

Draft Environmental Assessment

# Tsunami Safe Haven Vertical Evacuation Project

HMGP-DR-WA-4056

City of Long Beach, Washington

*November 2016*



**Federal Emergency Management Agency  
Region X  
Department of Homeland Security  
130 – 228<sup>th</sup> Street SW  
Bothell, WA 98021**

This document was prepared by



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## Acronyms and Abbreviations

AHAB	All Hazard Alert Broadcast
ACS	American Community Survey
ASCE	American Society of Civil Engineers
BMP	Best Management Practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CZMA	Coastal Zone Management Act
DAHP	Washington State Department of Archaeology and Historic Preservation
DHS	Department of Homeland Security
DNR	Washington State Department of Natural Resources
EA	Environmental Assessment
Ecology	Washington State Department of Ecology
EMD	Washington State Emergency Management Division
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	finding of no significant impact
FPPA	Farmland Protection Policy Act
HMGP	Hazard Mitigation Grant Program
IPaC	Information Planning and Conservation
MPC	Mitigation Planning Committee
NAAQS	National Ambient Air Quality Standards
NEHRP	National Earthquake Hazards Reduction Program
NEPA	National Environmental Policy Act

NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NWI	National Wetlands Inventory
PCEMA	Pacific County Emergency Management Agency
P.L.	Public Law
SHPO	State Historic Preservation Office
TWS	Tsunami Warning System
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service

## SECTION 1 Introduction

The City of Long Beach (City), Washington, proposes to construct a tsunami safe haven vertical evacuation structure to provide a refuge for residents and visitors in the event of a major tsunami. The City submitted an application to the Department of Homeland Security's (DHS) Federal Emergency Management Agency (FEMA) through the Washington State Emergency Management Division (EMD) under FEMA's Hazard Mitigation Grant Program (HMGP) to fund this proposed project. EMD is the recipient, and the City is the sub-recipient.

The HMGP is authorized by Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act. Under the HMGP, federal funds pay up to 75 percent of the project cost, and the remaining costs come from nonfederal sources. These HMGP funds are available from Presidential major disaster declaration DR 4056 WA from 2012. EMD will fund up to 12.5 percent of the project cost and the City will fund up to 12.5 percent of the project cost and any overages to meet the nonfederal obligation for the proposed project.

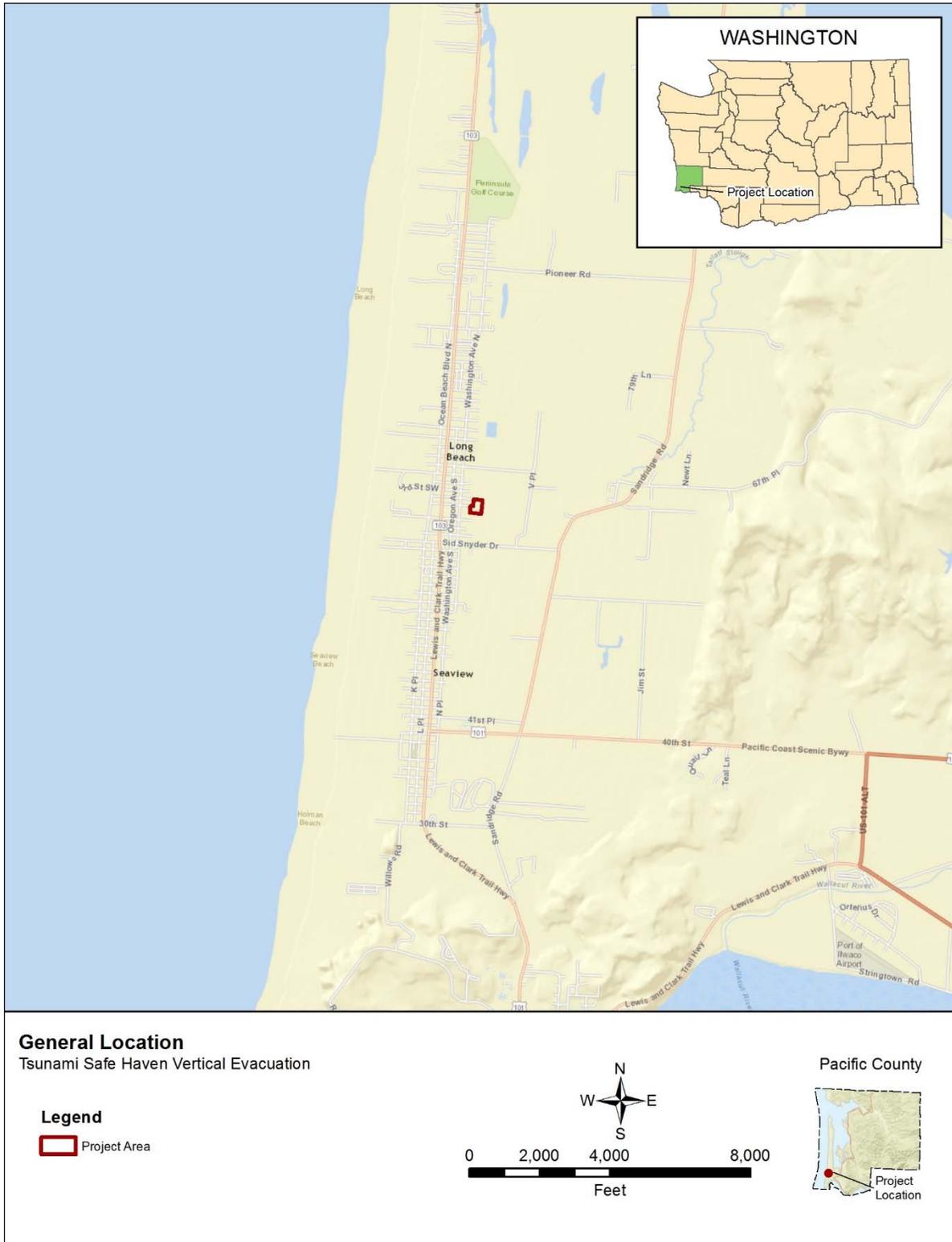
Long Beach is a small coastal city located on a peninsula in Pacific County in southwest Washington (see **Figure 1.1**). The North Beach Peninsula has the longest contiguous beach in the U.S. at about 28 miles, and the area draws a large seasonal and visitor population during the summer. The City is near the Cascadia Subduction Zone, which can produce large earthquakes and associated tsunamis along the Washington coastline. The entire city is located within the projected tsunami inundation area of such a seismic event and there is no existing high ground within a reachable walking or running distance that could provide a refuge for residents and visitors.

In June 2010, Pacific County, Washington completed a hazard mitigation plan. The plan's purpose is to provide guidance to substantially and permanently reduce Pacific County's vulnerability to natural and technological hazards. Long Beach is one of the jurisdictions represented on the Mitigation Planning Committee (MPC) created during the planning process of the mitigation plan. The plan included public involvement throughout the entire process that began in 2008. Tsunamis are one of the hazards identified in the plan and the City is rated high for this hazard (Pacific County 2010).

Under the direction of EMD, Pacific County's Emergency Manager, and the University of Washington Institute for Hazards Mitigation Planning and Research, Pacific County was selected as the pilot community to conduct the first safe haven identification project. Project Safe Haven is a public initiative in Pacific County to assess vertical evacuation needs in four communities, including Long Beach. This community-driven, year-long process began in January 2010 and included a number of community meetings, as well as input from a world café meeting. The process identified potential designs and locations for vertical evacuation. This proposed project was a result of that process and was identified as a preferred strategy for the City (University of Washington 2011).

This environmental assessment (EA) has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the President's Council on Environmental Quality (CEQ) regulations to implement NEPA (40 Code of Federal Regulations [CFR] Parts 1500 to 1508); DHS Instruction 023-01, and FEMA Instruction 108-01-1, NEPA implementing

procedures. FEMA is required to consider potential environmental impacts before funding or approving actions and projects. The purpose of this draft EA is to analyze the potential environmental impacts of the proposed project. FEMA will use the findings in this draft EA to determine whether to prepare an environmental impact statement or to issue a finding of no significant impact (FONSI).



