Fleet Parade	Public Event
8/11/2011	SAM Picnic in the Park	Public Event
8/18/2012	Federal Delegation Walking Tour	Briefing
9/1/2012	Federal Delegation Walking Tour	Briefing
9/8/2011	SAM Dancing 'Til Dusk	Public Event
9/9/2011	Pike Place Market Senior Center Briefing	Briefing
9/10/2011	SAM Salmon Family Return Festival	Public Event
9/16/2011	Salmon Homecoming Celebration and Environmental Fair	Public Event
9/17/2011	Fisherman's Fall Festival	Public Event
10/19/2011	Columbia City Farmers Market	Public Event
10/25/2011	League of Women Voters Briefing	Briefing
10/27/2012	Waterfront Seattle Design Ideas Event	Public Event
10/29-10/30/2011	Waterfront Seattle Photobooth and Seawall Coloring Activity (Trick or Treat at the Waterfront)	Public Event

Date	Name of Event	Type of Outreach
11/17/2011	Seattle Chamber of Commerce – Transportation Committee	Briefing
11/17/2011	Central Waterfront Stakeholders Group Meeting #6	Central Waterfront Stakeholders Meeting
12/1/2011	Magnolia Rotary Club	Briefing
1/30/2012	Central Waterfront Stakeholders Group Meeting #7	Central Waterfront
2/1/2012	Seawall Final Design Information and Networking Forum	Meeting
2/3/2012	Seattle Steam Briefing	Briefing
2/8/2012	Mobility and Access Discussion	Public Event
2/10/2012	Vulcan Briefing	Briefing
2/15/2012	SDOT IDT Public Realm Briefing	Briefing
2/16/2012	Disabilities Commission Briefing	Briefing
2/22/2012	People for Puget Sound Briefing	Briefing
2/27/2012	Environment and Ecology Discussion	Public Event
3/3/2012	Washington Sea Grant Orca Bowl	Public Event – Habitat Education
3/5/2012	Setting the Stage Discussion	Public Event
3/6/2012	Immigrant and Refugee Briefing	Briefing
3/7/2012	Youth Commission Briefing	Briefing
3/14/2012	Uniquely Seattle Discussion	Public Event
3/21/2012	Seattle Chamber of Commerce Transportation Committee Briefing	Briefing
3/26/2012	City Council Special Committee Briefing	Briefing
3/27/2012	American Water Resource Association Briefing	Briefing
3/27/2012	Washington State Historic Preservation Office Briefing	Briefing
3/29/2012	Central Waterfront Stakeholders Group Meeting #8	Central Waterfront Stakeholders Meeting
3/30/2012	Storming the Sound Conference	Public Event – Habitat Education
4/2/2012	Lake Union District Council Briefing	Briefing
4/4/2012	Leschi District Council Briefing	Briefing

Date	Name of Event	Type of Outreach
4/4/2012	Southwest District Council Briefing	Briefing
4/5/2012	League of Women Voters Briefing	Briefing
4/9/2012	East District Council Briefing	Briefing
4/11/2012	Pike Place Market Historical Commission Briefing	Briefing
4/12/2012	Central District Council Briefing	Briefing
4/12/2012	Northwest Universal Design Council Briefing	Briefing
4/17/2012	Seattle City Light Briefing	Briefing
4/18/2012	Delridge District Council Briefing	Briefing
4/25/2012	Duwamish District Council Briefing	Briefing
4/25/2012	Pier Peer with People for Puget Sound	Public Event – Habitat Education
5/2/2012	University of Washington Environmental Law and Regulations Program Briefing	Briefing
5/2/2012	North District Council Briefing	Briefing
5/2/2012	Queen Anne Community Council Briefing	Briefing
5/3/2012	Northeast District Council Briefing	Briefing
5/7/2012	International District Community Forum	Briefing
5/9/2012	Ballard District Council Briefing	Briefing
5/10/2012	Downtown District Council Briefing	Briefing
5/10/2012	Central Waterfront Stakeholders Group Meeting #9	Central Waterfront Stakeholders Meeting
5/12/2012	Maritime Festival	Public Event
5/19–5/20/2012	University District Street Fair	Public Event
5/20/2012	SDOT Alki Summer Streets	Public Event – Habitat Education
5/30/2012	Pier Peer with People for Puget Sound	Public Event – Habitat Education
6/2/2012	Seattle Science Festival Expo Day	Public Event – Habitat Education
6/3/2012	“Habitat Forum”	Meeting
6/7/2012	Department of Planning and Development Noise Variance Briefing	Briefing

Date	Name of Event	Type of Outreach
6/16–6/17/2012	Classic Weekend	Public Event
6/21/2012	Senior Coffee Hour	Briefing
6/22/2012	Parks Department & Department of Natural Resources Briefing	Briefing
6/26/2012	Waterfront Landings Briefing	Briefing
7/11/2012	Mercer Island PROBUS Briefing	Briefing
7/12/2012	Waterfront Seattle Design “Waterfront Into Focus”	Public Event
7/13–7/15/2012	West Seattle Summerfest	Public Event
7/14–7/15/2012	Chinatown-International District Dragon Fest	Public Event
7/17/2012	Central Waterfront Stakeholders Group Meeting #10	Central Waterfront Stakeholders Meeting
7/21–7/22/2012	White Center Jubilee Days	Public Event
7/25/2012	Pier Peer with People for Puget Sound	Public Event – Habitat Education
8/2/2012	Pioneer Square Art Walk	Public Event
8/4/2012	Seafair Fleet Week	Public Event – Habitat Education
8/7/2012	WRIA9 Implementation Technical Committee Briefing	Briefing
8/8/2012	Urban Forestry Commission Briefing	Briefing
8/10/2012	SDOT Greenwood/Phinney Summer Streets	Public Event – Habitat Education
8/18/2012	SDOT Rainier Summer Streets	Public Event – Habitat Education
8/18/2012	Central Area Community Festival	Public Event
8/30/2012	SAM Dancing ‘Til Dusk	Public Event
9/6/2012	Queen Anne Farmers Market	Public Event
9/7/2012	Phinney Farmers Market	Public Event
9/8/2012	Mountaineers OutdoorsFest	Public Event
9/8/2012	SAM Salmon Return Family Festival	Public Event
9/19/2012	Wallingford Farmers Market	Public Event
9/22/2012	Fishermen’s Fall Festival	Public Event – Habitat Education

Date	Name of Event	Type of Outreach
9/22/2012	Salmon Homecoming Celebration and Environmental Fair	Public Event – Habitat Education
9/23/2012	Broadway Farmers Market	Public Event
9/26/2012	Pier Peers with People for Puget Sound	Public Event – Habitat Education
9/28/2012	Madrona Farmers Market	Public Event
9/29/2012	Magnolia Farmers Market	Public Event
9/30/2012	Ballard Farmers Market	Public Event
10/7/2012	Fremont Farmers Market	Public Event
10/13/2012	University District Farmers Market	Public Event
10/17/2012	Columbia City Farmers Market	Public Event

CHAPTER 4. AFFECTED ENVIRONMENT

This chapter provides information on social resources within or immediately adjacent to the study area, a dense urban environment along the Seattle waterfront. For purposes of the Social Resources and Environmental Justice Discipline Report, the study area for construction and operational effects has been determined by neighborhood planning areas and census tracts. The study area, shown in Figure 4-1, extends between S. Washington Street on the south, Broad Street on the north, First Avenue on the east, and Elliott Bay on the west. This analysis focuses on resources located within the study area, but also considers resources in the downtown Seattle project vicinity. The remaining figures in this analysis omit the study area outline. Indirect effects are described for a broader area, such as the City of Seattle, King County, and the Puget Sound Region.

The study area includes the residents, neighborhoods, and structures that would likely be affected by the replacement of the seawall. The population of the study area consists of residents, employers, employees, commuters, visitors and others. The residents may or may not work in the study area. People who visit the waterfront attractions either shop or attend cultural activities and events, and they may reside in other Seattle neighborhoods, cities, and towns in the metro area, or outside of the region.

The study area traverses several neighborhood planning areas designated by the City. From south to north, these are the Pioneer Square, Commercial Core, Belltown and Denny Triangle neighborhoods.

Social resources addressed in this section include population, neighborhoods, housing, community facilities, religious institutions, social and employment services, cultural and social institutions, government institutions and military installations. Related topics are discussed in other discipline reports, including the Transportation Discipline Report, Land Use Discipline Report, Public Services and Utilities Discipline Report, and Economics Discipline Report (SDOT 2012a, 2012b, 2012c, and 2012d, respectively).

4.1 COMMUNITY RESOURCES

Figure 4-2 shows community resources in the project vicinity (social services are discussed in Section 4.4.2).

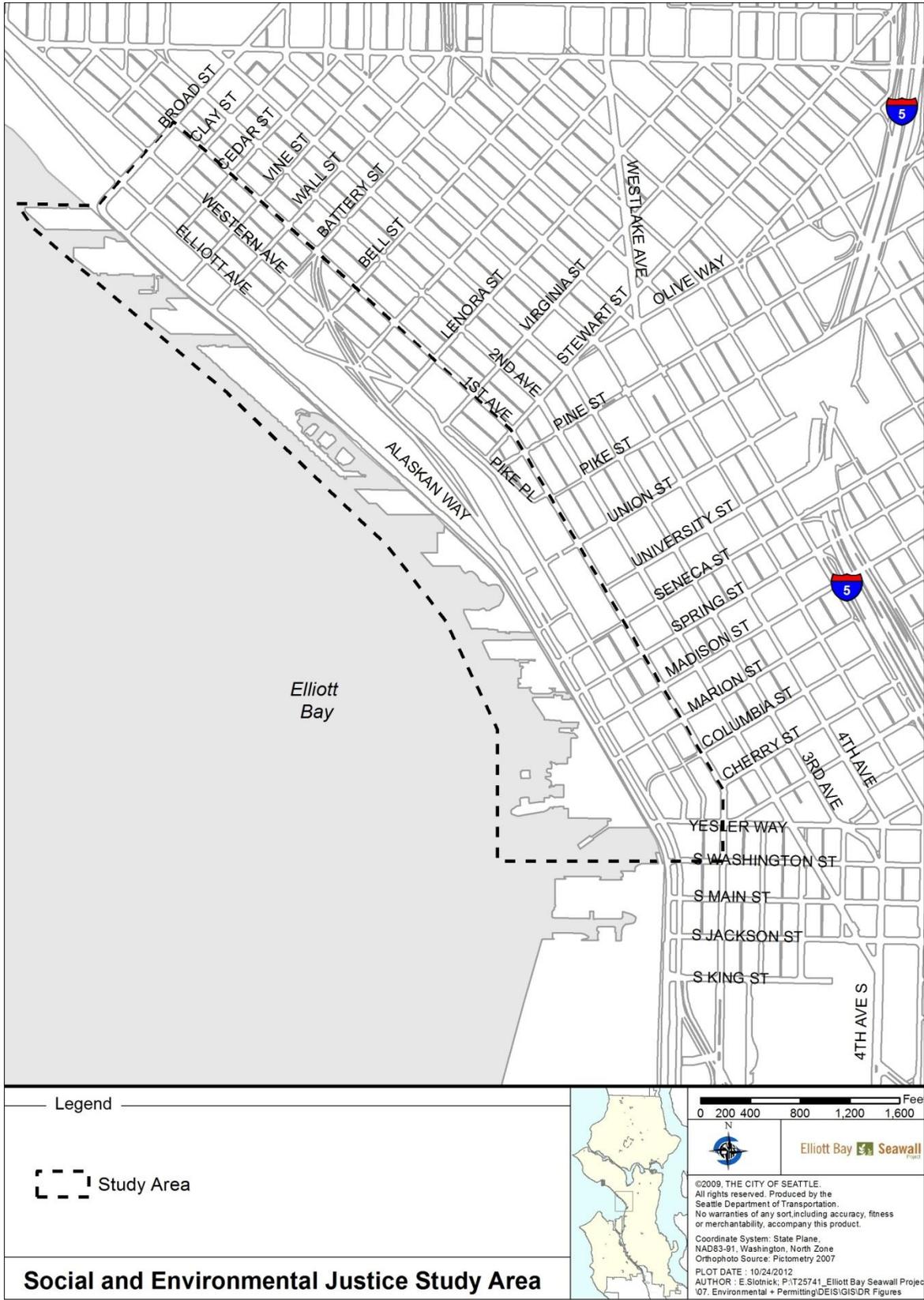


Figure 4-1. Study Area for Social Resources and Environmental Justice Analysis

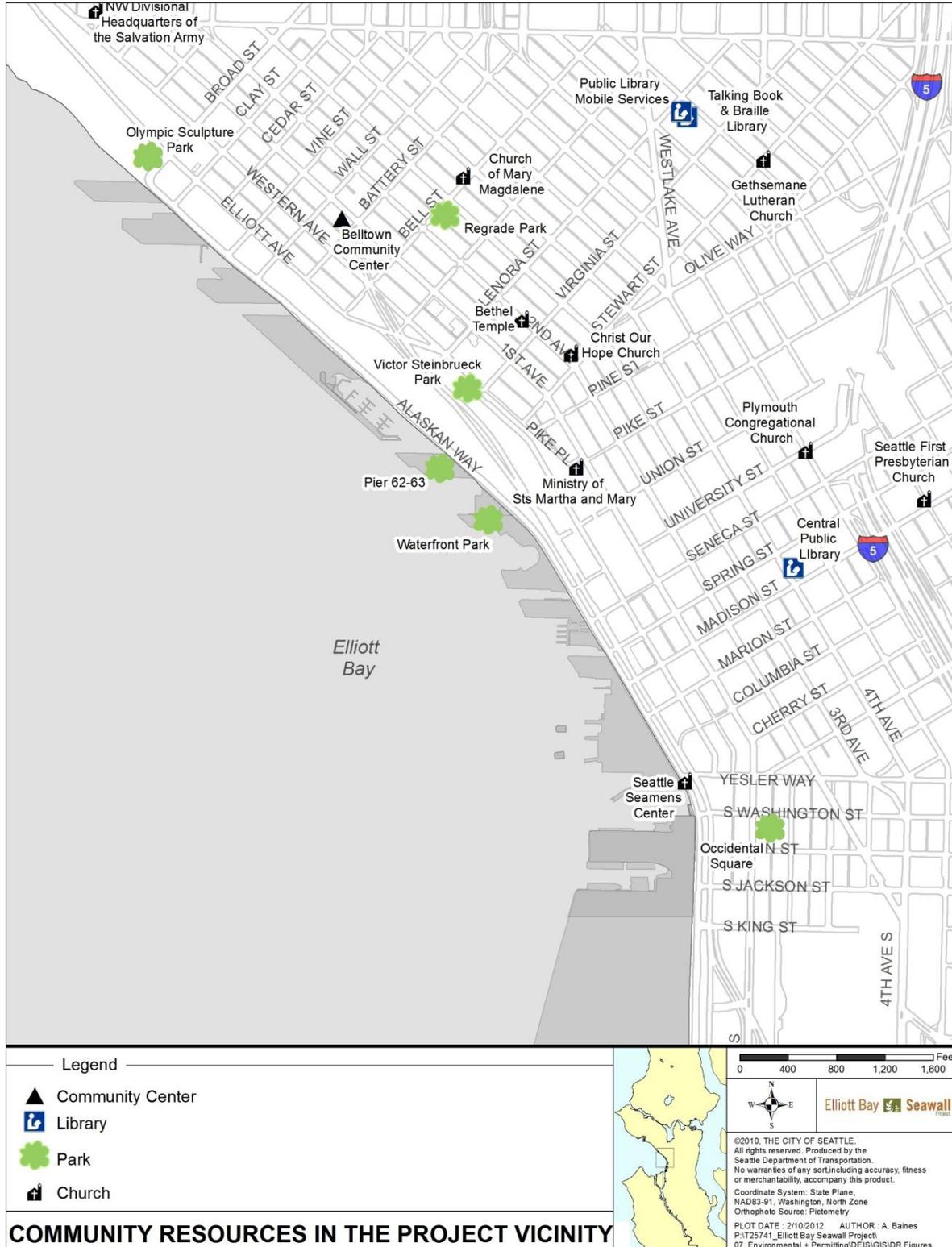


Figure 4-2. Community Resources in the Project Vicinity

4.2 POPULATION AND DEMOGRAPHICS

Although located in the densely developed downtown area, the study area population is only about two percent of the total population of Seattle (U.S. Census 2010). Several neighborhood planning areas designated by the City overlap with the study area. From south to north, these are the Pioneer Square, Commercial Core, Belltown and Denny Triangle neighborhoods, as shown on Figure 4-3. These neighborhoods are distinct and each has their own characteristics:

- The historic Pioneer Square neighborhood, formerly the city center of Seattle, is generally located between S. Royal Brougham Way and Columbia Street. The neighborhood was established in the late 1800s and is immediately east of the City's busy port facilities on Terminal 46.
- The Commercial Core is Seattle's major downtown area and generally extends along the waterfront between Columbia Street and Stewart Street. The neighborhood is set apart from adjacent neighborhoods by a change in the orientation of the street network to the north and south of the neighborhood. It is characterized by many high-rise office buildings and includes the City's financial district and retail core.
- The Belltown neighborhood is located immediately north of the Downtown Seattle area and generally extends from Stewart Street north to Denny Way. It encompasses the waterfront area and extends east to approximately Fifth Avenue, immediately north of the Commercial Core neighborhood. The neighborhood is characterized by medium-density business and commercial and residential land uses.
- The Denny Triangle lies north of the Commercial Core and east of Belltown. This neighborhood encompasses only the very northern portion of the Battery Street Tunnel, and is a mixture of apartment, retail, commercial, and mid-rise office buildings. With its proximity to the freeway, a number of local streets carry traffic to or from highway on- and off-ramps. The neighborhood is in transition, with downtown high-rise office development expanding into the neighborhood (FHWA et al. 2010).

The population trends and demographic characteristics of the study area are both similar and very different from the population of the City of Seattle as a whole. The most comprehensive complete source of demographic information for the study area is information published by the U.S. Census Bureau (2010). The study area is located within four 2010 census tracts (Census Tracts 80.01, 80.02, 81, and 92; Figure 4-4). As shown in the figure, boundaries of these four census tracts extend beyond the identified study area. If available, block group data provides better resolution than tracts, but not all data types are available at the block group level; therefore, tract level data are substituted, as needed. The following sections describe characteristics of the study area and compare them to those of the greater City. Characteristics described include total population, race and ethnicity, language, age, household status, income, disability, housing and transit dependency. Summary statistics are shown below. Table 4-1 and Figure 4-5 illustrate the population growth from 2000–2010 for the state, county, and city. Note that for the most part, population has gradually increased over the last decade except for a slight drop in the City's population from 2002 to 2003 and 2009 to 2010.



Figure 4-3. Neighborhood Planning Areas
 (Data Source: Seattle Public Utilities GIS Data 2007)

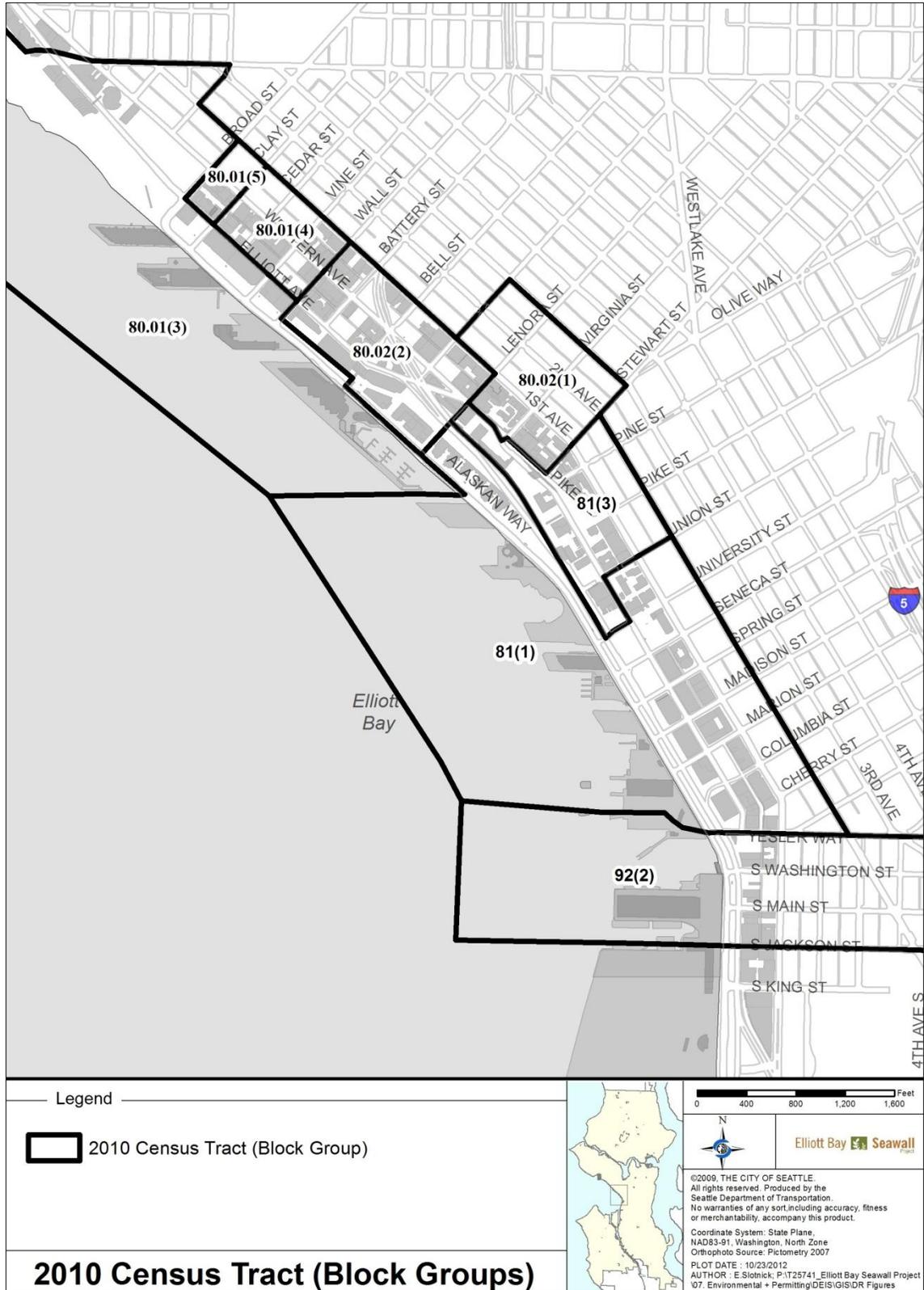


Figure 4-4. 2010 Census Tracts and Block Groups

TABLE 4-1. POPULATION, 2000–2010

Year	Washington	King County	Seattle City
2000	5,911,122	1,739,277	564,092
2001	5,987,785	1,756,988	570,724
2002	6,056,187	1,763,669	571,483
2003	6,113,262	1,769,753	570,789
2004	6,184,289	1,782,942	570,961
2005	6,261,282	1,803,691	575,036
2006	6,372,243	1,832,059	582,877
2007	6,464,979	1,857,506	592,647
2008	6,566,073	1,884,242	602,934
2009	6,664,195	1,916,441	616,627
2010	6,724,540	1,931,249	608,660

Source: U.S. Census Bureau 2012.

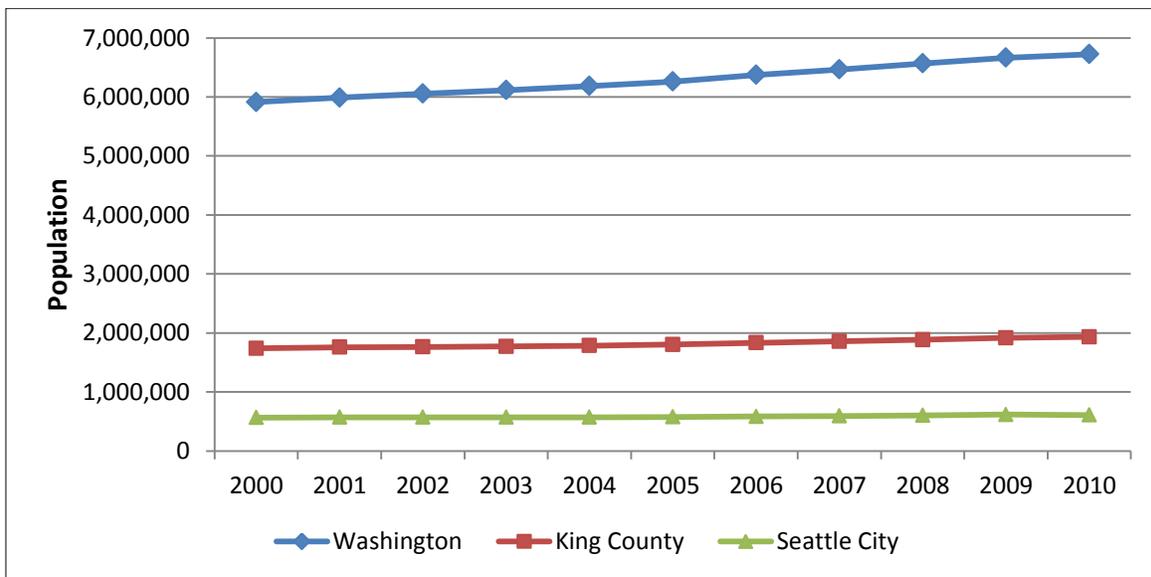


Figure 4-5. Population, 2000–2010
(Data Source: U.S. Census Bureau 2012)

4.2.1 Environmental Justice Communities – Low-Income and Minority Populations

The study area contains environmental justice (minority and low-income) populations. Table 4-2, Figure 4-6, and Figure 4-7 show detailed minority characteristics and income information in the study area. Table 4-2 summarizes this information. Low-income and minority persons are protected under Executive Order 12898 (1994). For the purposes of this study, demographic characteristics of the study area are compared to the demographics of the City of Seattle as a substitute for the demographics of the overall population that would benefit from proposed improvements associated with seawall replacement. The

residents and businesses located in the study area would directly experience the effects of construction activities associated with rebuilding or replacing the existing seawall. To determine the existing conditions for environmental justice communities (low-income and minority populations), census tracts and block groups within the project vicinity were overlaid on the study area to determine the race, ethnicity and income characteristics of the project area.

For the environmental justice analysis, minority populations are defined as individuals considering themselves to be non-White (Black or African American, American Indian and Alaskan Native, Asian, Native Hawaiian or other Pacific Islander, or other race) or an ethnic group. The U.S. Census publishes data on the ethnic Hispanic/Latino population (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race). In 2010, the percentage of minority populations in the study area was slightly less than the percentage of minority populations in the City of Seattle. The study area has several census tract block groups in which the percentage of minorities is substantially higher than that for the city (CT 92 BG 2 is 36 percent minority).

Table 4-3 and Figure 4-6 illustrate the racial diversity of the project area. The census tract block groups have comparable percentages for minority populations compared to the city. Both the city and the study area are made up of approximately 25 percent minorities.

Although minority populations in the Pacific Northwest and the study area include Native Americans, this project does not cross or directly affect tribal lands. Tribes with active interest in the area include the Muckleshoot, Suquamish, Duwamish, Tulalip, Snohomish, Snoqualmie, and Yakama Nation Tribes.

TABLE 4-2. SUMMARY OF MINORITY AND LOW-INCOME POPULATIONS IN THE STUDY AREA

Area	Population of One Race (2010)	White Alone* (2010)	Non-White Alone* (2010)	Median Household Income (2010)**	Percentage Below Poverty Level (2010)**
Washington	95.3	77.3	18.1	57,244	12.1
Seattle, WA	94.9	69.5	25.4	60,665	12.7
CT 80.01, BG 3	95.5	72.4	23.1	70,641	12.2
CT 80.01, BG 4	96.7	68.1	28.6		
CT 80.01, BG 5	96.1	73.4	22.7		
CT 80.02, BG 1	95.1	70.1	25.0	41,197	26.0
CT 80.02, BG 2	95.1	74.3	20.9		
CT 81, BG 1	96.6	78.4	18.2	33,592	39.3
CT 81, BG 3	97.3	73.6	23.7		
CT 92, BG 2	94.3	58.4	35.9	31,098	45.9
Study Area	95.8	70.7	25.1	not available	23.54**

Source: U.S. Census Bureau 2010, SF1.

Notes: "Population of one Race" includes those who checked only one race on the census form.

* White Alone includes those who checked "white only" on the census form; Non-White Alone includes all of those that selected a different single race from the list of races ("Black only," "Asian only," etc.).

** Data were not available at the block group level and are reported at the tract level. The study area row is likely an overestimate, as it includes a larger area than only those block groups in the study area.

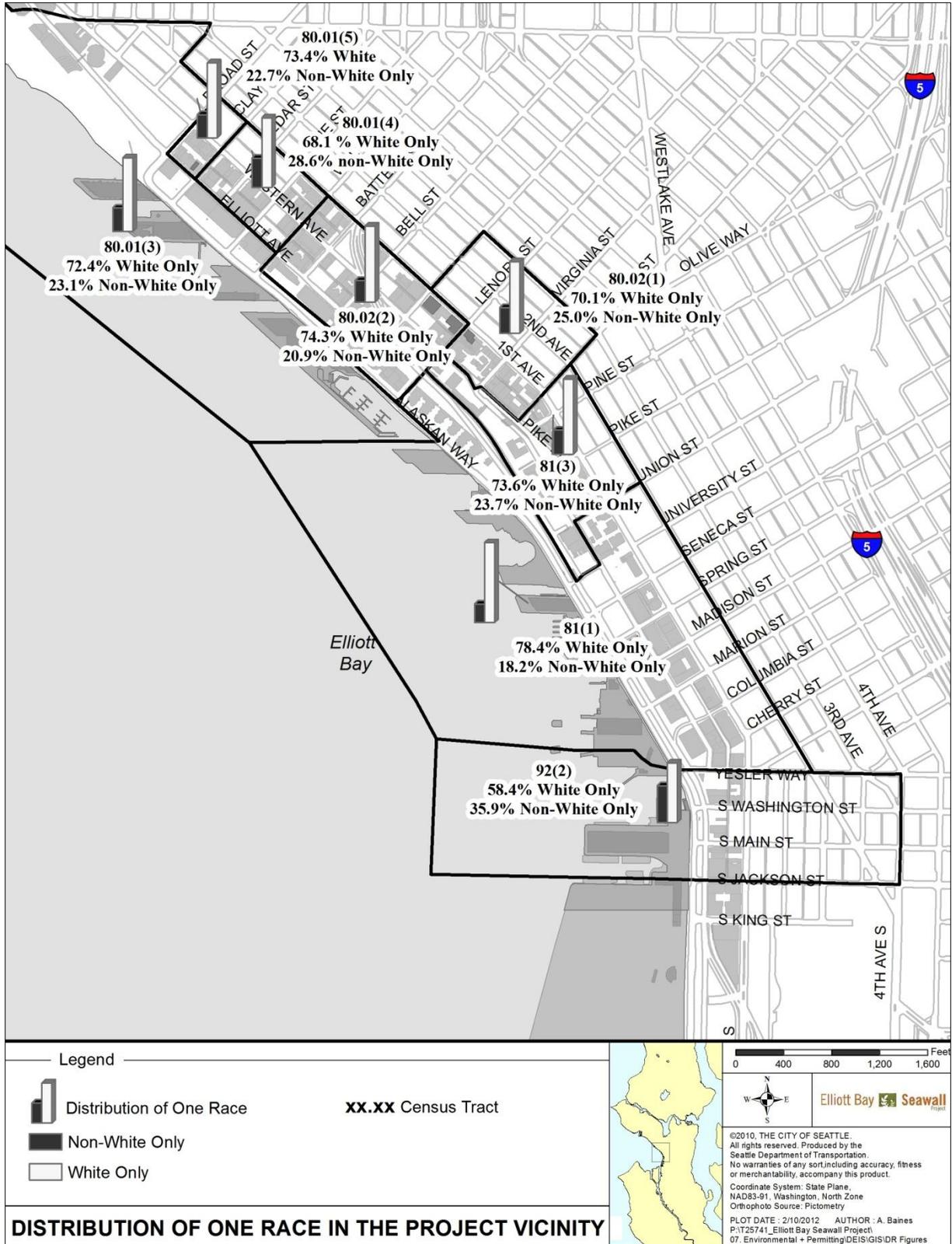


Figure 4-6. Distribution of One Race
 (Data Source: U.S. Census 2010)

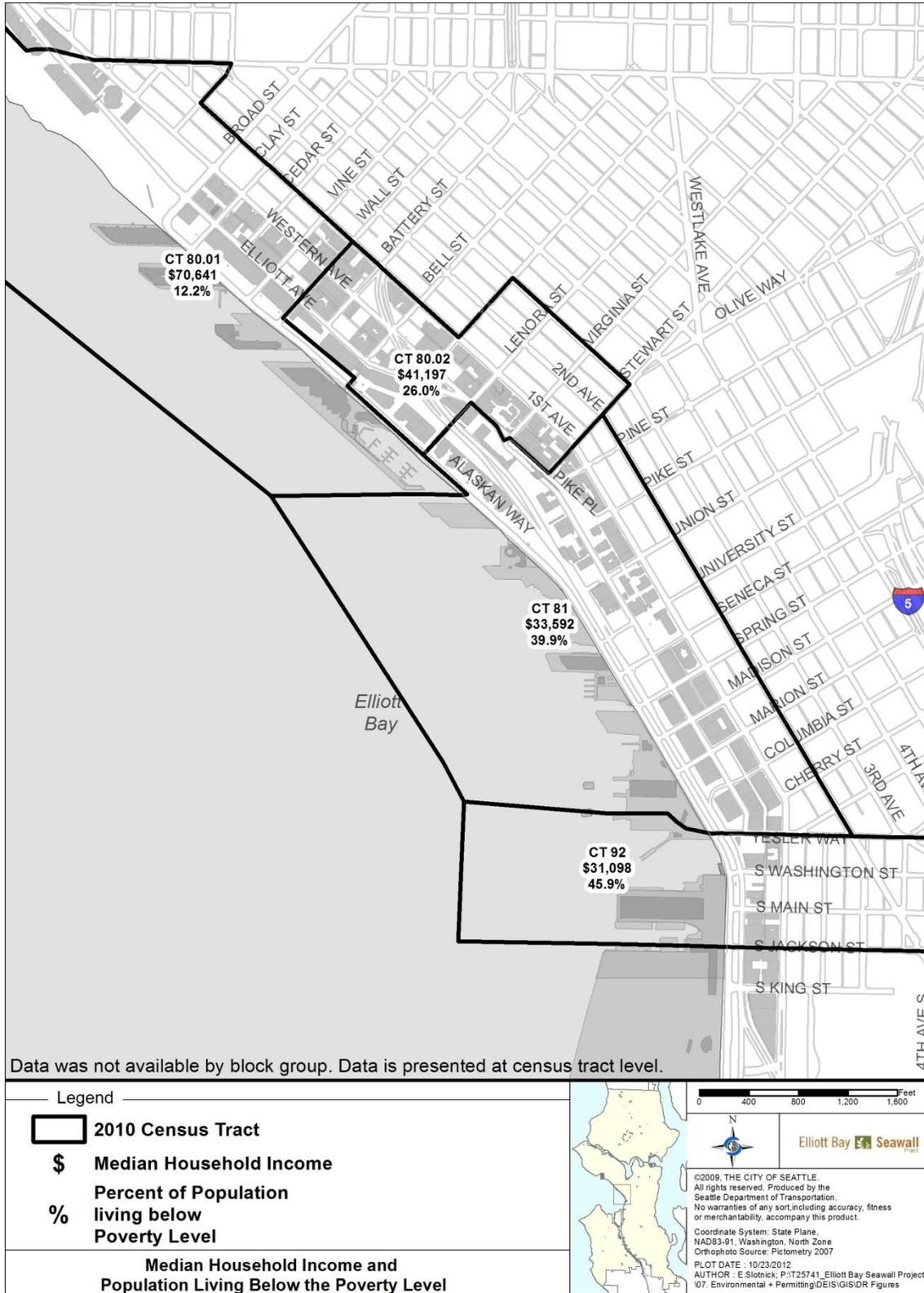


Figure 4-7. Median Household Income and Population Living Below the Poverty Level (Data Source: U.S. Census 2010)