Data Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Figure 1.1. Project Location Map

## SECTION 2 Purpose and Need

FEMA's HMGP provides funds to eligible state and local governments, federally-recognized tribal governments, and non-profit organizations to help implement long-term hazard mitigation measures after a Presidential major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable risk mitigation measures to be implemented during the recovery from a declared disaster.

The purpose of the proposed project is to improve public safety and reduce the potential loss of life in the event of a major tsunami by providing a tsunami refuge for residents and visitors in the City with particular emphasis on school-aged children.

The Pacific County hazard mitigation plan evaluated the impact of a number of hazards on the City and tsunamis are rated high (Pacific County 2010). The City is directly east of and approximately 50 miles from the Cascadia Subduction Zone. This zone is capable of producing earthquakes of magnitude 9.0 or greater, with resulting ground subsidence of up to 6.6 feet and tsunami waves of 32.8 feet along the Washington coastline. The modeled tsunami wave height at the Long Beach Elementary School is 14.4 feet. The entire City is within the projected tsunami inundation zone of such an event (see **Figure 2.1**). An event of this magnitude is predicted to have a 10 to 14 percent chance of occurring in the next 50 years (Pacific County 2010).

Long Beach is a visitor-serving city, with its “high” season the summer months between June and October. On any summer day, the City is home to about 1,400 permanent residents, 2,100 seasonal residents, 1,500 seasonal employees, and 5,000 visitors. In addition, there is an elementary school and a preschool located in the town, with about 350 students and staff on campus during the school year. Therefore, should a major seismic event occur during a summer day, about 10,000 people could be in jeopardy.

By road, the Long Beach City Hall at 115 Bolstad Avenue is approximately 2.3 miles to the nearest designated tsunami evacuation assembly area and approximately 1.7 miles to the boundary of the greatest risk tsunami hazard zone (see **Figure 2.1**). A person walking an average speed can travel 3,600 feet (0.7 miles) in 15 minutes (four feet per second). A person walking a below average speed can travel 2,700 feet (0.5 miles) in 15 minutes (three feet per second) (University of Washington 2011). Based on modeling, a major tsunami from a magnitude 9.0 earthquake could arrive at the coast in about 20 minutes and arrive at the Long Beach Elementary School at the eastern edge of the City in about 28 minutes (Gonzalez 2013). The long distance to the closest naturally occurring high ground and the short amount of time to reach that high ground by foot before a tsunami arrives means that a refuge closer to the City's population center is needed.



**Figure 2.1. Tsunami Inundation Map**

*Source: Washington Department of Natural Resources.*

## SECTION 3 Alternatives

This section describes the No Action Alternative, the proposed action, other action alternatives, and alternatives that were considered but dismissed.

### 3.1 Alternative Development

As part of Project Safe Haven, the City undertook a comprehensive, iterative, community-driven process to identify and evaluate alternatives for a vertical evacuation structure to serve City residents and visitors in the event of a major tsunami. Vertical evacuation allows residents and visitors to move upwards to safety and is particularly important on the peninsula where traditional evacuation measures are not feasible. The report identified preferred strategies for vertical evacuation and this proposed project was one of those strategies (University of Washington 2011).

Project Safe Haven used numerous meetings to gather community ideas and comments on several vertical elevation designs (berms, towers, and buildings), discuss conceptual locations for the structures, and arrive at preferred strategies. The City's preferred strategy identified through this process was construction of a series of berms (University of Washington 2011).

Several criteria were applied to evaluate sites for a vertical evacuation structure. To be considered further sites must be located within City limits and be greater than one acre. Sites were also evaluated based on their location relative to the City's elementary school and preschool and the site's current use. The service area of a vertical evacuation structure was defined as the area within a 15-minute walking distance.

Design considerations for the alternatives included review of tsunami modeling (Gonzalez 2013) and FEMA P-646 – *Guidelines for Design of Structures for Vertical Evacuation from Tsunamis*. These documents guided development of design criteria including berm height and berm sizing. FEMA P-646 guidelines specify that a vertical evacuation structure must be located well above the maximum tsunami inundation level anticipated at a site. The recommended minimum elevation for a vertical evacuation structure is the maximum tsunami run-up elevation modeled at a site, plus 30 percent, plus 10 feet of freeboard.

Based on tsunami modeling at the Long Beach Elementary School site, a Cascadia Subduction Zone magnitude 9.0 earthquake would result in a modeled tsunami wave height of 14.4 feet, after accounting for approximately 6.6 feet of ground subsidence (Gonzalez 2013). In addition, the geotechnical report for the site estimated 6 to 7 inches of initial ground settlement after construction of a berm and 3 to 4 inches of liquefaction-induced settlement that could occur during an earthquake (Hart Crowser 2016). Therefore, the minimum height of a vertical evacuation structure at the site, using the FEMA guidelines, is 14.4 feet (modeled wave height) + 4.32 feet (30 percent of the modeled wave height) + 10 feet (freeboard) + 1 foot (settlement based on geotechnical report) = 29.72 feet.

A vertical elevation structure must be designed to resist the inertial loads (ground shaking) associated with a major earthquake, as well as the forces and design conditions associated with the tsunami wave that is predicted to follow shortly thereafter. This includes the ability to resist

battering from the debris that the tsunami wave carries, such as trees, boats, and structures. The structure was designed for a useful life of 100 years. FEMA guidelines also specify that a vertical elevation structure should provide 10 square feet per person. Because a tsunami may arrive as multiple waves over several hours, it is important that the evacuation structure have enough space for people to shelter in place for 8 to 12 hours.

### 3.2 No Action Alternative

The No Action Alternative is included to describe potential conditions in the future if no action is taken to provide a refuge for residents and visitors in the City in the event of a major tsunami. Under the No Action Alternative, there would be no FEMA-funded tsunami refuge and the field behind the elementary school would not be disturbed. The school district would likely continue to mow and maintain the field, but because it would continue to be wet, it likely would not be used for other activities.

The City's existing tsunami evacuation route is along 67<sup>th</sup> Place outside the City to naturally occurring high ground. The closest designated tsunami evacuation assembly area is approximately 2.0 miles away from the elementary school, a distance not within a 15-minute walk. Without some safe haven for residents and visitors, the population would remain vulnerable to a major tsunami, and in such an event, there would be a significant loss of life given the long distance to travel by foot to the closest naturally occurring high ground.

### 3.3 Alternative 1: Proposed Action (Modified Prow)

The City proposes to construct an armored, hardened earth berm with an access ramp behind the Long Beach Elementary School at 400 Washington Avenue South (see **Figure 3.1**). The berm would provide a refuge for approximately 850 people. The footprint of the berm would be approximately 30,500 square feet, with a sheltering area at the top of approximately 8,500 square feet (see **Figures 3.2 and 3.3**). The berm would be approximately 32 feet high. The proposed design is known as the modified prow based on its triangular shape and reduced footprint as compared to the prow alternative, which is described below under alternatives considered and dismissed (see 3.5.5 Prow Design). The proposed design took into account tsunami modeling (Gonzalez 2013) and FEMA P-646 – *Guidelines for Design of Structures for Vertical Evacuation from Tsunamis* to guide the berm height, size, and siting. The following description of the berm design is based on two PND Engineers, Inc. (PND) reports, the 30% design report and the design criteria report (PND 2016).

The perimeter of the berm would be comprised of earthen side slopes, while the armored interior core of the berm would be comprised of concrete footings, mechanically stabilized earth, and structural fill to prevent wall failure during an earthquake and subsequent major tsunami (see **Figure 3.4**). The top of the berm would be surfaced with pavers, allowing for infiltration of stormwater. The pavers to be used would be permeable pavers, pervious pavers, or paving grids. The top two to three feet of soil at the proposed location would be removed. Then structural fill would be placed over an area of approximately 30,500 square feet to restore the original grade level.

The berm shape would be designed to shed water that would run up from an on-coming tsunami wave and any floating debris in the water. The berm slope protection would be designed for low annual maintenance with native plants.

The proposed location is owned by the Ocean Beach School District, which has committed it as an in-kind donation to the proposed project. The proposed project area is both close to the school population and centrally located in Long Beach. The proposed site is relatively flat and is a mowed, maintained field, surrounded by woods on two sides. The field is currently not used for any purpose. Wetlands are to the north, south, and east of the proposed site. Land uses surrounding the proposed site include Culbertson Park, an active recreation park to the north; woods and wetlands and a drainage ditch to the east; a lumber yard and woods to the south; and Long Beach Elementary School and preschool to the west.

Excavators, caterpillars, and haul trucks would be expected to be the largest equipment regularly on site during construction. Tree clearing would not be necessary as the footprint of the berm would be within the boundary of the mowed field. Possible construction staging areas would be to the west and north of the proposed berm in open, grassy areas associated with the school grounds (see **Figure 3.2**). Construction access would be on existing access roads that loop around the school.

Construction is proposed to occur during the summer months when school is out. Maintenance of the berm would be minimal, primarily consisting of mowing. Annual inspection of the berm would be conducted by the City.

The proposed action would provide a tsunami refuge within a 15-minute walking distance of the elementary school and the City's downtown core and would complement the City's existing tsunami evacuation plan (see **Figure 3.5**).

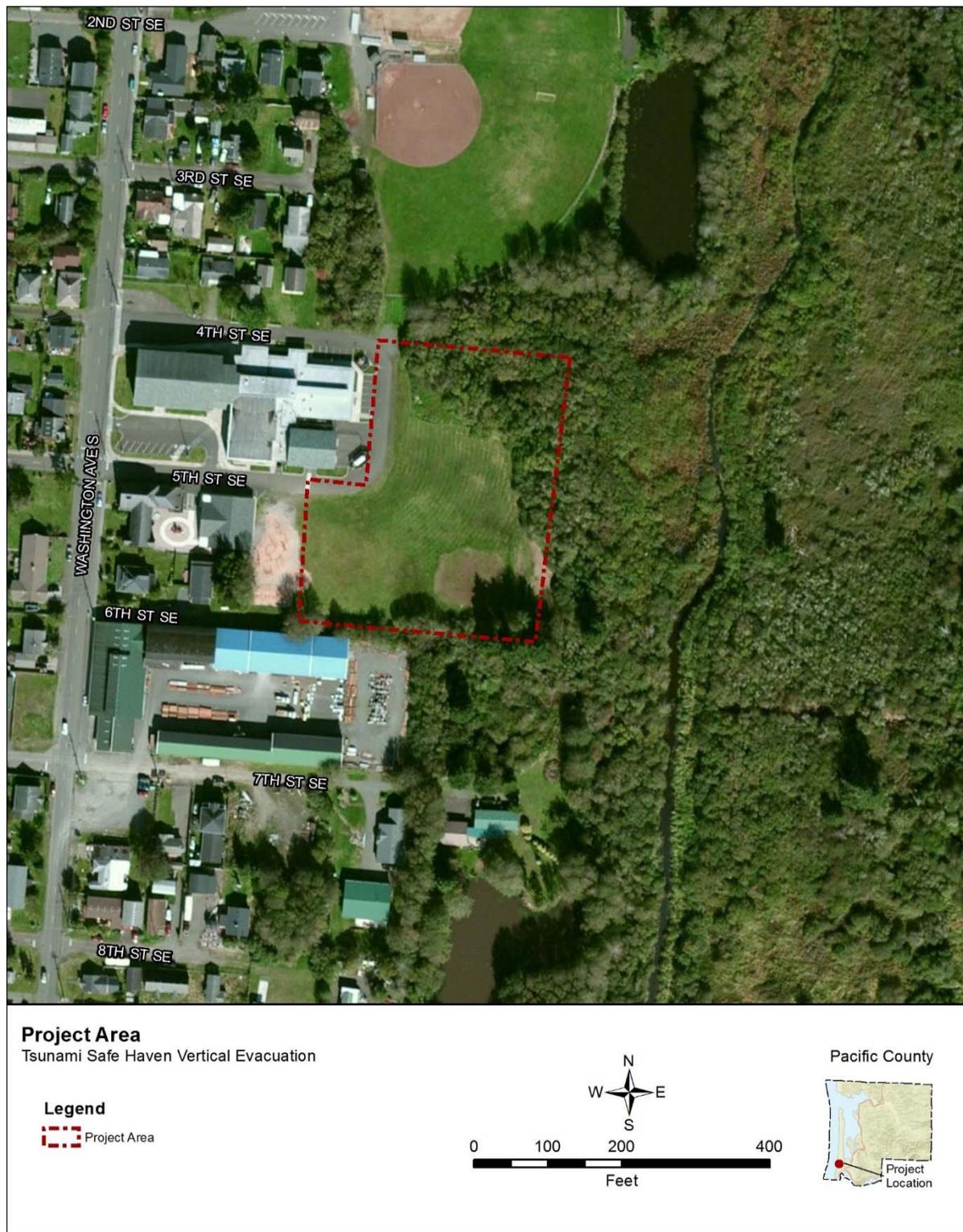


Figure 3.1. Project Area Map

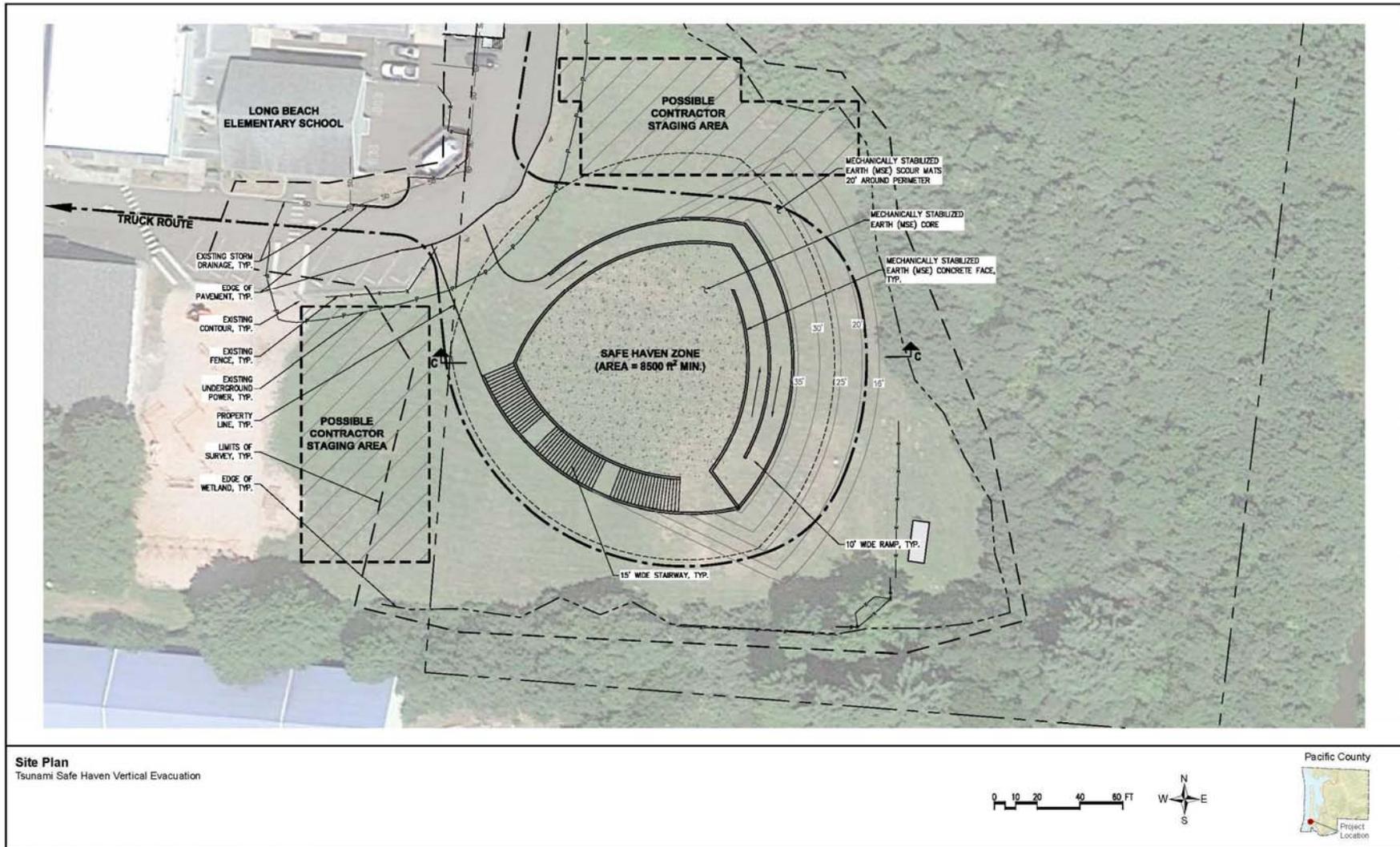


Figure 3.2. Proposed Site Plan

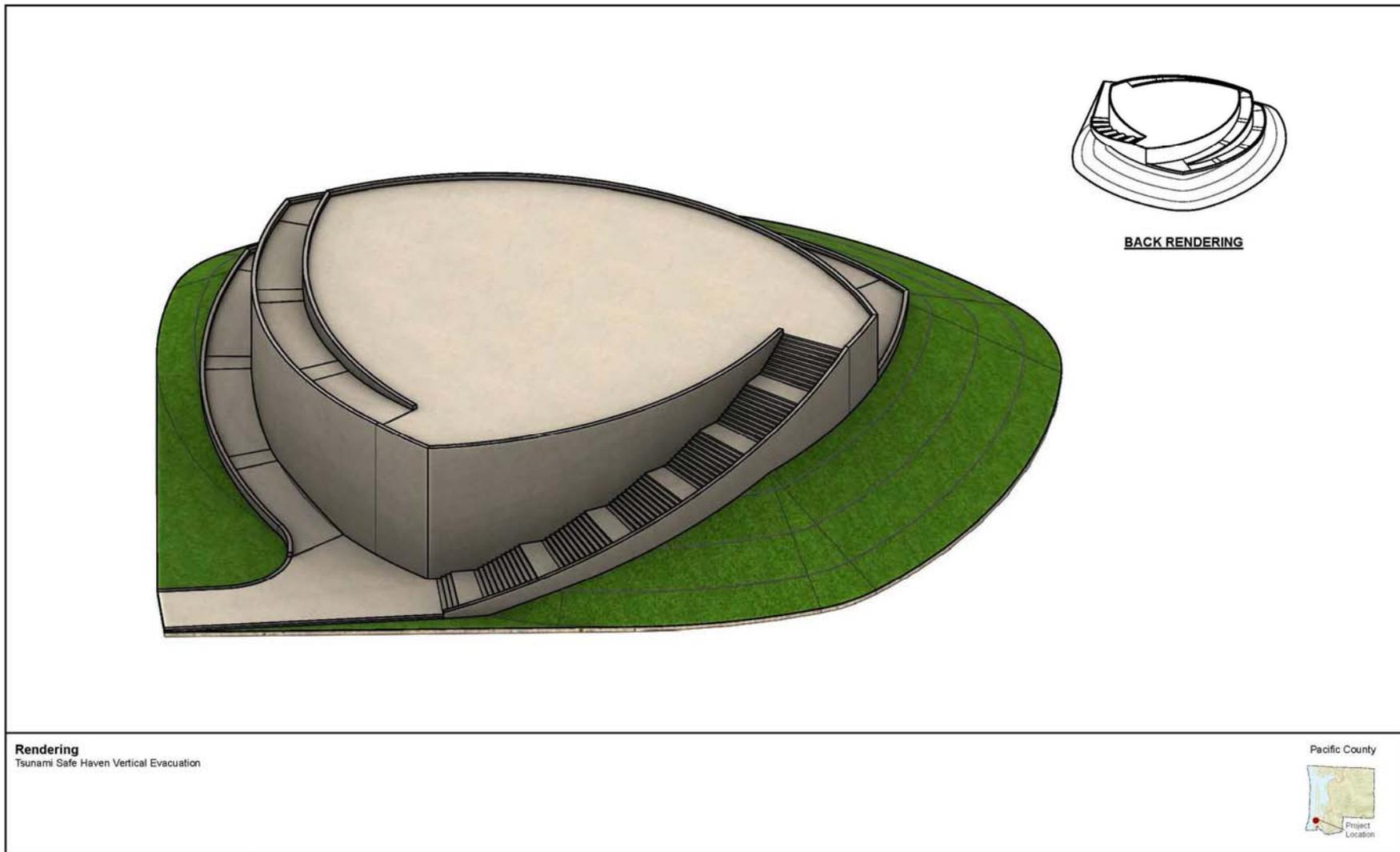
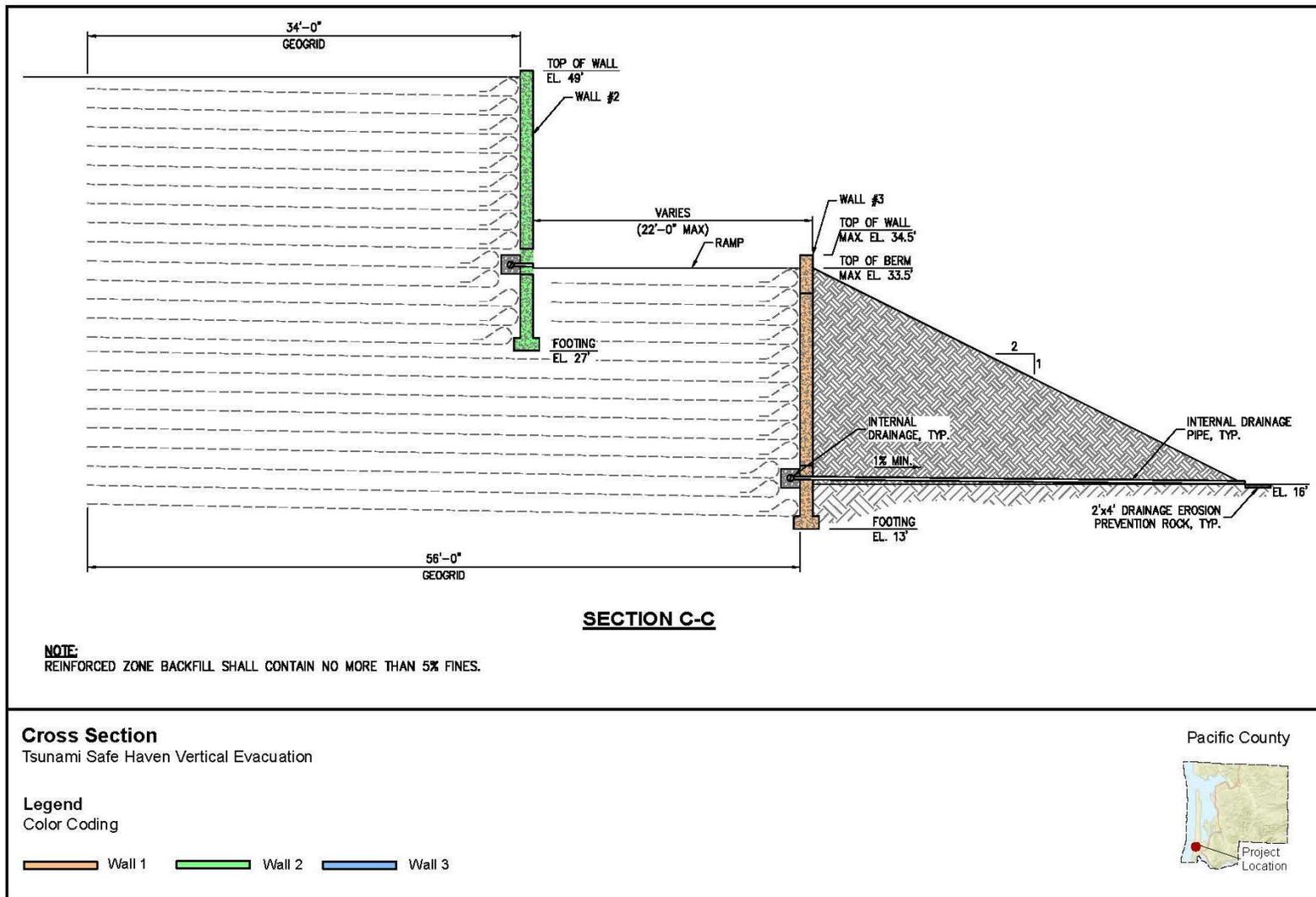
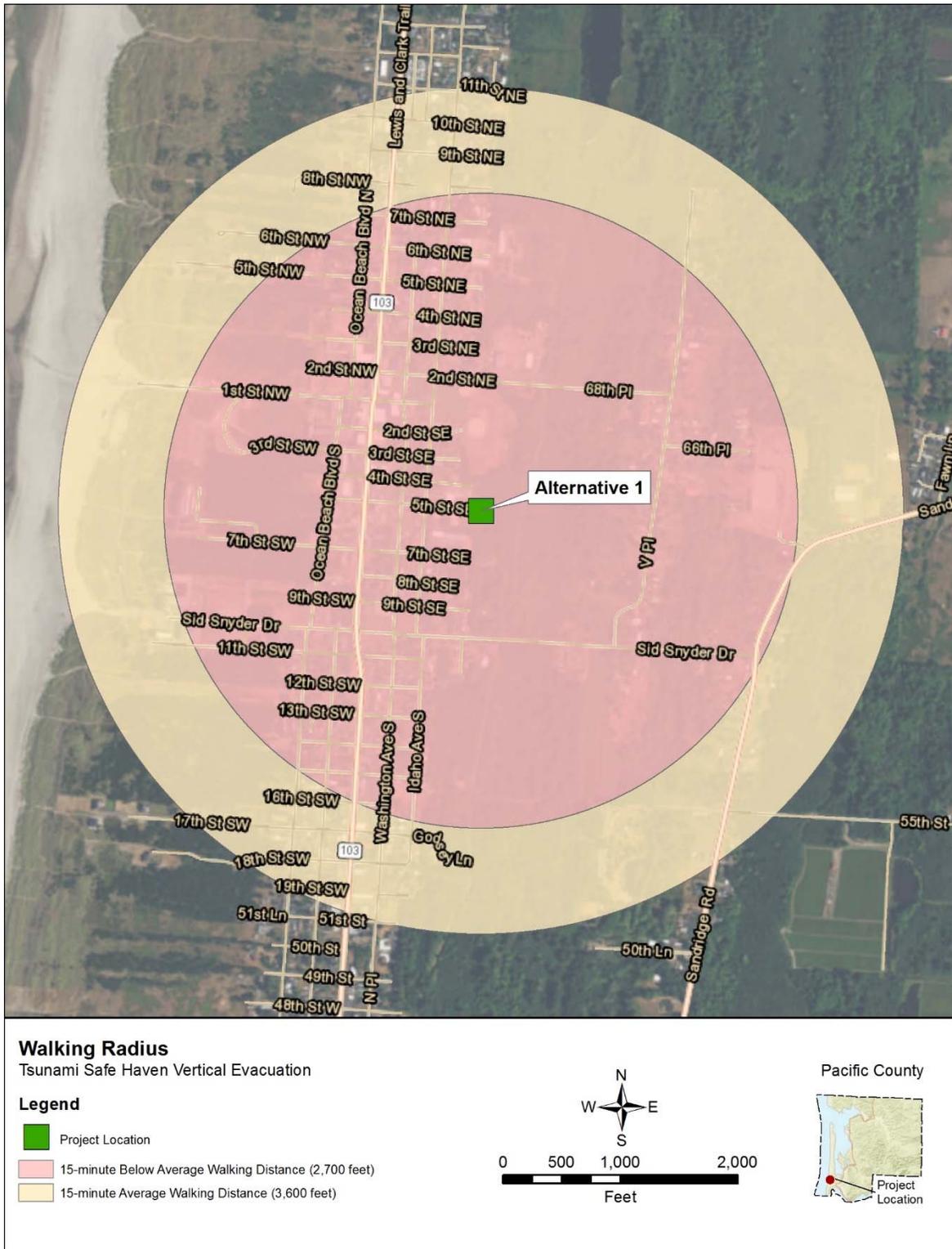