TABLE 4-3. POPULATION BY RACE, 2010

Area		Total Population	White Alone	Black or African American Alone	American Indian and Alaska Native Alone	Asian Alone	Native Hawaiian and Other Pacific Islander Alone	Some Other Race Alone	Non-White Alone
Washington	#	6,724,540	5,196,362	240,042	103,869	481,067	40,475	349,799	1,215,252
	%	100	77.3	3.6	1.5	7.2	0.6	5.2	18.1
Seattle, WA	#	608,660	422,870	48,316	4,809	84,215	2,351	14,852	154,543
	%	100	69.5	7.9	0.8	13.8	0.4	2.4	25.4
CT 80.01, BG 3	#	1,054	763	61	12	156	2	13	244
	%	100	72.4	5.8	1.1	14.8	0.2	1.2	23.1
CT 80.01, BG 4	#	1,432	975	137	22	229	2	20	410
	%	100	68.1	9.6	1.5	16.0	0.1	1.4	28.6
CT 80.01, BG 5	#	801	588	24	3	148	1	6	182
	%	100	73.4	3.0	0.4	18.5	0.1	0.	22.7
Ct 80.02, BG 1	#	1,758	1,232	223	51	128	7	30	439
	%	100	70.1	12.7	2.9	7.3	0.4	1.7	25.0
CT 80.02, BG 2	#	1,255	932	72	15	135	6	34	262
	%	100	74.3	5.7	1.2	10.8	0.5	2.7	20.9
CT 81, BG 1	#	1,478	1,159	31	11	200	1	26	269
	%	100	78.4	2.1	0.7	13.5	0.1	1.8	18.2
CT 81, BG 3	#	1,285	946	111	25	142	3	23	304
	%	100	73.6	8.6	1.9	11.1	0.2	1.8	23.7
CT 92, BG 2	#	1,499	876	341	56	84	7	50	538
	%	100	58.4	22.7	3.7	5.6	0.5	3.3	35.9
Study Area	#	10,562	7,471	1,000	195	1,222	29	202	2,648
	%	100	70.7	9.5	1.8	11.6	0.3	1.9	25.1

Source: U.S. Census Bureau 2010, SF1.

Note: Percentages may not sum to 100 due to rounding.

Anecdotal information indicates that there is fishing for squid and other species at several piers along the waterfront. In order to quantify sport-fishing patterns in this area, a concerted effort was made to survey the anglers who fish from the many structures associated with the seawall. Despite this effort, anglers proved to be rare and few actual interviews could be conducted. This outcome occurred due to the seasonality of fishing in the project area and the timing of the survey period. The few interviews completed, however, did provide insight into how sport anglers utilize the study area. Fishing in the study area is a favored activity for many Seattle area residents. While most anglers prefer to fish from boats, a significant number fish off of the various piers along the seawall and from the shores of Myrtle Edwards Park (USACE 2008). The favored fishing spot is north of the immediate study area at Pier 82 (Elliott Bay Park Fishing Pier). This popular spot is the most consistently used and has been known to attract over 50 people per evening during peak runs, but averages between two and 10 anglers per evening during the remainder of the fishing season. The relative popularity of Pier 82 is due to the widely held notion that compared to surrounding areas its waters attract more fish species in higher densities, with individuals being of larger size. Piers 62/63 are also relatively popular with sport anglers although on average, these piers are used less frequently than Pier 82 (USACE 2008).

Fishing occurs year-round in the study area for species such as shiner perch, pile perch, and Pacific herring; however, most fishing occurs from late summer through to late winter when most of the fisheries are open. Squid fishing has become one of the most popular fisheries in the study area, attracting evening crowds to well-lit piers from October through to the end of January. The various salmon runs that move through the study area also have very popular fisheries. Coho fishing occurs in the late summer; blackmouth Chinook occurs in the winter; and chum, silver, sockeye, and Chinook all occur from April through October. The two trout species that occur in the study area—bull trout and steelhead trout—are somewhat rare and not often targeted by fisherman (USACE 2008). Other species that are fished for in the study area include ling cod and rock fish from May through June, and crustaceans such as red and Dungeness crab from July through September (USACE 2008).

Executive Order 13158 directs the National Oceanic and Atmospheric Administration (NOAA) and the Department of Interior to "consult with...tribes...and other entities to promote coordination of federal, state, territorial, and tribal actions to establish and manage Marine Protected Areas (MPAs)." The right of tribal members to take salmon at all of their "usual and accustomed" fishing sites is explicitly guaranteed by treaty. Because the federal government has a trust responsibility to all federally recognized tribes, conservation goals, and management practices for MPAs affecting tribal resources should be established through government-to-government consultations (NOAA 2011). In 1974, the Boldt Decision reaffirmed tribal treaty-protected fishing rights. The ruling (*United States v. Washington*)—which has been upheld by the U.S. Supreme Court—established the tribes as co-managers of the resource entitled to 50 percent of the harvestable number of salmon returning to Washington waters.

The term "low income" is used for household incomes that are at or below the Department of Health and Human Services (HHS) poverty guidelines for that size of household (FHWA et al. 2010). The HHS poverty guidelines are the other version of the federal poverty measure. HHS poverty guidelines are a

simplified version of the U.S. Census Bureau's poverty thresholds. In 2012, the HHS poverty guideline was \$11,170 for 1 person and \$23,050 for a family of four in the continental United States (Table 4-4).

TABLE 4-4. 2012 DEPARTMENT OF HEALTH AND HUMAN SERVICES POVERTY GUIDELINES

Persons in Family	48 Contiguous States and D.C. (\$)	Alaska (\$)	Hawaii (\$)
1	11,170	13,970	12,860
2	15,130	18,920	17,410
3	19,090	23,870	21,960
4	23,050	28,820	26,510
5	27,010	33,770	31,060
6	30,970	38,720	35,610
7	34,930	43,670	40,160
8	38,890	48,620	44,710
For each additional person, add:	3,960	4,950	4,550

Source: HHS 2012.

4.2.2 Income Characteristics

Generally, the residents of the study area are less well off than residents of the city as a whole. In 2010, the median household income in the study area was considerably less than the median income of households in Seattle. With the exception of Tract 80.01, median household income for the study area is below that for the City of Seattle, while per capita income remains higher than that of the city for all tracts. This is most likely due to the study area's high proportion of single-person households. The study area also shows a higher percentage of its population living at or below the poverty level, especially tracts 81 and 92, which have 39 percent and 46 percent of their population living below the poverty level, respectively. This information is summarized in Table 4-5 and shown in Figure 4-7 (above).

TABLE 4-5. HOUSEHOLD AND INCOME CHARACTERISTICS, 2010

Area	Median Household Income (2010)	Per Capita Income (2010)	Population for Whom Poverty Status is Determined	Individuals Below the Poverty Level	Percent Below Poverty Level
Washington	57,244	29,733	6,430,231	780,009	12.1
King County, WA	68,065	38,211	1,850,930	188,539	10.2
Seattle, WA	60,665	40,868	575,700	73,338	12.7
CT 80.01	70,641	68,550	5,003	609	12.2
CT 80.02	41,197	73,892	2,731	711	26.0
CT 81	33,592	63,084	4,185	1,643	39.3
CT 92	31,098	24,089	2,187	1,004	45.9
Study Area Tracts	-	-	14,106	3,967	23.54

Source: U.S. Census Bureau 2010, American Community Survey.

Notes: Data were not available at the block group level and are reported at the tract level. The study area row is likely an overestimate, as it includes a larger area than only those block groups in the study area. Percentages may not sum to 100 due to rounding.

4.2.3 Primary Language Spoken at Home

The data on primary language spoken at home are shown in Table 4-6. These data suggest that information on the project should be made available to reach potentially linguistically isolated households affected by the project, considering that approximately 22 percent of the study area households primarily speak a language other than English at home. Figure 4-8 illustrates the language spoken at home in the study area. A “linguistically isolated” (Table 4-6, last column) household is one in which there is no household member (14 years or older) that speaks only English or speaks a non-English language but also speaks English “very well.” In addition, the U.S. Census data identified the number of households that were linguistically isolated from the community due to the lack of any adult member who had a good command of the English language. In 2010, approximately five percent of the census tracts containing the study area households were linguistically isolated (Table 4-6).

4.2.4 Educational Attainment

Data on educational attainment are tabulated for the population 25 years old and over. The data show that the City of Seattle and the study area have a high percentage of people with a graduate degree (both over 18 percent) compared to the state as a whole (11 percent) (Table 4-7). Figure 4-9 provides additional information on educational attainment.

TABLE 4-6. PRIMARY LANGUAGE SPOKEN AT HOME, 2010

Area		English	Spanish	Other Indo-European Languages	Asian and Pacific Island Languages	Other Languages	Linguistically Isolated ¹
Washington	#	2,126,334	201,035	92,786	136,601	20,619	108,250
	%	82.5	7.8	3.6	5.3	0.8	4.2
King County, WA	#	591,957	49,265	44,573	82,108	14,706	48,483
	%	75.7	6.3	5.7	10.5	1.8	6.2
Seattle, WA	#	444,684	25,427	21,471	59,894	13,561	33,337
	%	78.7	4.5	3.8	10.6	2.4	5.9
CT 80.01	#	3,163	138	146	380	12	88
	%	82.4	3.6	3.8	9.9	0.3	2.3
CT 80.02	#	1,759	80	202	107	76	111
	%	79.2	3.6	9.1	4.8	3.4	5.0
CT 81	#	2,223	57	90	90	40	115
	%	89.0	2.3	3.6	3.6	1.6	4.6
CT 92	#	1,004	31	49	427	114	478
	%	61.9	1.9	3.0	26.3	7.0	29.5
Study Area Tracts	#	7,952	290	496	1,135	313	1,054
	%	78.1	2.9	4.9	11.2	3.1	10.4

Source: U.S. Census Bureau 2010, American Community Survey.

Notes: Data were not available at the block group level and are reported at the tract level. The study area row is likely an overestimate, as it includes a larger area than only those block groups in the study area.

Data are based on a sample survey, not the 100 percent census; therefore, the total number of households is estimated.

Percentages may not sum to 100 due to rounding and excluded data.

¹ Households in which no adult speaks only English; and no adult speaks English "very well."

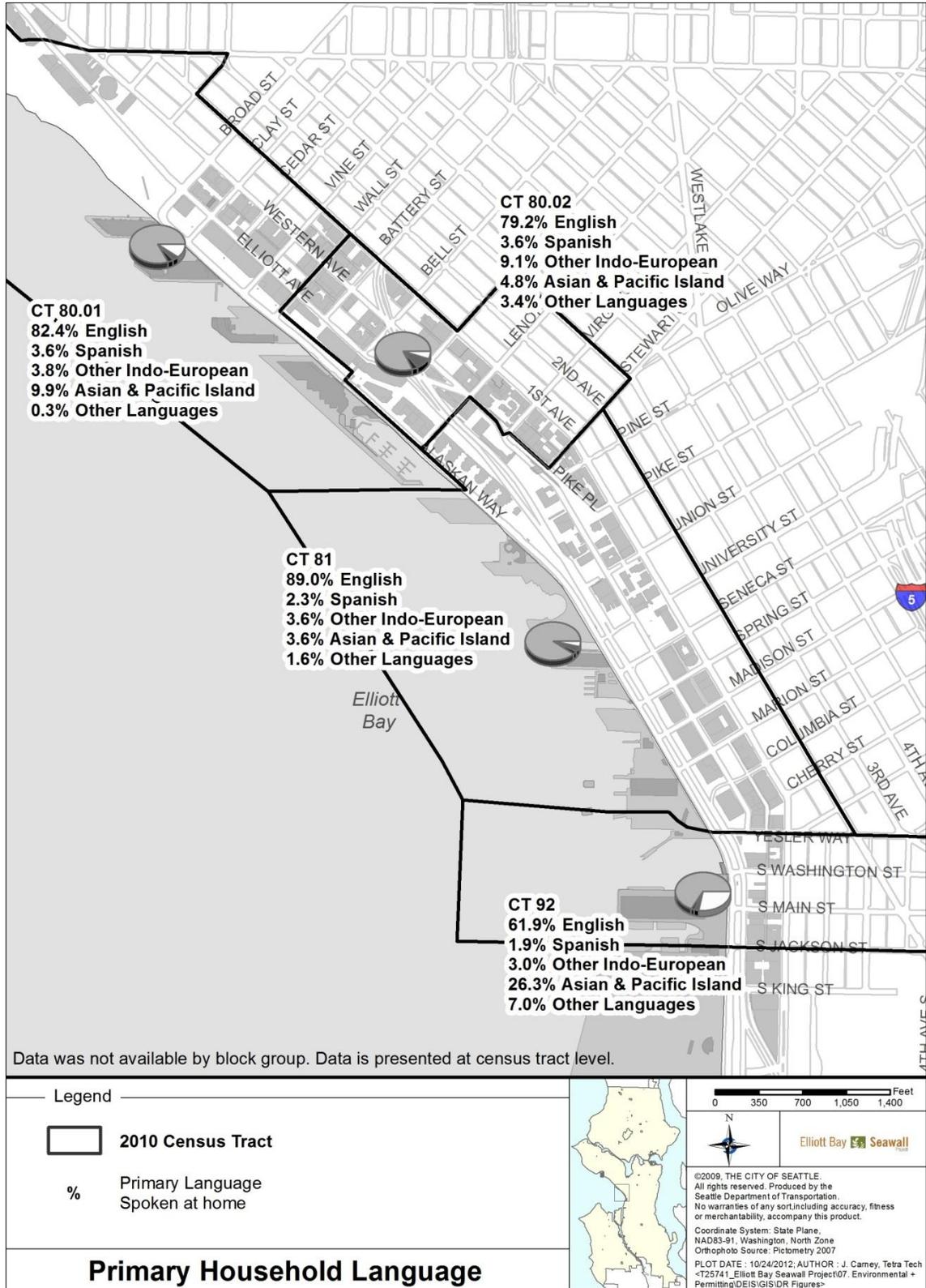


Figure 4-8. Primary Household Language as a Percentage of all Households
 (Data Source: U.S. Census 2010, American Community Survey)

TABLE 4-7. EDUCATIONAL ATTAINMENT OF POPULATION 25 AND OLDER, 2000

Area		Total Population 25 Years and Older	Less than 9th Grade	9th to 12th Grade, No Diploma	High School Graduate (includes equivalency)	Some College, No Degree	Associate's Degree	Bachelor's Degree	Graduate or Professional Degree
Washington	#	4,360,316	178,773	279,060	1,059,557	1,085,719	409,870	872,063	479,635
	%	100	4.1	6.4	24.3	24.9	9.4	20.0	11.0
King County, WA	#	1,299,736	45,491	59,788	230,053	271,645	103,979	374,324	213,157
	%	100	3.5	4.6	17.7	20.9	8.0	28.8	16.4
Seattle, WA	#	434,044	15,626	16,928	55,558	76,826	29,515	144,103	95,056
	%	100	3.6	3.9	12.8	17.7	6.8	33.2	21.9
CT 80.01	#	4,334	82	82	286	663	230	1,599	1,387
	%	100	1.9	1.9	6.6	15.3	5.3	36.9	32.0
CT 80.02	#	2,327	156	84	198	437	107	980	365
	%	100	6.7	3.6	8.5	18.8	4.6	42.1	15.7
CT 81	#	3,981	32	494	673	665	211	1,147	764
	%	100	0.8	12.4	16.9	16.7	5.3	28.8	19.2
CT 92	#	2,019	398	232	351	380	115	410	135
	%	-	19.7	11.5	17.4	18.8	5.7	20.3	6.7
Study Area Tracts	#	12,661	921	931	1,564	2,203	662	4,055	2,330
	%	-	7.3	7.4	12.4	17.4	5.2	32.0	18.4

Source: U.S. Census 2010, American Community Survey

Note: Data were not available at the block group level and are reported at the tract level. The study area row is likely an overestimate, as it includes a larger area than only those block groups in the study area.