Figure 3.3. Modified Prow Berm



Source Data: Cross Section drawing provided by PND Engineers, Inc, Seattle, WA.

Figure 3.4. Cross Section Showing Access Ramp



Source Data: Background image: NAIP 2015; ESRI World Transportation

Figure 3.5. Walking Distance to Proposed Site

### **3.4 Alternative 2**

Alternative 2 is part of parcel #10111631037 in the northeast area of Culbertson Park, directly north of the proposed project site. The site is also owned by the Ocean Beach School District. Partially cleared and adjacent to maintained baseball fields, the site is approximately 650 feet from the elementary school and centrally located on the eastern edge of the City limits. Land uses surrounding Alternative 2 include baseball fields and other park facilities of Culbertson Park to the west; woods, wetlands, and a small pond to the south; woods and wetlands and a drainage ditch to the east; and partially cleared undeveloped land to the north, which is zoned for residential use.

The design of the berm at the site would mimic that of the proposed action. As with the proposed action, Alternative 2 would construct an armored, hardened earth berm with an access ramp. Approximately 32 feet high, the berm would provide a refuge for approximately 850 people and would have a sheltering area at the top of approximately 8,500 square feet (see Section 3.3 Alternative 1: Proposed Action [Modified Prow] for more specific design details of the berm, which would be the same as under Alternative 1). Unlike Alternative 1, Alternative 2 would require tree clearing to facilitate construction of the berm.

### **3.5 Additional Action Alternatives Considered and Dismissed**

The City considered and dismissed two additional location alternatives and three design alternatives. Wetland impacts would not be avoided through the selection of these alternative sites, because much of eastern Long Beach has wetland characteristics. Most of the peninsula is very flat and the soils are similar; therefore, most undeveloped locations can be expected to encounter some wetlands. The alternatives considered and dismissed are as follows.

#### **3.5.1 Idaho Avenue South and 14<sup>th</sup> Street Southeast**

Parcel #1011212968 near the intersection of Idaho Avenue South and 14<sup>th</sup> Street Southeast is a privately owned, wooded parcel on the southeastern edge of the City limits. The site is undeveloped and has limited public access, but is adjacent to residential areas. The site is approximately 2,150 feet (0.4 miles) from the elementary school and would be within a 15-minute walking distance. There would be additional costs for land purchase. Since the parcel is wooded and bisected by a drainage ditch, there would be greater environmental impacts than at the proposed action location. Due to the greater environmental impacts, the greater costs, and the fact that it is on the edge of the travel zone from the school, this alternative site was dismissed from further consideration.

#### **3.5.2 2312 Washington Avenue North**

Parcel #10110924041 at 2312 Washington Avenue North is a privately owned, residential parcel near the northeast corner of the City limits. The site has limited public access, but is located near residential areas; however, the site is approximately 7,450 feet (1.4 miles) from the elementary school and would not be within the 15-minute walking distance. There would be additional costs for land purchase and demolition of an existing residence. Based on the distance from the

elementary school and the center of the City, this alternative site does not meet the project's purpose and need. Therefore, this alternative site was dismissed from further consideration.

### **3.5.3 Tower Design**

Towers may provide the vertical elevation needed to get people above the height of a major tsunami and allow them to shelter in place until the wave has subsided. A basic tower design consists of a four-legged base with a driven pile foundation stabilized by grade beams. Towers are economical to build, typically have a smaller footprint, and can be multifunctional. A tower design that could serve both the school and the downtown area of the City would not be feasible because it would not hold enough people and could easily become overwhelmed by people trying to seek refuge during a major tsunami event. Therefore, this alternative design was dismissed from further consideration.

### **3.5.4 Orb Design**

The orb was a design alternative for the berm proposed at Site A and is named based on its circular geometry. As with the proposed action, the orb design would involve construction of an armored, hardened earth berm with an access ramp behind the Long Beach Elementary School at 400 Washington Avenue South. Approximately 32 feet high, the berm would provide a refuge for approximately 850 people and would have a sheltering area at the top of approximately 8,500 square feet. The footprint of the berm would be approximately 37,900 square feet, 12,900 square feet larger than the proposed action. The larger footprint would have a greater wetland impact and an increased project cost; therefore, this alternative design was dismissed from further consideration.

### **3.5.5 Prow Design**

The prow was another design alternative for the berm proposed at Site A and is named based on its triangular shape. As with the proposed action, the prow design would involve construction of an armored, hardened earth berm with an access ramp behind the Long Beach Elementary School at 400 Washington Avenue South. Approximately 32 feet high, the berm would provide a refuge for approximately 850 people and would have a sheltering area at the top of approximately 8,500 square feet. The footprint of the berm would be approximately 36,700 square feet, 11,700 square feet larger than the proposed action. The larger footprint would have a greater wetland impact and an increased project cost; therefore, this alternative design was dismissed from further consideration.

## SECTION 4    Affected Environment, Potential Impacts, and Mitigation

This section describes the environment potentially affected by the alternatives, evaluates potential environmental impacts, and recommends measures to avoid or reduce those impacts. When possible, quantitative information is provided to establish potential impacts, and the potential impacts are evaluated qualitatively based on the criteria listed in **Table 4.1**. The “study area” includes the footprint and construction access and staging areas needed for both action alternatives under consideration.

**Table 4.1 Evaluation Criteria for Potential Impacts**

Impact Scale	Criteria
None/Negligible	The resource area would not be affected, or changes or benefits would be either non-detectable or, if detected, would have effects that would be slight and local. Impacts would be well below regulatory standards, as applicable.
Minor	Changes to the resource would be measurable, although the changes would be small and localized. Impacts or benefits would be within or below regulatory standards, as applicable. Mitigation measures would reduce any potential adverse effects.
Moderate	Changes to the resource would be measurable and have either localized or regional scale impacts/benefits. Impacts would be within or below regulatory standards, but historical conditions would be altered on a short-term basis. Mitigation measures would be necessary, and the measures would reduce any potential adverse effects.
Major	Changes would be readily measurable and would have substantial consequences on a local or regional level. Impacts would exceed regulatory standards. Mitigation measures to offset the adverse effects would be required to reduce impacts, though long-term changes to the resource would be expected.

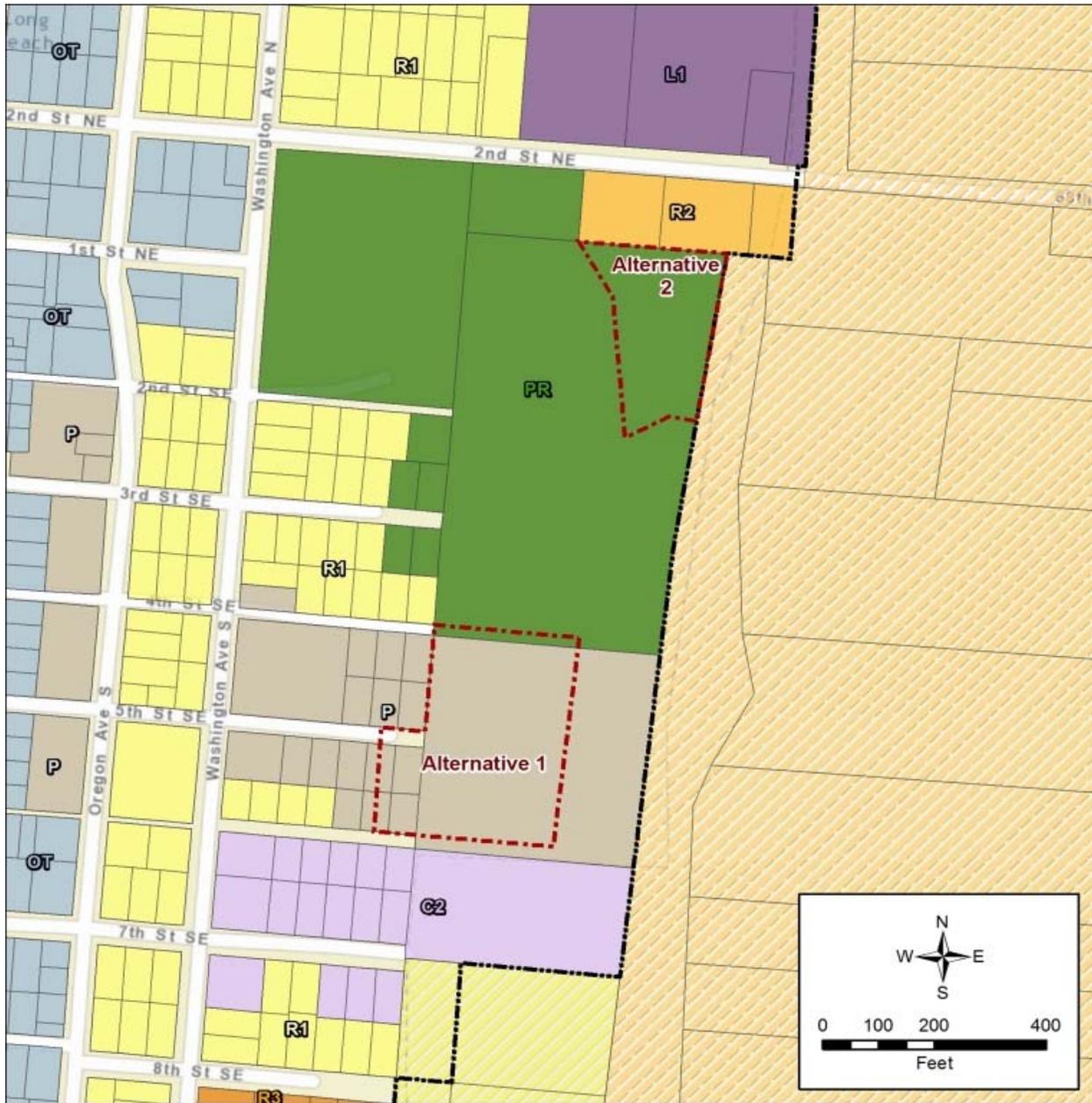
### 4.1 Resources Not Affected and Not Considered Further

This section provides an overview of the environmental resources that would not be affected by the alternatives and that have been removed from further consideration in this EA.

#### 4.1.1 Prime and Unique Farmlands

Prime and unique farmlands are protected under the Farmland Protection Policy Act (FPPA) (Public Law [P.L.] 97-98, 7 United States Code [U.S.C.] 4201 et seq.). The FPPA applies to prime and unique farmlands and those that are of state and local importance. The study area for the alternatives is within the corporate boundaries of the City. The parcel for Alternative 1 is zoned P, public, and the parcel for Alternative 2 is zoned PR, parks and recreation (**Figure 4.1**). The land that would be needed for the alternatives is considered committed to urban development; therefore, it is not subject to the FPPA. The alternatives would have no effect on farmlands.

# Affected Environment, Potential Impacts, and Mitigation



## Zoning

Tsunami Safe Haven Vertical Evacuation

### Legend

City Limits (January 2016)

Project Area

Pacific County Zoning Classifications

General Residential

Rural Residential

### Long Beach City Zoning Classifications

C2 - Commercial Retail Warehouse

L1 - Light Industrial

OT - Old Town

P - Public

PR - Parks and Recreation

R1 - Single Family Residential

R2 - Two Family Residential

R3 - Multi-family Residential

Pacific County



Data Sources: City Boundary and County Zoning from Pacific County, 2016 (<http://www.co.pacific.wa.us/gis/DesktopGIS/WEB/index.html>); City zoning from City of Long Beach, 2016 (<http://54.69.22.136/longbeach/>); Background Data: ESRI World Street Map.

**Figure 4.1. Zoning Map**

### 4.1.2 Wild and Scenic Rivers

The National Wild and Scenic Rivers System (P.L. 90-542; 16 U.S.C. 1271 et seq.) was created in 1968 to preserve rivers with outstanding natural, cultural, and recreational value in a free-flowing condition. The study area for the alternatives is not near a designated wild and scenic river. Although the State of Washington has six designated wild and scenic rivers, the closest designated wild and scenic river is the Sandy River in Oregon, approximately 99 miles away (National Wild and Scenic Rivers System 2016). The alternatives would have no effect on wild and scenic rivers.

## 4.2 Physical Resources

This section provides an overview of the affected environment and potential environmental effects of the alternatives on physical resources, including geology, soils, and topography; air quality and climate change; and visual quality and aesthetics.