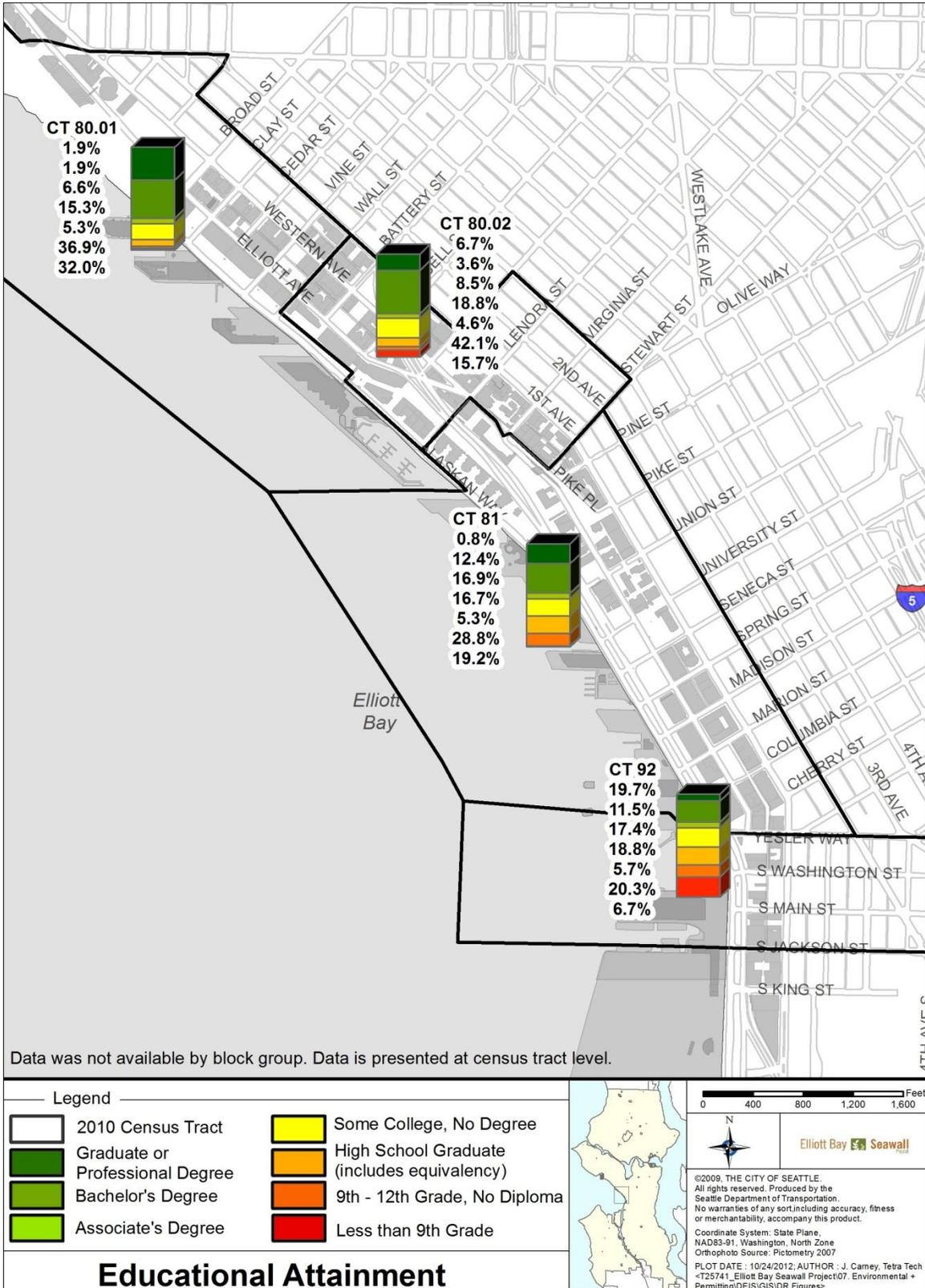


Figure 4-9. Educational Attainment of Population 25 Years and Older
(Data Source: U.S. Census 2010, American Community Survey)

4.2.5 Age Characteristics

In general, the study area exhibits a lower level of diversity with respect to age than the overall City of Seattle, with predominantly an older population. All four census tracts have numbers of children (ages 0–17) well below the City of Seattle, and the median age in the study area is roughly 43 versus 36 in the City of Seattle. These data are summarized in Table 4-8.

TABLE 4-8. AGE CHARACTERISTICS, 2010

Area		Total Population	0–4 Years	5–19 Years	20–64 Years	65 Years and Over	Median Age (years)
Washington	#	6,561,297	426,484	1,312,259	4,041,759	774,233	37.0
	%	100	6.5	20.0	61.6	11.8	-
King County, WA	#	1,879,189	116,510	334,496	1,228,990	197,315	36.9
	%	100	6.2	17.8	65.4	10.5	-
Seattle, WA	#	595,240	30,357	78,572	422,620	64,286	36.3
	%	100	5.1	13.2	71.0	10.8	-
CT 80.01	#	5,003	30	185	4,463	330	35.6
	%	100	0.6	3.7	89.2	6.6	-
CT 80.02	#	2,731	16	153	2,237	325	40.0
	%	100	0.6	5.6	81.9	11.9	-
CT 81	#	4,399	101	18	3,744	545	44.8
	%	100	2.3	0.4	85.1	12.4	-
CT 92	#	2,187	28	22	1,693	442	51.7
	%	100	1.3	1.0	77.4	20.2	-
Study Area Tracts	#	14,320	172	383	11,943	1,829	N/A
	%	100	1.2	2.7	83.4	12.8	-

Source: U.S. Census Bureau 2010, American Community Survey.

Note: Percentages may not sum to 100 due to rounding.

4.2.6 Household Characteristics

Compared to the overall City of Seattle, the study area displays a much higher proportion of one-person households and a far lower proportion of households with children. Likewise, the percentages of family households and single-parent families are well below the values for the City of Seattle which has an average household size of 2.06. The study area consists predominantly of one-person households (average household size of 1.36). As seen in Table 4-9 and Figure 4-10, the study area's elderly population appears to be concentrated in Census Tract 80.02 Block Group 1 and in Census Tract 81 Block Group 3, though the percentages are in line with Seattle, the county, and the state.

TABLE 4-9. HOUSEHOLD AND OCCUPANCY CHARACTERISTICS, 2010

Area	Total Housing Units	Occupied Housing Units	Percent of Total Housing Units Occupied	Total Households	Average Household Size	Percent Renter-Occupied	Percent Owner-Occupied	Householder Living Alone	Percent of All Households Householder Living Alone	Family Households	Percent of All Households Family Households	Households with Children	Percent of All Households with Children	Elderly Households	Percent of All Households Elderly Households
Washington	2,885,677	2,620,076	91	2,620,076	2.51	36	64	711,619	27	1,687,455	64	836,227	32	597,620	23
King County	851,261	789,232	93	789,232	2.40	41	59	244,699	31	461,510	58	230,025	29	154,215	20
Seattle, WA	308,516	283,510	92	283,510	2.06	52	48	117,054	41	121,690	43	55,117	19	49,872	18
CT 80.01, 3	838	765	91	765	1.38	64	36	515	67	165	22	23	3	52	7
CT 80.01, 4	1,022	885	87	885	1.37	49	52	596	67	181	20	29	3	66	7
CT 80.01, 5	629	549	87	549	1.46	80	20	327	60	125	23	20	4	27	5
CT 80.02, 1	1,260	1,084	92	1,084	1.25	78	22	843	78	157	14	18	2	247	23
CT 80.02, 2	1,064	919	86	919	1.37	81	19	618	67	154	17	26	3	67	7
CT 81, 1	1,333	1,018	76	1,018	1.43	74	26	631	62	272	27	28	3	111	11
CT 81, 3	1,081	881	82	881	1.32	76	24	638	72	177	20	26	3	268	30
CT 92, 2	778	730	94	730	1.32	94	6	560	77	83	11	24	3	62	8
Study Area	8,005	6,831	85	6,831	1.36	75	25.63	4,728	69	1,314	19	194	3	900	13

Source: U.S. Census Bureau 2010, SF1.

Notes: Families are households with more than one person related by blood or marriage or adoption.

Households with children are households with one or more child less than 18 years of age residing in the home.

Elderly households have at least one member 65 years or older.

Percentages may not sum to 100 due to rounding.

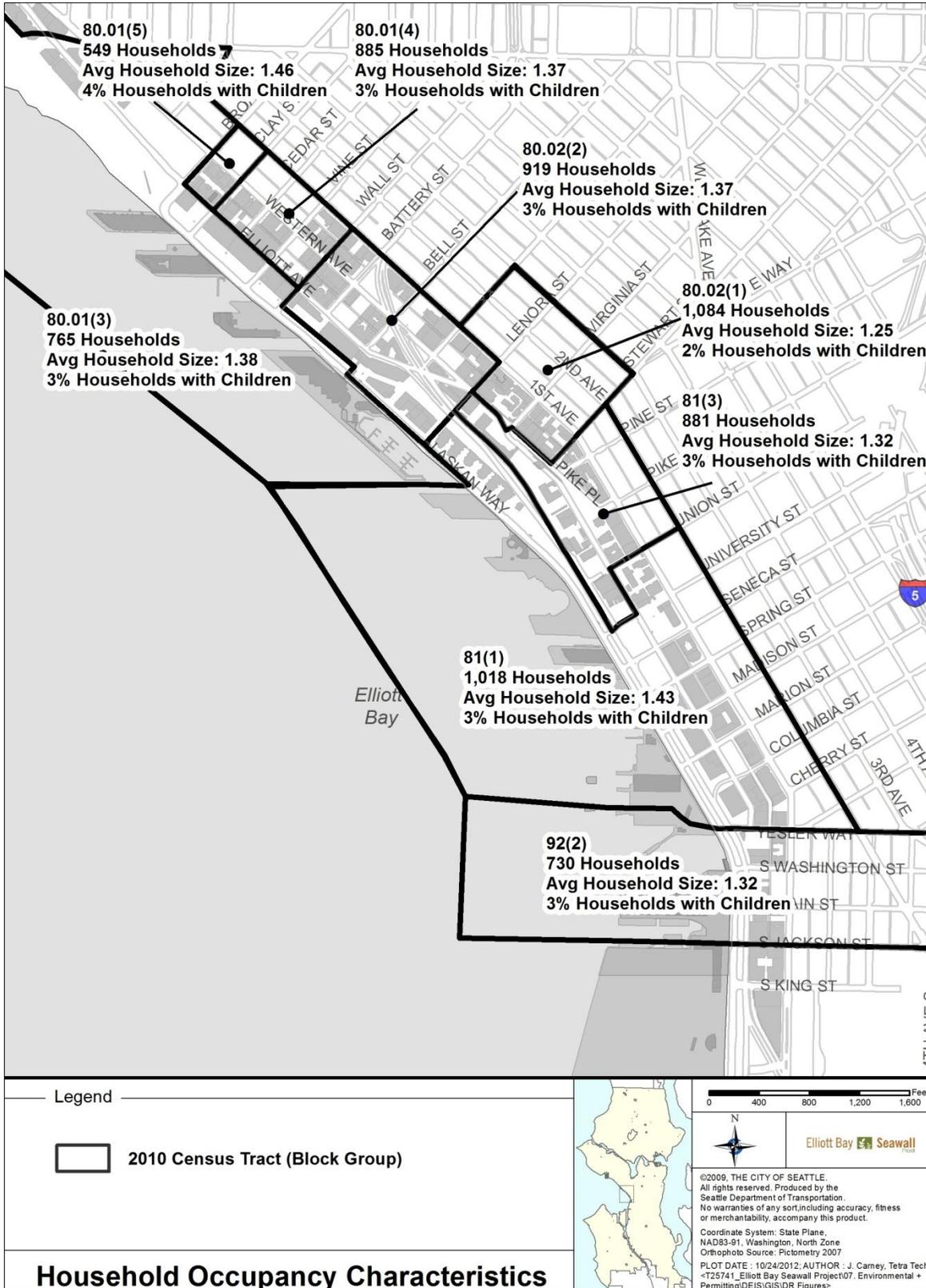


Figure 4-10. Household Occupancy Characteristics
 (Data Source: U.S. Census 2010)

4.2.7 Disabled Persons

The 2000 U.S. Census estimated the number of persons with disabilities based on responses to questions on the U.S. Census short form. Because the 2010 Census did not contain a long form questionnaire, no updated data on disabled persons were collected. Thus, the 2000 Census information remains the most recent data on disabled persons. The American Community Survey will collect information on disabled persons in the future, but is not scheduled to release updated data until 2013.

The 2000 U.S. Census short form asked respondents if they had any of the following long-term conditions: (1) blindness, deafness, or a severe vision or hearing impairment (sensory disability); or (2) a condition that substantially limits one or more basic physical activities such as walking, climbing stairs, reaching, lifting or carrying (physical disability). In addition, respondents were asked if they had a physical, mental or emotional condition that made it difficult to perform certain activities, including (a) learning, remembering, or concentrating (mental disability); (b) dressing, bathing, or getting around inside the home (self-care disability); (c) going outside the home alone to shop or visit a doctor's office (go-outside-the-home disability); and/or (d) working at a job or business (employment disability). As Table 4-10 illustrates, three census tracts have a higher proportion of disabled persons than the City of Seattle (6.7 percent) and Census Tract 80.01 is about the same (6.4 percent)

Respondents could report more than one type of disability, and the disabilities could cause limitation to one or more activities. Not all limitations, however, can be assumed to affect mobility. As such, it is not appropriate to report all persons with all disabilities as representative of persons with mobility limitations. A disabled person with mobility limitations, as defined by the Census, is a person 16 years and older that has a disability that affects his or her ability to go outside of the home alone. This information is not available from the Census Bureau at the Block Group level, but it is available at the census tract level. In Census Tract 80.1, over six percent are disabled to an extent that affects their ability to go outside the home. That's a sharp contrast to Census Tract 82, where the same figure is roughly 17 percent (Table 4-10 and Figure 4-11).

4.2.8 Veteran Status

A civilian veteran is a person 18 years old and over who, at the time of the U.S. Census, had served on active duty in the U.S. Army, Navy, Air Force, Marine Corps, or Coast Guard in the past, but was not currently on active duty, or who had served in the Merchant Marine during World War II. People who had served in the National Guard or Military Reserves were classified as veterans only if they had ever been called or ordered to active duty. All other civilians 18 years old and over were classified as nonveterans (U.S. Census 2010). Figure 4-11 shows the percentage of veterans was found to be somewhat higher in the study area than in the City of Seattle. This pattern is true for all four census tracts (Table 4-11 and Figure 4-11).

TABLE 4-10. DISABILITY POPULATION CHARACTERISTICS, 2000

Area		Disabled Population as a Percentage of Whole	Population 16 to 64 Years with a Disability that Affects One's Ability to go Outside the Home Alone
Washington	#	981,007	304,783
	%	18.2	6.9
King County, WA	#	259,843	85,903
	%	16.1	6.2
Seattle, WA	#	90,999	32,051
	%	17.2	6.7
CT 80.01	#	828	216
	%	24.4	6.4
CT 80.02	#	738	296
	%	28.3	11.3
CT 81	#	1,150	313
	%	35.5	9.8
CT 92	#	838	325
	%	43.2	16.9
CT 80.01, BG 3	#	298	N/A
	%	26.9	N/A
CT 80.02, BG 1	#	453	N/A
	%	30.5	N/A
CT 80.02, BG 2	#	285	N/A
	%	25.3	N/A
CT 81, BG 1	#	597	N/A
	%	25.3	N/A
CT 92, BG 2	#	399	N/A
	%	42.1	N/A
Study Area	#	1,734	N/A
	%	29.3	N/A

Source: U.S. Census Bureau 2000, SF3. P042, P039, QTP21.

Notes: Disability population is based on the non-institutionalized civilian population five years and older. 2010 U.S. Census data for disabled persons are not available, 2000 Census is the most recent.