### 4.2.1 Geology, Soils, and Topography

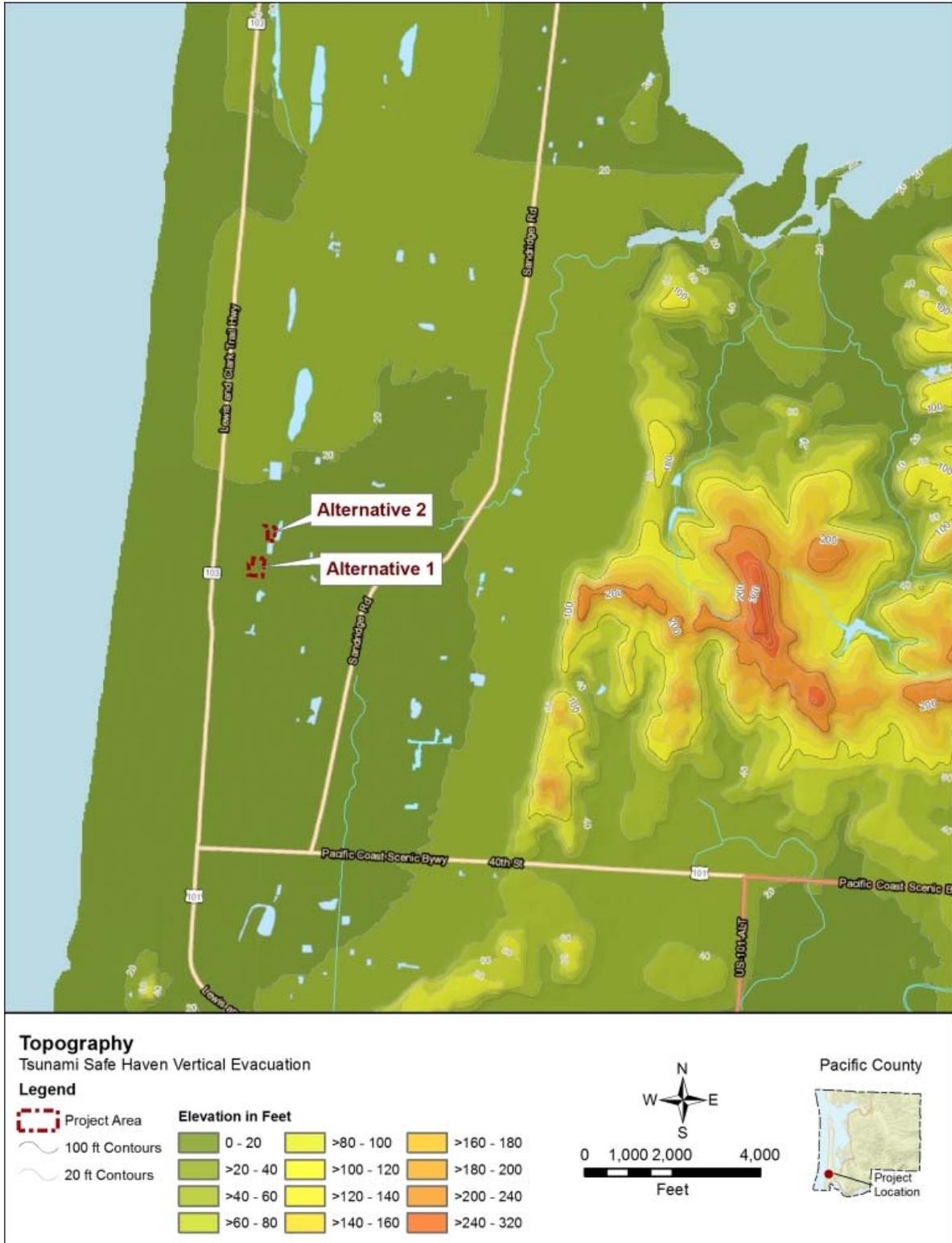
The City is on relatively flat ground with elevation ranges from sea level to 25 feet (City of Long Beach 2008). The nearest naturally occurring high ground is east of the City, approximately 1.7 miles from the City Hall. The project area of Alternative 1 ranges in elevation between 16 and 18 feet. The project area of Alternative 2 ranges in elevation between 17 and 19 feet. Topography is shown on **Figure 4.2**.

The City's flat topography combined with its location along the Pacific coast and proximity to the Cascadia Subduction Zone (located approximately 50 miles to the west) places the entire City within the zone of greatest risk for being inundated from a tsunami wave generated as a result of a 9.1 magnitude earthquake (**Figure 2.1**). The Cascadia Subduction Zone is where the oceanic Juan de Fuca plate is forced under (subducts beneath) the continental North American plate. Three types of earthquakes are associated with subduction zones: intraslab, interface, and crustal earthquakes.

Intraslab earthquakes are deeper zone earthquakes associated with the bending and breaking of the Juan de Fuca plate. Interface earthquakes occur when the plates suddenly rupture from built-up stresses and are some of the largest magnitude earthquakes on record. Hart Crowser's review of historic records indicate that intraslab and interface earthquakes contribute over 97 percent of the total seismic hazard to the study area (Hart Crowser 2016). Crustal earthquakes are caused by cracking of the continental crust resulting from the stress that builds as the subduction zone plates remain locked together. This type of earthquake's contribution to the total seismic hazard to the study area is less than 3 percent.

Studies of large magnitude earthquakes on the Cascadia Subduction Zone have documented at least 40 large magnitude earthquakes over the past 10,000 years, with a magnitude 9.0 or greater earthquake having an average return period of about 500 to 525 years (Goettel & Associates 2013). The last such event occurred in 1700. The Cascadia Subduction Zone is predicted to have a 10 to 14 percent chance of generating a magnitude 9.0 or greater earthquake in the next 50 years (Pacific County 2010).

# Affected Environment, Potential Impacts, and Mitigation



Source Data: Topography from 10-m DEM from Pacific County, 2002 (<http://www.co.pacific.wa.us/gis/DesktopGIS/WEB/index.html>); Transportation from ESRI

**Figure 4.2. Topography Map**

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Along this part of the Washington coastline, these large earthquakes typically result in the subsidence or lowering of large sections of land (along other areas of the coast, large earthquakes can result in the land rising). The shaking and the sudden drop in the land causes the water to first recede and then form a large wave that comes onshore, first building up in height as it advances over the nearshore areas and then dissipating as it travels further inland. A magnitude 9.0 earthquake event has been modeled and is expected to result in a tsunami wave height of 14.4 feet at the Long Beach Elementary School, after accounting for approximately 6.6 feet of ground subsidence (Gonzalez 2013).