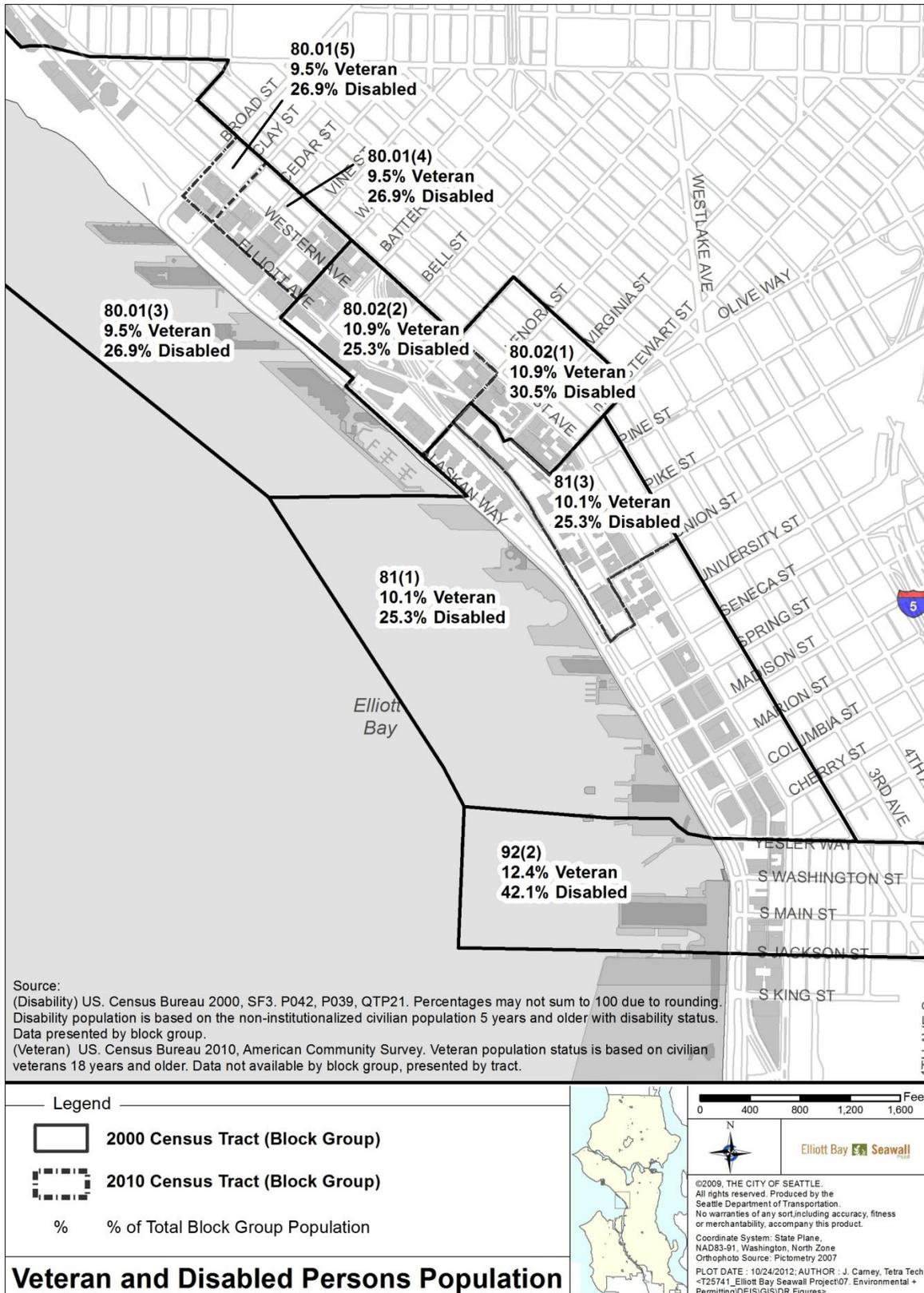


Figure 4-11. Veterans and Disabled Persons as Percentages of Total Block Group Populations

TABLE 4-11. VETERAN STATUS, 2010

Area	Veteran Population and Veteran Population as a Percentage of Whole	
Washington	#	607,737
	%	12.3
King County, WA	#	126,726
	%	8.6
Seattle, WA	#	34,947
	%	6.9
CT 80.01	#	471
	%	9.5
CT 80.02	#	283
	%	10.9
CT 81	#	432
	%	10.1
CT 92	#	265
	%	12.4
Study Area Tracts	#	1,451
	%	10.4

Source: U.S. Census Bureau 2010, American Community Survey

Notes: Percentages may not sum to 100 due to rounding.

Veteran population status is based on civilian veterans 18 years and older.

Data were not available at the block group level and are reported at the tract level. The study area row is likely an overestimate, as it includes a larger area than only those block groups in the study area.

4.2.9 Transit-Dependent Persons

Because the study area is located in downtown Seattle, the analysis must consider potential adverse effects on transit-dependent persons. The 2010 U.S. Census reported that a large proportion of study area households, nearly 48 percent, had no vehicle available for personal use, as shown in Table 4-12. In fact, half of all households in the study area had no access to a private vehicle. This demographic characteristic sharply contrasts with an estimated 16 percent of all households in Seattle that don't have access to a vehicle for personal use. These residents with no access to a vehicle must rely on walking, bicycling, and public transit (trains, light rail, streetcar, paratransit, monorail, buses, and taxis) for their transportation needs.

TABLE 4-12. TRANSIT-DEPENDENT HOUSEHOLDS, 2010

Geography	Total Number of Households	Percent of All Households that are Transit Dependent
Washington	2,577,375	6.5
King County	781,977	9.0
Seattle	280,453	15.5
CT 80.01	3,838	27.8
Ct 80.02	2,221	48.9
CT 81	2,498	51.4
CT 92	1,622	62.4
Study Area Tracts	10,179	47.6

Source: U.S. Census Bureau 2010, American Community Survey.

Note: Households recording "no vehicles available" are listed as transit-dependent.

Percentages may not sum to 100 due to rounding.

Data were not available at the block group level and are reported at the tract level. The study area row is likely an overestimate, as it includes a larger area than only those block groups in the study area.

4.2.10 Occupancy Status

Occupancy rates for housing units in the study area are generally lower than for the overall City of Seattle, which has a 2010 vacancy rate of just eight percent. Census Tract 81, Block Group 1, has a particularly high vacancy rate of almost 24 percent and the study area vacancy rate is almost 15 percent (Table 4-13).

TABLE 4-13. OCCUPIED HOUSING UNITS, 2010

Area		Total	Occupied	Vacant
Washington	#	2,885,677	2,620,076	265,601
	%	100	90.8	9.2
Seattle, WA	#	308,516	283,510	25,006
	%	100	91.9	8.1
CT 80.01, BG 3	#	838	765	73
	%	100	91.3	8.7
CT 80.01, BG 4	#	1,022	885	137
	%	100	86.6	13.4
CT 80.01, BG 5	#	629	549	80
	%	100	87.3	12.7
CT 80.02, BG 1	#	1,260	1,084	176
	%	100	86.0	14.0
CT 80.02, BG 2	#	1,064	919	145
	%	100	86.4	13.6
CT 81, BG 1	#	1,333	1,018	315
	%	100	76.4	23.6
CT 81, BG 3	#	1,081	881	200
	%	100	81.5	18.5
CT 92, BG 2	#	778	730	48
	%	100	93.8	6.2
Study Area	#	8,005	6,831	1,174
	%	100	85.3	14.7

Source: U.S. Census Bureau 2010 SF1.

4.3 REGIONAL AND COMMUNITY GROWTH

This section provides information on growth trends of the Puget Sound Region and helps to establish the socio-economic context of the study area. The discussion addresses regional population, employment, major employers, and regional economic stability.

4.3.1 Regional Population and Employment

The study area is located within the U.S. Census designated Seattle-Tacoma Standard Metropolitan Statistical Area (SMSA). This designation reflects the economic ties between the four centrally located Puget Sound counties.

Historically, King County has comprised more than 50 percent of the four-county Puget Sound Region's population and more than 30 percent of the total population of the state. Table 4-14 shows the recent population trends for the four counties in the Puget Sound Region. The populations of Pierce and

Snohomish counties are similar, and each accounts for about 20 percent of the region’s total population. The population of Kitsap County is by far the smallest, with only seven percent of the region’s total population. The three larger counties (King, Pierce, and Snohomish) are the first, second, and third most populated counties in Washington, respectively.

TABLE 4-14. 2010 POPULATIONS FOR KING, KITSAP, PIERCE, AND SNOHOMISH COUNTIES

Year	King County	Kitsap County	Pierce County	Snohomish County	Total – Puget Sound Region
2000	1,739,423	232,524	704,182	609,093	3,285,222
2001	1,757,197	233,271	716,429	622,049	3,328,946
2002	1,764,061	235,855	727,968	630,812	3,358,696
2003	1,770,970	236,446	733,596	634,419	3,375,431
2004	1,783,597	237,483	739,357	641,895	3,402,332
2005	1,804,208	234,280	747,131	652,733	3,438,352
2006	1,832,259	238,397	762,246	667,937	3,500,839
2007	1,857,877	236,702	771,864	680,610	3,547,053
2008	1,885,368	238,590	785,083	690,482	3,599,523
2009	1,922,645	239,587	795,985	701,219	3,659,436
2010	1,931,249	251,133	795,225	713,335	3,690,942

Source: U.S. Census 2010 SF1 and American Community Survey.

Since 2000, the four-county population increased by about 470,000 people. Between 2000 and 2010, the population of King County increased by 192,000 persons or 11 percent. Pierce County increased by approximately 91,000 persons or 13 percent, Snohomish County by 104,000 persons or 17 percent, and Kitsap County by just 18,600 persons, or eight percent. The region experienced population growth in the 1990s, but population growth from 2000–2010 has been much more gradual. Although the total population increase in King County was larger than for the other counties, population grew at a faster rate in both Pierce and Snohomish counties (Figure 4-12).

The City of Seattle is the most populated city in King County. In 2010, the estimated population of Seattle was 608,660 persons, which is five times larger than the next most populated city. The City of Bellevue’s 2010 population was 122,363 persons. Other large cities include Kent, Federal Way, Renton, and Shoreline. Thirty-one percent of the entire county’s population, however, resides in Seattle (U.S. Census 2010).

Population forecasts for the region indicate that historical growth trends will likely continue. The Washington State Office of Financial Management (OFM) publishes a 20-year population forecast every five years. According to the 2011 report, the population of the Puget Sound Region is expected to continue to increase over the next 20 years. The population of Washington State is expected to increase to nearly 8.8 million persons by 2040, a 30 percent increase from 2010 to 2040. These forecasts indicate that despite the poor economy over the last few years, relatively strong population growth can be expected for the four-county region in the future.

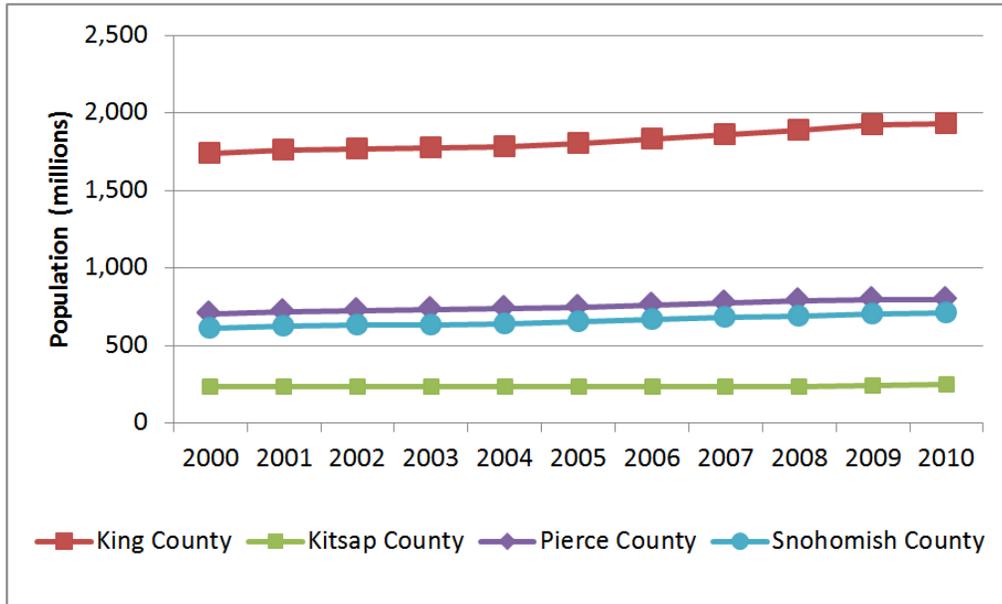


Figure 4-12. 2000–2010 populations for King, Kitsap, Pierce, and Snohomish Counties (Source: U.S. Census 2010)

The primary reason for the increase in population is the overall size of the regional economy. As shown in Table 4-15, PSRC reported that roughly 65 percent of all of the region’s jobs are located in King County (PSRC 2011). Many workers commute to jobs in King County from Kitsap, Pierce, and Snohomish counties (FHWA et al. 2004).

TABLE 4-15. EMPLOYMENT IN THE PUGET SOUND REGION

Current Total Employment	2000	2008	2009	2010
King County	1,276,100	1,310,900	1,247,400	1,194,800
Kitsap County	82,200	100,000	91,200	89,100
Pierce County	278,300	324,300	324,500	315,600
Snohomish County	231,000	280,800	263,300	254,400
Region Total	1,867,500	2,016,000	1,926,400	1,853,900

Source: PSRC 2011.

Notes Estimates are for total employment, including uniformed military personnel.

As the largest city in King County, Seattle has the majority of all jobs in the county. In 2010, the PSRC reported a total of 1,673,400 covered jobs. The largest sector was Services with almost half (45 percent) of the regional employment. The next sector was Government and Education which accounted for 17 percent, and Manufacturing and Retail each accounted for about 10 percent of the employment (Table 4-16).

TABLE 4-16. EMPLOYMENT BY SECTOR IN THE PUGET SOUND REGION

Covered Employment by Sector	2008	2009	2010	2010 (%)
Construction & Resource	125,500	101,200	83,700	5.0
Finance, Insurance & Real Estate	104,800	96,900	89,500	5.3
Manufacturing	189,900	176,200	165,700	9.9
Retail	186,500	174,600	171,500	10.2
Services	768,900	755,900	749,000	44.8
Wholesale, Transportation & Utilities	145,000	137,200	130,000	7.8
Government & Education	276,500	281,200	283,000	16.9
Total	1,797,200	1,723,200	1,673,400	100.0

Source: PSRC 2011.

Note: Covered employment refers to jobs “covered” under the state’s Unemployment Insurance program, and constitutes approximately 85–90 percent of total employment.

4.3.2 Major Regional Employers

The Seattle-Tacoma SMSA region has a diverse economy. It is a national center for manufacturing, high technology industries, services, international trade, and tourism (FHWA et al. 2004). It is a major manufacturing center for transportation equipment and wood products. The region’s several seaports, international airport, and a network of railroad and trucking services make it one of the nation’s largest import-export centers. It is also a regional finance and services center for the Pacific Northwest Region. The high-tech and biotech industries are a growing sector of the economy. Furthermore, the region is home to several military bases (FHWA et al. 2004).

The ten largest employers in the Seattle area are:

- Boeing – about 70,000 employees;
- Microsoft – about 40,000 employees;
- University of Washington – about 25,000 employees;
- Amazon – about 15,000 employees;
- Weyerhaeuser – about 10,000 employees;
- Group Health Cooperative – about 9,000 employees;
- Fred Meyer – about 8,700 employees;
- Bank of America – about 7,300 employees;
- Century Link (formerly Qwest Communications) - about 7,000 employees; and
- Nordstrom – about 6,000 employees (Williams 2011).

4.3.3 Regional Economic Stability

The Puget Sound Region has provided, and will continue to provide, a favorable business environment for existing and new businesses despite a difficult economy over the past few years. Seattle is an important business and commercial center for the region and plays a major role in the substantial Pacific

Rim trade with the East. Key factors that attract businesses include the highly skilled work force, well-recognized major educational institutions, manufacturing capabilities, access to both domestic and international markets, and a diverse regional economy. For residents, the Puget Sound offers a high quality of life, nationally recognized performing arts, professional sports teams, and scenic beauty. All of these factors contribute to conditions that are expected to bring continued employment and population growth in the region for the foreseeable future (FHWA et al. 2004).

4.4 COMMUNITY FACILITIES

4.4.1 Educational Facilities

This section provides information on educational and community facilities located in the study area. There are three education facilities located at the northern end of the study area: Argosy University, the Art Institute of Seattle, and the Seattle School of Theology and Psychology (formerly the Mars Hill Graduate School). Argosy University in Seattle offers professional certificates, programs, and doctoral, master's, and bachelor's degrees in the following colleges: College of Psychology and Behavioral Sciences, College of Education, College of Business, College of Health Sciences, and College of Undergraduate Studies. The Art Institute of Seattle is a private professional/technical school abutting just east of Alaskan Way. The main building (South Campus) is located at 2323 Elliott Avenue and the North Campus building (shared with Real Networks) is located at 2600 Alaskan Way. The mission of The Art Institute of Seattle is "to provide higher education programs that prepare students for careers in design, technology, business, and hospitality related fields." The Seattle School of Theology and Psychology is located at 2501 Elliott Ave and its mission is to "to train people to be competent in the study of text, soul, and culture in order to serve God and neighbor through transforming relationships." In downtown Seattle, there are no public education facilities, but there are a number of childcare facilities and other non-traditional places of learning (Figure 4-13).

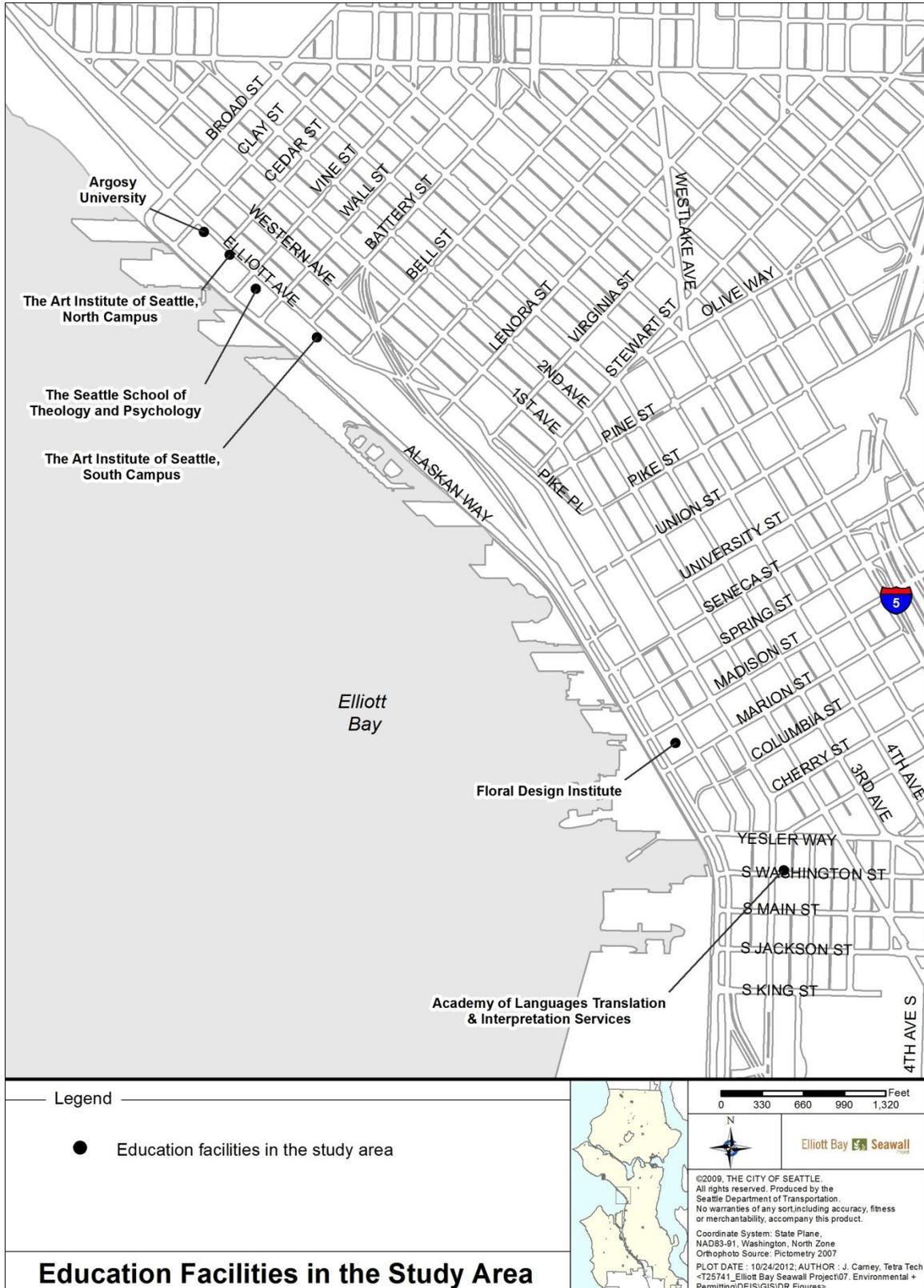


Figure 4-13. Education Facilities in the Study Area

4.4.2 Social and Employment Services

There are social and/or employment service providers located within the study area, which provide hot meals, food bank services, drop-in hygiene facilities, clothing, employment and mental health counseling and legal services, and referrals for other social services and employment. Extensive outreach was conducted with those resources shown in Figure 4-14 in an attempt to reach as many people as possible that might be affected by the project.

4.4.3 Cultural and Social Institutions

There are many cultural and social institutions located in the Seattle Commercial Core area in close proximity to the project area. These include exhibition centers, community landmarks, and museums. They attract residents from the Puget Sound Region, as well as business visitors and tourists. Events occur during daytime and evening hours seven days a week. Some cultural and social institutions and landmarks within the study area include the Seattle Aquarium, Bell Street Pier 66 conference center, and Olympic Sculpture Park at the north end of the study area.

Several concentrations of cultural and social institutions are found in the study area. One large concentration is found in the historic Pioneer Square neighborhood, in the southern portion of the study area. It contains the Klondike Gold Rush National Historic Park, the nation's smallest national park, which celebrates the early days of Seattle and commemorates the starting place for the Klondike Gold Rush in Alaska. Occidental Square is the focal point of the First Thursday Art Walks among neighborhood art galleries. The area also has other historic landmarks, museums, and two large professional sports team stadiums (CenturyLink Field and Safeco Field) that attract local residents and visitors alike. Several other cultural and social institutions are located in the Commercial Core neighborhood. The Seattle Art Museum, Garden of Remembrance veterans' memorial, and Benaroya Hall are clustered near Second Avenue and Union Street. The Seattle Art Museum Olympic Sculpture Park opened in January 2007 on Broad Street (FHWA et al. 2010).

4.4.4 Government Institutions

Many government agency offices are located in the Seattle Commercial Core area; however, few are located within the study area. The exceptions are the Port of Seattle facilities at Pier 69, which accommodate the Port of Seattle headquarters and the terminal for the Victoria Clipper; Bell Street Terminal, which is home to a cruise ship terminal, conference center, and marina at Pier 66; Seattle Parks facilities; and the Seattle Aquarium. The only state facility in the study area is the Washington State Ferries terminal at Colman Dock.



Figure 4-14. Social Resource Agency Outreach

4.5 NEIGHBORHOOD COHESION

As described in prior sections, the project study area crosses four Seattle neighborhoods. Land uses, population characteristics, public facilities, community services, and special landmarks all help to define these neighborhoods. Transportation services and infrastructure define accessibility within and between the neighborhoods. A key aspect of cohesion is connectivity of land uses, facilities, services, and population, and the inter-relationships between these elements that define the human environment. The following sections highlight the elements that define the cohesiveness of the study area as a whole and the several neighborhoods traversed by the project corridor (see the Transportation Discipline Report [SDOT 2012a]).

4.5.1 Transportation Services

Alaskan Way is downtown Seattle's westernmost arterial along the shores of Elliott Bay. It serves as a vital economic, transportation, and social link for Seattle. Alaskan Way parallels the waterfront from Broad Street in the north to S. Washington Street in the south and has two southbound and two northbound lanes with parking generally provided on both sides of the roadway. The roadway carries approximately 12,000 vehicles per day. Alaskan Way is designated by the City as a Major Truck Street used primarily to accommodate freight movement and oversized loads, carry out local deliveries, and transport hazardous materials prohibited on either SR 99 (the AWV) or Interstate 5 (I-5). Alaskan Way accommodates significant freight movement through the city, and to and from major freight traffic generators, including the Port of Seattle facilities. Most of the project area is accessible by public transit from outside of the downtown area. Buses and taxis provide transportation service throughout the Commercial Core and waterfront area. The "Ride Free" zone in the Commercial Core provided free transit service between 6 a.m. and 7 p.m. The "Ride Free" service ended in September 2012.

4.5.2 Land Uses

A variety of land uses exist between S. Washington and Broad Streets. Land use types vary and include commercial, retail, recreational, governmental, and residential uses (see the Land Use Discipline Report [SDOT 2012b]).

4.5.3 Population Characteristics

Office workers, residents (including homeless persons), visitors, and others use different portions of the study area. A percentage of this mixed population group lives in the study area, while other segments of the population are present only during weekday business hours, sports events, or tourist seasons.

4.5.4 Unique Community Identity

The Pioneer Square neighborhood, in the south end of the project area, is an important symbol of the city and its historic staging area in the late 1800s for thousands of miners heading for the Klondike Gold Rush in Alaska. In particular, the S. Washington Street Boat Landing is considered an important element of the surrounding historic district.

The Commercial Core is Seattle's major downtown area and generally extends along the waterfront between Columbia Street and Stewart Street. The neighborhood is set apart from adjacent neighborhoods by a change in the orientation of the street network to the north and south of the neighborhood. It is characterized by many high-rise office buildings and includes the city's financial district and retail core. First-class hotels, restaurants, museums, theaters, and the symphony hall are concentrated between First and Fifth Avenues. Along the waterfront the population is predominantly office workers and visitors. The exception is the large number of residents from Vashon Island and Kitsap County who use the ferries to travel to and from jobs in downtown Seattle and elsewhere in King County.

The Belltown neighborhood is located immediately north of the city's downtown area and generally extends from Stewart Street north to Denny Way. It encompasses the waterfront area and extends east to approximately Fifth Avenue, immediately north of the Commercial Core neighborhood. The neighborhood is characterized by medium-density business, commercial and residential land uses (FHWA et al. 2010).

4.5.5 Interaction between People

Because the study area is located in downtown Seattle, there are numerous opportunities for people to interact. Downtown residents, homeless people, workers, suburban visitors, and tourists can be found interacting on sidewalks, buses, parks, restaurants, coffee houses, and taverns. Interaction between people in the Pioneer Square neighborhood is primarily in public spaces such as sidewalks and Occidental Square. The central waterfront is typically the domain of tourists, with downtown workers crossing from the ferries to downtown offices in the Commercial Core during commute hours. On warmer days, downtown workers may exercise along the waterfront or eat lunch at one of the many outdoor restaurants on the waterfront piers. Every year from May through September, thousands of cruise line passengers embark and disembark at the Bell Street Pier Cruise Terminal (Pier 66). The interaction between people in the office district of the Commercial Core is more limited due to the comparatively small number of residential complexes, activity centers, and open restaurants during evening hours and on weekends. Interaction between people is plentiful at the Pike Place Market, Pacific Place, and Westlake Center (FHWA et al. 2010).

4.5.6 Housing

Although located in downtown Seattle, the project area has a considerable amount and variety of housing. Downtown Seattle has many high-rise and large residential buildings, particularly in the Belltown and Commercial Core neighborhoods. Compared to the city as a whole, a higher percentage of study area residents rented in 2010 rather than owned their homes (Table 4-17); 75 percent were rental units in the study area versus just 52 percent in Seattle. This would generally be expected due to the high cost of real estate in the downtown area and lower median household income.

In contrast to many metropolitan cities across the nation, a substantial number of new residential dwelling units have been constructed in downtown Seattle over the past 15 to 20 years. This

development has considerably increased and diversified the types of housing available in downtown neighborhoods.

Residential, retail commercial, office, and industrial land uses may be located in adjacent buildings on the same block or even in the same buildings in the study area. Many social service organizations scattered throughout the study area provide support services and basic necessities for people living in downtown subsidized and emergency shelter housing (FHWA et al. 2010).

TABLE 4-17. HOUSING CHARACTERISTICS, 2010

Area	Total Housing Units	Occupied Housing Units	Percent of Total Housing Units Occupied	Total Households	Average Household size	Percent Renter-Occupied	Percent Owner-Occupied
Washington	2,885,677	2,620,076	91	2,620,076	2.51	36	64
King County	851,261	789,232	93	789,232	2.40	41	59
Seattle, WA	308,516	283,510	92	283,510	2.06	52	48
CT 80.01, 3	838	765	91	765	1.38	64	36
CT 80.01, 4	1,022	885	87	885	1.37	49	52
CT 80.01, 5	629	549	87	549	1.46	80	20
CT 80.02, 1	1,260	1,084	92	1,084	1.25	78	22
CT 80.02, 2	1,064	919	86	919	1.37	81	19
CT 81, 1	1,333	1,018	76	1,018	1.43	74	26
CT 81, 3	1,081	881	82	881	1.32	76	24
CT 92, 2	778	730	94	730	1.32	94	6
Study Area	8,005	6,831	85	6,831	1.36	75	26

Source: U.S. Census Bureau 2010, SF1.

Notes: Families are households with more than one person related by blood or marriage or adoption. Households with children are households with one or more child less than 18 years of age residing in the home. Elderly households have at least one member 65 years or older.

Percentages may not sum to 100 due to rounding.

4.5.7 Neighborhood Characteristics

Each of the several study area neighborhoods has its own identity. The Pioneer Square area is an important symbol of the city and its historic early days as the shipping off point for thousands of miners heading for the Klondike Gold Rush in Alaska. In particular, the totem pole and pergola at the square, the Smith Tower, King Street Station and Union Station are representative elements of the surrounding historic district. The very large cargo loading cranes that tower above nearby buildings to the south now symbolize the region's international trade links to the Pacific Rim. The neighborhood also has an active and vibrant nightlife with a variety of bars, restaurants, and clubs.

Along the central waterfront, the historic piers, railings, and ferries are unique symbols of Seattle. The turn-of-the-century piers broadly represent the community's historic ties to the waterfront and the

fishing industry. The piers were originally used to store and transfer cargo in the days before the shipping industry was modernized. The several ferry routes transport residents, goods, and visitors across Puget Sound and link King County and Kitsap County. The waterfront also has major tourist attractions, such as the Seattle Aquarium and Bell Street Pier Cruise Terminal.

The characteristics of the Belltown neighborhood are somewhat similar to that of the Pioneer Square neighborhood in that this neighborhood is predominantly residential. Many apartment buildings and condominiums are located here, including a large concentration of low-income, subsidized, transitional, and women and family emergency housing (Seattle 2007). This neighborhood has undergone substantial redevelopment over the past 10 to 15 years. Expensive mid-rise condominiums have been constructed along the waterfront. High-rise condominiums and apartment buildings have also been built farther up the hill overlooking Elliott Bay. Land uses near the Battery Street Tunnel are characterized by old and new residential buildings, retail shops and restaurants, and low- to mid-rise office buildings. The neighborhood includes many of the city's historic hotels and apartment buildings, many of which have been converted to subsidized housing. Because of the relatively large residential population, the neighborhood is typically active all week and for many hours of the day and night. The neighborhood has an active and vibrant nightlife with a variety of bars, restaurants, and clubs (FHWA et al. 2010).

4.5.8 Subsidized, Transitional, and Emergency Housing

The study area, particularly the Pioneer Square and Belltown neighborhoods, includes much of Seattle's subsidized, special needs, and emergency housing. Special needs housing includes low-cost and low-income housing, senior housing, transitional and long-term residential services, emergency temporary housing, and shelters. In fact, the study area houses approximately one-quarter of the entire city's population living in non-institutional group housing, including transitional housing and emergency shelters. This is markedly disproportionate considering that the study area population is less than four percent of the City's total population.

There are many social services that operate in the study area to provide much needed emergency housing, counseling, hot meals, food banks, health clinics, employment referrals, and other services for a large number of downtown residents (Crisis Clinic 2011). Some of these services provide assistance to people residing outside of the immediate area. The vast majority of these services, however, help support the substantial low-income and homeless population residing in the study area. Moreover, a substantial portion of study area residents depend on these linkages to social services for their survival.

The Archdiocesan Housing Authority and the Plymouth Housing Group, two large nonprofit housing agencies, and the Seattle Housing Authority operate the majority of these subsidized housing facilities (FHWA et al. 2010). These buildings, however, do not include scattered Section 8 dwelling units. This federal program allows low-income persons to select housing of their choice and use Section 8 vouchers to pay a portion of their rental housing costs.

For some subsidized housing complexes, the number of units set aside for low-income households may change over time because of expiring restrictions associated with building financing. In 2005, The Committee to End Homelessness of King County issued its "Ten-Year Plan to End Homelessness in King County," which "offers a blueprint for how the region will work together to confront the issues that

cause homelessness and create the housing and supportive services needed to end homelessness for the thousands of men, women and children who currently live without a permanent roof over their heads.” Eight organizations, coalitions, and local governments came together in 2002 to form the Committee to End Homelessness in King County, a unified effort to provide the vision and leadership required to develop and implement a plan to end homelessness in King County. Homeless or formerly homeless youth and adults, faith communities, philanthropy, businesses, local governments, non-profit human service providers, non-profit housing developers, advocates and other stakeholders from throughout the county were involved in the process. The plan has been approved by the Metropolitan King County Council and endorsed by cities representing 85 percent of the county's population, as well as by dozens of social organizations and faith communities countywide (King County 2005).

In addition to low-income housing, Figure 4-15 illustrates that the study area also has a number of special needs and emergency housing facilities. Together, these facilities have a capacity to serve over 1,300 people, including battered women and their children, persons with developmental disabilities and mental health issues, and chronically homeless and transient persons. Several local government buildings and existing homeless shelters also provide additional emergency shelter during severe cold winter weather (FHWA et al. 2010).

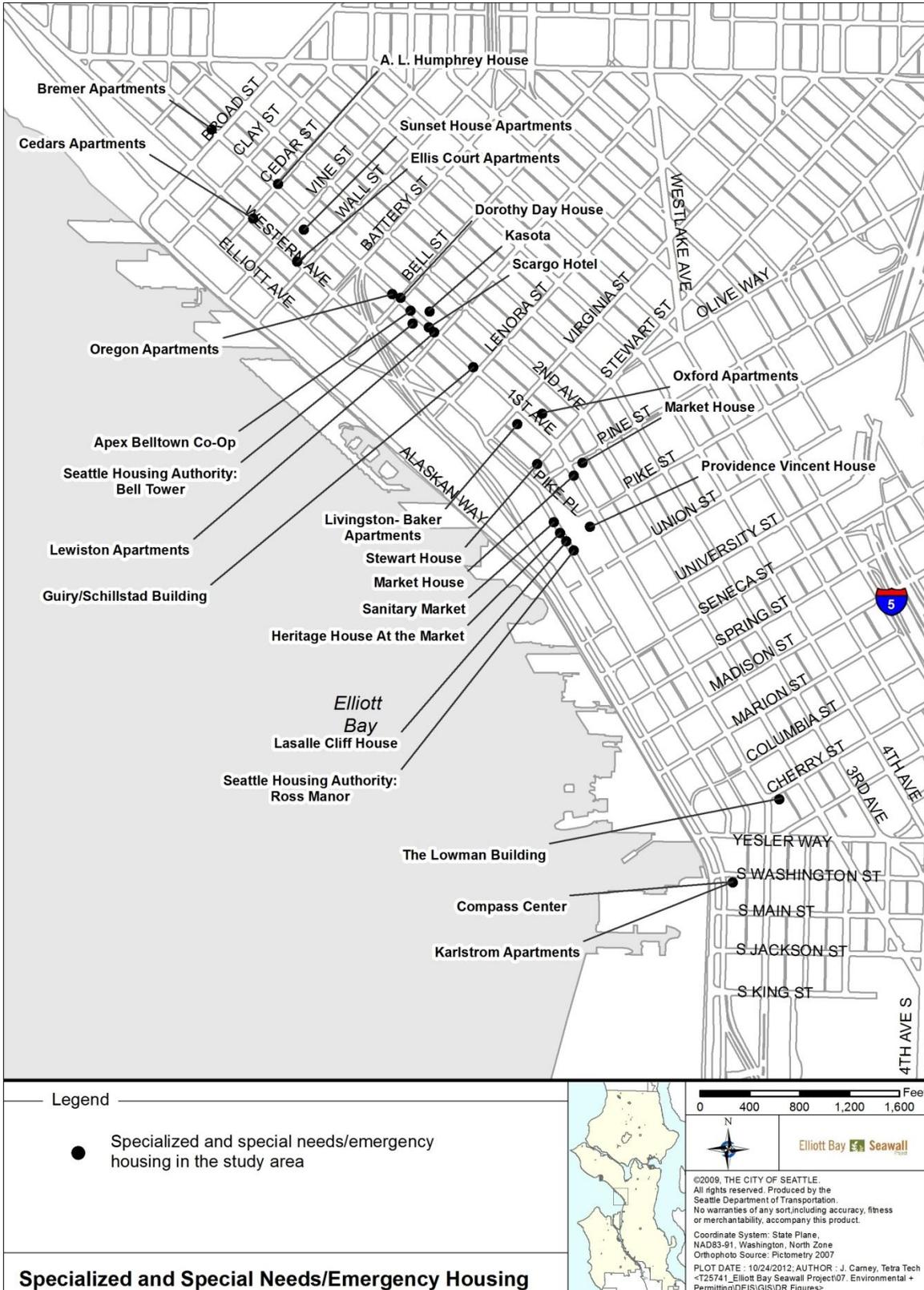


Figure 4-15. Specialized and Special Needs/Emergency Housing in the Study Area (Data Source: FHWA et al. 2010)

4.5.9 The Unsheltered Homeless Population

Some individuals in downtown Seattle use building overhangs, porticos, elevated walkways, and roadways for protection from weather when sleeping. These homeless persons are almost certainly low-income. In the study area, much of the space under the AWWV structure is used for parking or roadways. Because these areas provide shelter, people sleep under them. The hillside underneath the viaduct between the Pike Place Hillclimb and Battery Street Tunnel could be used for overnight camping, although no obvious or substantial campsites were observed (FHWA et al. 2010).

The One Night Count survey produces data about people using homeless housing programs at a single point in time (thus, no person is counted twice). Staff in emergency shelters and transitional housing programs complete a survey describing the group of people in their programs on that particular night. No information that would identify a specific individual is reported. The survey helps to identify the number and characteristics of these people and households (SKCCH 2008). From 2007 through 2011, the annual One Night Count reported 1,589, 1,976, 1,977, 1,986, and 2,442 homeless persons in Seattle, respectively (SKCCH 2007, 2008, 2009a, 2010, 2011).

For the 2012 One Night Count, 800 volunteers counted the people sleeping outdoors in King County. They counted 2,594 people living outside in King County, 1,898 of which were in the City of Seattle. They counted children, adults, and seniors, some huddled in doorways, some sleeping in cars, others camped in green spaces or sheltered in makeshift campsites. Seattle/King County Coalition on Homelessness (SKCCH) organized more than 137 teams through ten area headquarters in urban, suburban, and rural King County. Counters returned to historical and new count areas in Bellevue, Redmond, Kirkland, Woodinville, Shoreline, Kenmore, Bothell, Seattle, White Center, Federal Way, Kent, Renton, and Auburn. The 2012 One Night Count also collected information from select hospitals about emergency room usage, and from King County Metro night owl buses. Volunteers counted 152 more people living in publicly-accessible parts of King County in 2012 than in 2011: this number represents a six percent increase (SKCCH 2012). The complete 2012 One Night Count Report will be released as soon as the other data are compiled.

The numbers of people counted outside are separate from roughly 6,000 people who were in area emergency shelters and transitional housing programs during the 2011 count. Winter shelters in Seattle and Redmond meant that 149 people were inside at night that would otherwise have had no place to go. SKCCH is tracking how many families were turned away from shelters because they were full during the count (SKCCH 2011).

In part because approximately 80 percent of the county's emergency and homeless housing facilities and many social services are located in downtown Seattle, an estimated 70 percent of the county's unsheltered homeless people live on the streets in downtown Seattle. Based on the 2009 One Night Count, approximately 23 percent were found to be located in or under structures or roadways. An additional one percent was found sleeping in their cars or trucks, including many who were assumed to be located under the AWWV (SKCCH 2009). Although no data provide details about how many homeless people sleep under the viaduct, it is clear that a substantial number of people may spend the night under or near the viaduct (FHWA et al. 2010). While no data are available for 2012 at this time, the ongoing construction activities along the AWWV as part of the Alaskan Way Viaduct Replacement Project

have likely impacted the homeless population in the area. This includes conversion of the southern portion of the viaduct to a surface roadway that will eliminate some areas previously sheltered by the viaduct.

CHAPTER 5. CONSTRUCTION EFFECTS AND MITIGATION

This section of the Discipline Report discusses anticipated changes and disruptions that could affect social resources during the construction period of each of the proposed project alternatives. Topics addressed include the adverse effects of construction noise, adverse effects on access to the waterfront, and other effects on the local population and housing, neighborhood social resources, neighborhood cohesion, and environmental justice populations. Also discussed are the anticipated effects of construction related traffic congestion, construction staging areas, and traffic detours and changes in access. Recommended mitigation measures are presented at the end of the chapter.

In summary, construction effects include increased congestion, travel delays, increased response time for emergency services, increased noise, and decreased long-term parking. Construction activities and the associated noise, light and glare effects in the construction corridor could affect homeless persons living on downtown streets. Although the effects of construction could be moderate to substantial, these effects can be avoided, minimized and mitigated with proper mitigation measures. Communication is key and discussions with service providers have identified potential solutions to many known and potential construction effects. The key to mitigating potential effects of the project is ongoing community outreach and communication efforts before, during, and after construction. Monitoring mitigation during the construction period will be important to ensure that the suggested measures are successful and to understand how they might be modified to be more effective.

5.1 NO ACTION ALTERNATIVE

No construction is proposed for the No Action Alternative, thus there are no anticipated effects. Refer to Section 6.1 for a discussion of operational effects and continued maintenance likely to occur for the No Action Alternative.

5.2 ALTERNATIVES A, B, AND C

Under Alternatives A and C, construction of the seawall and habitat improvements and restoration of the roadway will occur in stages over a number of years. The current project schedule assumes that no work would occur during the peak summer months (Memorial Day weekend through Labor Day weekend) to minimize impacts on businesses, visitors, and local residents. Under Alternative B, the larger wall pullback and the use of the BSP construction technique are anticipated to result in a longer overall construction period. Therefore, Central Seawall construction is expected to take three to four construction seasons depending on the alternative. During construction of the Central Seawall, a vehicular detour would be provided east of the existing surface street, with three lanes under the existing AWV and a fourth lane just west of the AWV structure. During this period, parking would be removed from under the AWV and would not return until completion. This loss of parking will reduce the supply of available parking that serves visitors and residents along the waterfront.

The schedule analysis indicates that North Seawall construction for Alternative B would have an overall duration similar to Alternatives A and C (through it is expected to be slightly longer) of four construction seasons. This extended duration for work on the North Seawall is primarily due to the restricted width of the construction work zone available and lack of a continuous construction haul road.

Generally speaking, the specific impacts to adjacent social resources during construction will be similar under all build alternatives except for the increased duration of Alternative B construction discussed earlier. The effects of all build alternatives are assumed to be the same except where noted.

5.2.1 Population and Demographics

Construction activities could have several different types of adverse effects that could be substantial on residents living in and near the construction zone. The construction traffic, road detours, light and glare, noise, and dust will certainly affect residents living within approximately one to two blocks of construction. In addition, residents living across the street or adjacent to potential construction staging areas will also be affected. The extent of these effects will depend on the stage of construction and proximity to residents and businesses and will range from minor to substantial in some instances.

For the proposed project, trucks will most likely be the primary mode used to transport both workers and materials to and from the project corridor construction zone. Existing City-designated haul routes will most likely be used for the proposed project. Actual routes specific to the proposed project will be determined by the City as part of project permitting.

Isolation of the construction activities to ensure public safety will require corridor fencing, temporary road closures, and traffic detours. The closures and detours will likely be needed for varying periods of time, some for a number of years and others for perhaps only months. As project construction progresses, the road closures and traffic detours will change to best accommodate construction needs and to minimize traffic congestion. Specific routes will be determined both during project permitting and as part of ongoing construction management activities. At this time, the specific road closures and traffic detours are unknown, so the potential extent and duration of such effects on nearby residents is unknown. These construction impacts, however, may cause temporary hardships and/or stress to some residents, especially to elderly, disabled, and transit-dependent persons, who tend to be more affected by access issues given their higher use of public transportation.

In the immediate construction area, noise from specific construction equipment may be heard a few blocks away from the construction zone. Residents generally will hear noises associated with the operation of construction equipment up to a distance of approximately one to two blocks. Residents living across the street will be able to view construction activities and equipment storage areas within the fencing, especially from top floors of buildings. Lights will be directed at construction activities and shielded, but residents may experience some additional lighting and glare. Construction vehicles will enter and exit the construction zone at gates in the perimeter fencing surrounding the construction zone. These gates will likely be located at the ends of streets abutting the construction zone. Pedestrian and vehicle use of some streets may be temporary. In addition, direct access to and from some buildings may be disrupted, though not eliminated, for short periods of time. Some residents will be affected by the construction activities associated with the potential construction staging area. A map of the potential construction staging areas proposed for the project is contained in the *Elliott Bay Seawall Project Seawall Construction Sequence and Schedule for DEIS Alternatives* (SDOT 2011).

As discussed in Section 4.2.2, 25 percent of the population is minority/non-white and approximately 24 percent are living below the poverty level. Construction activities will also adversely affect homeless

persons by removing informal places of shelter, such as underneath the AWW. Similarly, construction-related activities may also cause a shifting of locations currently used by homeless persons to congregate. On close examination of the project corridor construction area, many residential buildings are located immediately adjacent to the construction zone. Persons residing in the residential buildings are most likely to be affected by noise, light and glare associated with construction activities. The largest share of social resources most affected by construction activities will be residential properties. Construction-related effects from noise, light and glare, and change in access will be greatest for these residential buildings.

The right of tribal members to take salmon at all of their "usual and accustomed" fishing sites is explicitly guaranteed by treaty. There are no subsistence fisheries in the study area and all fishing is for personal consumption or distribution to family members; however, there will be some impacts to fishing during construction due to increased noise levels, increased levels of light and glare, reduced access to the piers, traffic and in-water work. The impacts of construction of all build alternatives are similar except that Alternative B has a longer construction period by as much as two years. Total construction duration is expected to be between three and five construction seasons depending on the build alternative (not including summer construction shutdown periods). Impacts could be substantial but will be mitigated where possible.

5.2.2 Regional and Community Growth

Construction expenditures will occur over a number of years, directly creating new demand for construction materials and labor inputs. Both the direct and indirect impacts of construction expenditures cause firms in all industries to employ more workers to meet increases in demand; this leads to induced impacts as the additional wages and salaries paid to workers lead to higher consumer spending. The economic impacts at the regional and state levels due to influx of capital construction funds are quantified as direct and indirect impacts. The impacts are calculated using multipliers using the IMPLAN (IMpact Analysis for PLANning) model. The study region is defined as the Central Puget Sound Region of King, Pierce, Snohomish, and Kitsap counties.

The discussion of benefits only includes benefits directly associated with the expenditure of construction and right-of-way funds during the construction period and does not include secondary economic benefits after construction is completed (see the Economics Discipline Report [SDOT 2012d]). The cost associated with construction of any of the build alternatives will result in additional (gross) activity throughout all economic sectors within the Puget Sound Region and the State of Washington. This gross economic activity is derived from the multiplier effects on the capital expenditures for the project.

Examples of capital expenditures include the direct hiring of temporary construction workers, the purchase of construction materials and equipment, and the expenditure of capital funds to acquire new rights-of-way. The alternative with the highest estimated capital cost (Alternative B) will generate the greatest amount of economic activity within the region. The alternative with the lowest estimated capital cost (Alternative A) will generate the least amount of economic activity within the region.

The amount of new economic activity directly associated with these alternatives that are the result of new money entering the Puget Sound regional economy is roughly equivalent for all build alternatives.

This is due to the fact that the amount of new money is assumed to be fixed (equal across all alternatives) and that the portion of new money to overall construction costs depend on the build alternative. All other fund sources are coming from within either the state or the Puget Sound Region and would likely be spent in the local economy, even in the absence of this project.

The extent of the effects will depend on the stage of construction and the proximity to businesses, but overall, the project is expected to strengthen the local economy due to the influx of construction spending, increased wages for the local labor market, and indirect spending that result from the construction of the project. See the Economics Discipline Report (SDOT 2012d) for more detailed information on construction spending and the anticipated direct and indirect effects of that spending.

5.2.3 Community Facilities

As described in Section 4.6, the project study area includes a number of community facilities. Potential construction effects will likely be less severe than the effects on residents, because those using community facilities will typically be at the facility during only daytime hours, but the effects could be substantial depending on the phase and timing of construction. Most people have higher thresholds for loud noises, light and glare, and dust during daytime hours. For additional discussion, see the Noise Discipline Report (SDOT 2012e). As such, primary concerns will be related to building access, (i.e., doors, garages, driveways, and walkways). In addition, people will be concerned about their ability to gain vehicular and transit access to the neighborhood and building. For all facilities located adjacent to the construction zone, general transportation access, and building access will be ensured. Construction zone fencing will have gates for vehicles to enter buildings, as needed. As such, community facilities will experience some adverse effects, but not substantial adverse effects.

Potential construction effects on the two education facilities located at the northern end of the study area—the Art Institute of Seattle and the Seattle School of Theology and Psychology would be similar to the effects on other community facilities. Effects would include construction traffic, noise, and effects from glare and construction lighting. Since most lectures and classes occur during the day when most construction will occur, there may be some adverse impacts to teachers and students.

Potential construction effects on religious institutions will be more similar to effects experienced by residents than those experienced by people at community facilities. Again, construction activities will be ongoing six days per week with two 10-hour shifts per day. So, despite the customary attendance of events at religious institutions only one day per week, construction effects may be perceived as substantial adverse effects. Religious institutions are places of worship, quiet contemplation, and meditation. Loud construction noises will disrupt the experience normally expected at such institutions. For the project study area, potential adverse construction effects may be experienced by the Ministry of Saints Martha and Mary which is located just outside the construction area (see Figure 4-2).

Potential adverse construction-related effects on social and employment services will be similar to those described above for community facilities and may be substantial. Workers, clients, volunteers, and other would primarily be in the building during daytime hours. As such, they will be less sensitive to noise, light and glare, and dust than if they were outside. The effects will be adverse, but will not likely be perceived as significant. However, social and employment services also must be able to continue to

provide services to their clients during the construction period. This may include referring their clients to other social or employment service agencies. The clients most likely will take public transportation or walk to the location of the other service agency. In addition, some service agencies may provide transportation for their clients. The Millionaire Club Charity located near Wall Street and Western Avenue has a designated outside location where day laborers wait to get picked up for casual day-labor work. Such activities will be disrupted by construction activities. Plans, however, could be made in advance to ensure that services will not be compromised. As such, effects on social and employment services will not likely be considered a substantial adverse effect.

The project area has several areas where cultural and/or social institutions are located in close proximity to the construction zone. The Seattle Aquarium, Bell Harbor Conference Center, and Olympic Sculpture Park are all located adjacent to the construction zone along the waterfront. Depending on the type of event, construction effects could be perceived as an inconvenience or potentially adverse effect. Vehicle, transit, and pedestrian access to social and cultural institutions to attend events could be affected by construction activities, particularly construction-related congestion, road closures, and traffic detours.

Activities along the waterfront could be adversely affected, depending on the types of construction activities. The Alaskan Way roadway detour will affect those attending events along the waterfront. Such adverse effects will be particularly severe when the start of events occurs during or close to rush hour traffic periods. The inconvenience caused by reroutes and additional travel time could deter some patrons from attending some events. The actual event, however, may not be affected by construction-related disruptions. If there are events that require a quiet environment, patrons may not be able to hear the words or music. However, since construction will be suspended during the summer months, only those events that occur after Labor Day and before Memorial Day will be adversely affected. In summary, potential effects on cultural and social institutions will be mixed—both substantial adverse effects and little to no effect—depending on the season and time of day.

Potential construction effects to key government office buildings are expected to be similar to those described for other community facilities. There are a number of government institutions that are adjacent to the construction zone. The Port of Seattle Terminal 46 (Hanjin), Colman Dock Ferry Terminal (Pier 52), Port of Seattle Cruise Terminal (Pier 69), and the Port of Seattle Marine Headquarters (Pier 69) are located adjacent to the construction zone. Building occupants will primarily be inside during daytime hours when people generally have a higher threshold for construction-related noise, light and glare, and dust. No significant adverse effects are expected.

The impacts of construction of all three build alternatives are similar except that Alternative B has a longer construction period by as much as two years.

5.2.4 Neighborhood Cohesion

Potential construction-related effects on neighborhood cohesion are more complex to evaluate than the individual effects primarily caused by property acquisition and changes in traffic congestion, noise, light and glare, or dust. Effects on neighborhood cohesion are more closely linked to the cumulative effects from a variety of factors that define neighborhood character. These factors include transportation

services, land uses, population characteristics, unique community identity, and interaction between people, housing, neighborhood characteristics, subsidized, transitional, and emergency housing, and the unsheltered homeless population.

A key adverse project construction impact will be the temporary loss of a large amount of parking under the viaduct that won't be available for use by residents, workers, or visitors. This loss of parking for an estimated three to five construction seasons for the Central Seawall will be a severe effect on people who want to visit the waterfront. Construction activities are proposed to occur six days per week with two 10-hour shifts per day to meet proposed construction schedules, though 24 hours per day construction is possible. Construction activities may also occur in two zones within the project corridor concurrently.

These activities will create ongoing hardship and stress upon residents, workers, visitors, and businesses. The social fabric of neighborhoods could be affected by the long duration of the project alternative construction schedules. Some residents may decide to move. Some businesses, such as restaurants and those selling sundries may see an increase in business due to the large number of construction workers in the area. Others will suffer little or no adverse effects. And others still may experience a noticeable decline in patronage and/or sales, increased operating costs, and/or decreased operational efficiency. These construction-related effects could adversely affect the comfort and daily life of residents and inconvenience and/or disrupt the flow of customers, employees, and materials/supplies to and from businesses.

These effects will adversely affect those located in and near the study area during construction, but the effects would be mostly localized to where construction is occurring and only while construction is in progress. The length of disruption depends on the build alternative as discussed earlier.

Estimates of the average annual number of construction jobs required for each of the proposed alternatives anticipated duration of the construction periods have been estimated. Overall, the construction of the seawall will require many workers to be employed for roughly 7.5 to 10 years. Among the build alternatives, the average number of construction jobs will range between approximately 20 and 50 workers per shift depending on the alternative and the activity or activities underway. The required skills will be those typical of construction workers.

In 2013 (near the start of proposed project construction), the total number of workers employed in the construction sector of the regional economy is forecasted to be approximately 40 workers per shift. The average annual number of workers employed on the project will be only a very small percent of the forecasted number of workers in the region's construction sector. The size of the forecasted regional work force and particularly the construction sector appears to be more than adequate to accommodate the anticipated demand for construction workers associated with the proposed project. Workers from outside the region will generally not be expected to move to the area for employment opportunities specifically associated with the EBSP. For additional information see the Economics Discipline Report (SDOT 2012d).

In conclusion, it is not anticipated that the demand for project construction workers and their need for housing will directly affect population or the demand or price of housing in the Puget Sound Region.

Construction activities would adversely affect the homeless living on the streets. During interviews, social service providers indicated that areas under certain portions of the viaduct are known to be encampments and sleeping places for the homeless. The availability of long-term parking for car-camping and the displacement of shelter under the viaduct are concerns for the homeless population. People congregate or spend the night in these informal places of shelter. For some, these locations may be areas in which they are accustomed to seeking shelter on a regular basis. Therefore, they may attempt to continue using these areas, even though the areas have become part of a construction zone. Homeless people may try to climb over or otherwise gain access through fences surrounding the construction zone to return to their habitual nighttime shelter locations, at potential risk to themselves. However, these activities are illegal and thus are not protected by the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

Depending on the location and severity of the construction effects, homeless may decide to move elsewhere in the study area, leave the downtown area for adjacent neighborhoods, or obtain shelter inside existing homeless shelters.

Section 3.3, Public Involvement Activities describes the outreach conducted with social service providers in the study area. The following summarizes the concerns relating to construction that were noted during social service agency interviews:

- Transit service disruptions or reroutes (low-income populations depend on public transportation as a primary means of transportation);
- Utility disruptions;
- Increased stress, anxiety, and accidents for homeless people;
- Construction site hazards;
- Service outages for power and other utilities;
- Increased traffic congestion and decreased access, which could affect services, deliveries, staff, volunteers, and emergency service response times;
- Changes in pedestrian access to services and usual pedestrian routes;
- Construction and detours around customary routes, which may disorient persons who are blind or partially sighted and may pose potential hazards for them;
- Displacement of homeless people who find nighttime shelter under the viaduct;
- Increased demand for social services;
- Increased pressure on shelter capacity;
- Elimination of parking used by homeless persons with cars; and
- Noise, vibration, and degraded air quality at shelters (FHWA et al. 2010).

Several social service providers could be temporarily affected by construction of the seawall due to their proximity to construction activities. Located on Alaskan Way, The Compass Center provides shelter, meals, and a shower facility. The Compass Center has just one door for public access to the facility that is located very close to Alaskan Way. Access to the facility and noise levels will be affected during construction. Heritage House, Bread of Life Mission, Pike Market Senior Center, Plymouth Housing

Group, Catholic Seamen’s Club, and Rose of Lima House are also close to the construction area and have similar concerns. Sidewalks may be periodically closed to pedestrian traffic for many months during construction; however, alternative pedestrian access to businesses and residences would be available at all times. This may require short-term relocation of bus stops (FHWA et al. 2010).

5.2.5 Environmental Justice Determination

NEPA requires that environmental documentation analyze the environmental effects of projects involving federal actions, including effects on minority low-income communities. Part of the process is an Environmental Justice Determination.

Construction effects on minority and low-income populations would include increased congestion, travel delays, increased response time for emergency services, changes to transit services, and decreased parking (effects common to all area residents). These changes could have substantial adverse effects on the minority and low-income populations in the study area and the organizations that serve them. These populations and organizations are heavily reliant on transit services, which could be hampered by traffic congestion. Many service providers require clients to arrive in time to get their names on a waiting list for shelter that night, or to arrive by a certain time for other services. If individuals accessing services are unable to reach these providers by certain times, they may not have access to the services or a safe place to sleep. Traffic congestion could also delay emergency access and make deliveries to service providers more difficult. Providing safe pedestrian routes to and from service providers and other central locations is critical. For more information see the Economics Discipline Report (SDOT 2012d).

At this time, analysis has determined that although the effects on environmental justice populations may be substantial, the project will not cause “disproportionately high and adverse” effects (adverse effects that are predominately borne by a minority and/or a low-income population; or will be suffered by the minority population and/or low-income population, and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by others) on minority and low-income populations. The extent of any effects on environmental justice populations will depend on the stage and proximity of construction. Mitigation will be implemented in order to avoid and minimize effects.

Both temporary and permanent impacts on environmental justice populations have been discussed that may result from both the construction and operation of the project. This analysis used demographic information such as race, median household income, poverty status, and language spoken at home, and considers both adverse and beneficial effects and any proposed mitigation measures. Outreach efforts to minority and low-income populations and related service organizations have been described, including how such groups were/are involved in the decision-making process.

The City has worked to ensure the full and fair participation by all potentially affected communities in the transportation decision-making process through extensive public involvement and numerous outreach efforts that focused on minority and low-income groups. The City will continue to reach out to minority and low-income populations and respond to their concerns regarding the operational and construction effects of the build alternatives. The results of the analysis of effects on environmental justice populations included in the environmental review process for the build alternatives indicate that disproportionately high and adverse effects on environmental justice populations would be avoided,

minimized or mitigated through careful planning and design or through individual choices to use alternate routes or transit. Continued outreach to minority and low-income populations, to employees of the displaced businesses, and others will identify additional mitigation measures to support this determination.

5.3 MITIGATION

In order to mitigate impacts, the City would engage in timely communications with social service agencies and providers as construction activities proceed. Details on detours, utility disruptions and other activities would be provided. The City would work with social service contacts concerning access issues during design and construction phases. Other potential mitigation to reduce adverse effects, such as hardships to low-income residents and the homeless population in the project area during construction include constant communication of construction location and activities, maintaining the most optimal access possible for all transportation modes (pedestrian, bicycle, transit, passenger vehicle, freight, ferry and cruise, and marine cargo) to the project area as much as possible, and implementing mitigation activities during construction. Potential mitigation actions include the following:

- Establish neighborhood advisory groups prior to the start of construction to solicit input for mitigation measures. Periodically during construction, meet with neighborhood representatives to communicate important information concerning construction activities and to inquire about the effectiveness of the mitigation measures.
- Prior to the start of construction and periodically during construction, hold neighborhood public meetings to advise the public of planned construction activities, road closures, traffic detours, changes in pedestrian walkways, and other construction-related activities.
- Publish a project newsletter to alert members of the public of planned construction activities, road closures, traffic detours, changes in transit routes, changes in pedestrian access routes, and other information. Newsletters should be published in appropriate languages to be effective.
- Provide representatives of study area social resources with the name(s) of one or more contacts with whom they may communicate concerns related to construction activities.
- Establish a community telephone information line so that any member of the public can directly report problems related to construction activities and have these problems addressed promptly.
- Mark pedestrian pathways in the construction area to ensure public safety and to facilitate access. Monitor installed signage during construction to ensure effective communication to all pedestrians and bicyclists. Help arrange pedestrian detours that comply with Americans with Disabilities Act accessibility guidelines and meet the safety needs of those who have disabilities.
- Coordinate with neighborhood groups, including residents close to construction and staging areas, to develop appropriate mitigation measures for extended durations of 24-hour effects from construction-related noise, vibration, light, glare, and dust.

- Develop special news bulletins and use the project email list to communicate upcoming construction activities to residents close to the project construction and staging areas.
- Coordinate with childcare providers near construction activities to determine whether additional special mitigation is needed.
- Work with representatives of religious institutions located close to construction zones to develop mitigation measures to address potential noise that could adversely affect services, meditation sessions, or other events.
- Coordinate with cultural and social institutions to develop specific mitigation measures for venues where construction-related noise and traffic restrictions or detours could result in adverse effects.
- Include government agencies located near the project construction areas on distribution lists for general notifications about planned construction activities. Notify representatives of the Port of Seattle on an ongoing basis of planned construction activities near the Bell Street Pier Cruise Terminal (Pier 66) and the Victoria Clipper passenger terminal at Pier 69.
- Notify representatives of Washington State Ferries on an ongoing basis to alert them of planned construction activities near Colman Dock to help facilitate passenger and vehicle loading and unloading during the construction period.
- Where possible, fencing around the construction site would provide for a minimum of 4 to 6 feet of pathway for pedestrians to enter buildings, and signs would be posted to direct both vehicle and pedestrian traffic.

The City also plans on shutting down construction during the peak summer months to minimize impacts on visitor-oriented businesses and eliminate construction noise during the period when businesses and residences are most likely to have windows open. Minor preparation work or work-zone maintenance could occur as necessary during the summer shutdown periods to minimize public safety concerns and fix minor problems between construction seasons.

CHAPTER 6. OPERATIONAL EFFECTS AND MITIGATION

This chapter discusses operational effects of the project. The intent of all the build alternatives is to restore the roadway, sidewalks, trails, and parking to their original functionality. Recommended mitigation measures are presented at the end of the chapter.

6.1 NO ACTION ALTERNATIVE

Both federal and Washington State environmental regulations require agencies to evaluate a No Action Alternative to provide baseline information about existing conditions in the project area. For this project, the No Action Alternative is not a viable alternative because the existing seawall is vulnerable to earthquakes and structural failure due to ongoing deterioration. Multiple studies of the seawall's current condition have determined that retrofitting or rebuilding the existing seawall is not a reasonable alternative. At some point in the future, the seawall will need to be replaced. The severity and duration of the effects of the No Action Alternative depend on the scenario (Minimal Damage, Loss of Functionality, or Collapse of the Seawall) that occurs (see Table 6-1 for summary of operational activities by scenario).

The damage to the seawall under the No Action Alternative could affect adjacent social resources, including market-rate and low-income housing, community facilities, educational institutions, social services, and cultural and social institutions. The temporary or permanent loss of one or more of these resources due to seawall failure could affect a number of residents in the community, including minority and low-income populations and homeless persons.

Under the Minimal Damage scenario, repair and maintenance work will be planned consistent with current practices. These activities will cause only short-term temporary disruptions. Each repair or maintenance job will likely be completed in a number of weeks or several months at most. Construction zones will be expected to be limited in size, perhaps only several city blocks at most. As planned work efforts proceed, normal mitigation measures to ensure access to buildings and use of adjacent properties and nearby land uses will be implemented. All impacts to social resources will be short-term and temporary. As such, there will be no substantial adverse effects on any social resources. The existing seawall and surface street will remain in place unless all or a portion of the seawall collapses as a result of tidal or seismic activity.

Under the Loss of Functionality scenario, it is likely that sidewalk, parking and/or travel lanes would be impacted with short-term closures or detours required as repairs are made. Construction activities to provide temporary access to Colman Dock Ferry Terminal and Fire Station No. 5 would likely result in short-term noise and dust. Access along the waterfront and to and from the waterfront would be restricted in areas of seawall failure and likely in adjacent areas where further failure would be possible.

Under the Collapse of the Seawall scenario, access along the waterfront would be partially or severely restricted or even prohibited. Access to piers along the waterfront could be severely restricted or prohibited until reconstruction of the seawall is complete. Construction impacts similar to those of the build alternatives analyzed in this Discipline Report would occur as the seawall is reconstructed at some future date. However, unlike the proposed project, reconstruction after a collapse of the seawall would

likely occur on a year-round emergency basis (with in-water work restrictions) and access to piers and, possibly, businesses and residences on the east side of Alaskan Way, would be unavailable or severely restricted. This would result in business closures and residential units would possibly be inaccessible for an indeterminate amount of time.

TABLE 6-1. OPERATIONAL ACTIVITIES BY NO ACTION SCENARIO

Operational Activity	Minimal Damage	Loss of Functionality	Collapse
Annual operations and maintenance	Y	N	N
Tidal repairs	Y	N	N
Seismic repairs	Y	N	N
Transportation impacts	N	Y	Y
Utility impacts	N	Y	Y
Damages to Alaskan Way Surface Street	N	Y	Y
Temporary reroute of Sounder Commuter Rail (Seattle–Everett)	N	N	Y
Temporary reroute of Amtrak service (Seattle– Vancouver; Seattle– Spokane– Chicago)	N	N	Y
Environmental contamination	N	N	Y
City Shoreline Stabilization Needed	N	N	Y

Source: USACE 2011, Figure 22.

Environmental justice communities would be adversely affected by the Loss of Functionality and Collapse of Seawall scenarios where there would be restricted access to public transportation and social service providers until repairs or reconstruction takes place.

6.2 ALTERNATIVES A, B, AND C

Upon completion of the EBSP, the waterfront and study area would be very similar to what they are today. The current restored roadway plans indicate that on-street parking along Alaskan Way will be reduced by about seven spaces from the current configuration once the project is complete. This loss of parking reduces the supply of available parking that serves the residents, businesses and visitors in the study area. The impacts to social resources and environmental justice populations are similar between Alternative A and Alternative B.

6.2.1 Population and Demographics

None of the build alternatives will likely have a long-term effect on population or housing in the study area because the waterfront will look very similar to what it looks like today once construction is complete. The safer and more attractive waterfront with more proposed amenities under Alternative B may encourage people to move closer to the waterfront, which may increase the demand for housing in the long term.

The operation of the proposed build alternatives will require workers to repair and maintain the seawall, although likely on a less frequent basis than currently occurs. Workers will be required for all of the build alternatives for operations and maintenance of the seawall, although given the new seawall repair work should be minimal as compared to current requirements. The number of employees will likely be small and already employed by SDOT, Seattle Public Utilities (SPU), Seattle City Light, and other private utility personnel. Any new jobs created (if any) will likely be hired from the regional labor force, as the types of new jobs will not likely require employees with highly specialized skills. The completed project will not require workers from outside of the region and thus will not result in increases in regional population or demand for housing. There will be beneficial impacts to those who fish along the piers and/or waterfront due to habitat improvements and better access to the water.

6.2.2 Regional and Community Growth

Alternative A, which has the reconstructed seawall as close to the original alignment as possible and restores all facilities in generally the same location as currently exists, will have minor impacts to the regional economy. Alternative B, with the addition of some additional public spaces and new viewpoints along the waterfront, will have slightly greater beneficial impacts to the regional economy. Alternative C, which is a true hybrid of the two other build alternatives will have slightly more beneficial impacts in terms of additional public spaces and improved viewpoints than Alternative A, and slightly less beneficial impacts than Alternative B which has a higher level of public amenities.

These effects would occur over time with the revitalization and reinvestment in the project area once construction is complete and the Seattle waterfront becomes more attractive to residents and visitors. Revitalization and reinvestment could increase property values, stimulate economic activity, enable opportunities for new or expanded business and employment, and generate more tax revenues. This revitalization and redevelopment could result in increased economic activity.

6.2.3 Community Facilities

No community facilities (churches, schools, community centers, or libraries) will be affected from the operation of the project. The study area will look very similar to what is there today so very little effect (if any) is expected. However, added amenities and a safer waterfront may result in increased foot traffic and visitors to the waterfront.

6.2.4 Neighborhood Cohesion

When complete, the waterfront, and study area will be very similar to what it is today. Therefore, none of the build alternatives will have an effect on neighborhood cohesion in the study area. The build alternatives will not affect travel routes and durations, transit service, pedestrian access, and the character of land uses in neighborhoods.

Because there are very limited and minor effects from project operations and all facilities will be restored as they are now, analysis has determined that the project will not cause “disproportionately high and adverse” effects on minority and low-income populations and there are no adverse effects that will be predominately borne by minority and/or low-income populations.

6.3 INDIRECT EFFECTS

Improved fish habitat proposed under all three build alternatives could increase the number of salmon and other fish species in years to come, which could indirectly benefit people who fish. Furthermore, additional public amenities along the waterfront associated with any of the build alternatives could make the area more appealing to residents and visitors and increase the number of cultural, recreational, and educational events along the waterfront. Improvements that may attract additional residents and/or visitors to the general vicinity of the waterfront may also indirectly benefit adjacent areas. These indirect effects are expected to be minor and beneficial.

6.4 MITIGATION

The mitigation of the expected minor operational effects of the project would be limited to minimizing the effects of long-term changes, particularly changes in downtown access, immediately after completion of seawall construction. The most important mitigation measures for avoiding, minimizing, or reducing these adverse effects are community outreach and communication during the initial months before and after construction.

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