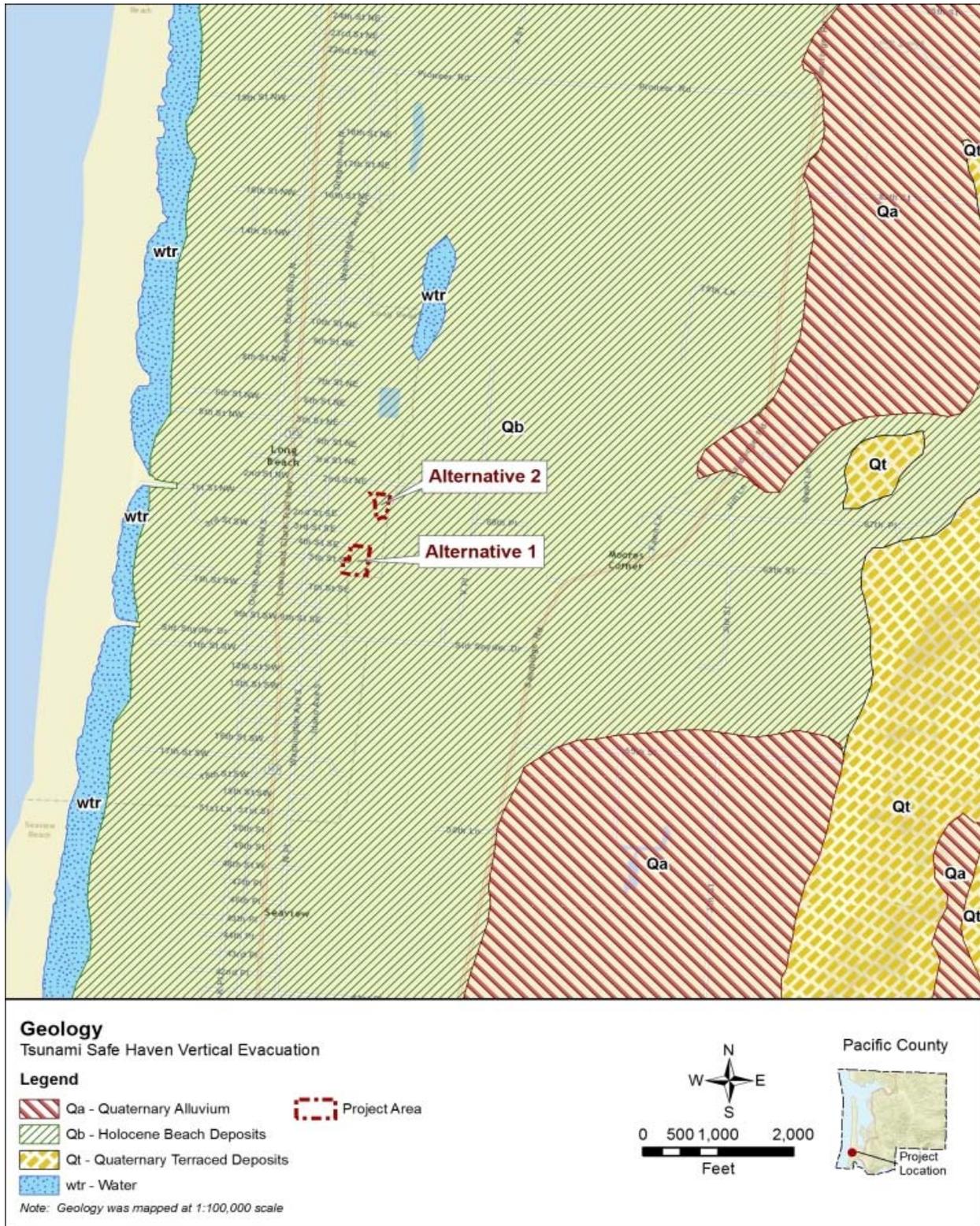
The study area is underlain by Holocene beach deposits (Qb) (**Figure 4.3**). Qb on the Long Beach peninsula is described as fine to coarse sand, forming beaches and several rows of stabilized longitudinal dunes (Hart Crowser 2016). Mapping by the U.S Department of Agriculture (USDA) indicates that three soil units are present within and nearby the study area (USDA 2016): Netarts fine sand, 3 to 12 percent slopes (92), Seastrand mucky peat (132), and Yaquina loamy fine sand (162) (**Figure 4.4**). The project area for Alternative 1 is primarily Yaquina loamy fine sand. The project area for Alternative 2 is entirely Seastrand mucky peat. The properties of the soil types present within the study area are summarized in **Table 4.2**.

**Table 4.2 Properties of Soils in the Study Area**

Parameters	Netarts fine sand, (92)	Seastrand mucky peat (132)	Yaquina loamy fine sand (162)
Depth	More than 80 inches	More than 80 inches	More than 80 inches
Drainage	Well drained	Very poorly drained	Somewhat poorly drained
Permeability	High (1.98 to 5.95 inches per hour [in/hr])	Moderately high to high (0.57 to 1.98 in/hr)	High (1.98 to 5.95 in/hr)
Parent Material	Eolian sands	Herbaceous organic material over beach sand	Beach sand and eolian sands
Slope	3 to 12 percent	0 to 1 percent	0 to 1 percent
Depth to Water Table	More than 80 inches	About 6 to 18 inches	About 0 inches
Hydric Soils	No	Yes	Yes

A Preliminary Geotechnical Findings report from Hart Crowser investigated the soil conditions at the project area of Alternative 1 (Hart Crowser 2016). Soils encountered included a surficial layer of organic soils and peat between 1 and 8 feet thick, underlain by loose to very dense, fine to medium beach sand with occasional layers of silt between 4 to 8 feet in thickness. Thicker deposits of fine-grained silt and clay were encountered at depths greater than 80 feet.

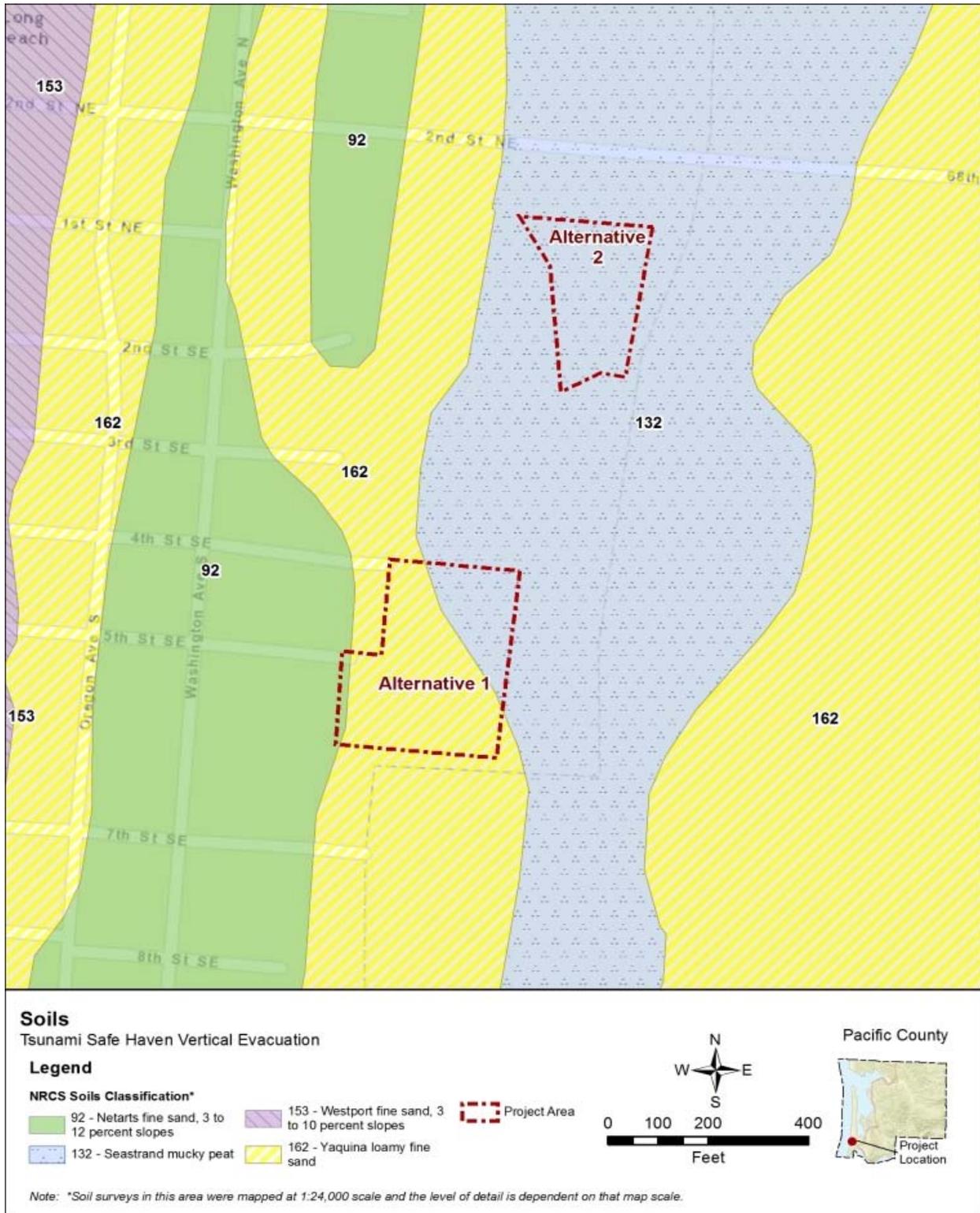
# Affected Environment, Potential Impacts, and Mitigation



Data Sources: WA DNR 2010 (<http://www.dnr.wa.gov/programs-and-services/geology/publications-and-data/gis-data-and-databases/>); Background: ESRI World Street Map

**Figure 4.3. Geology Map**

# Affected Environment, Potential Impacts, and Mitigation



**Figure 4.4. Soils Map**

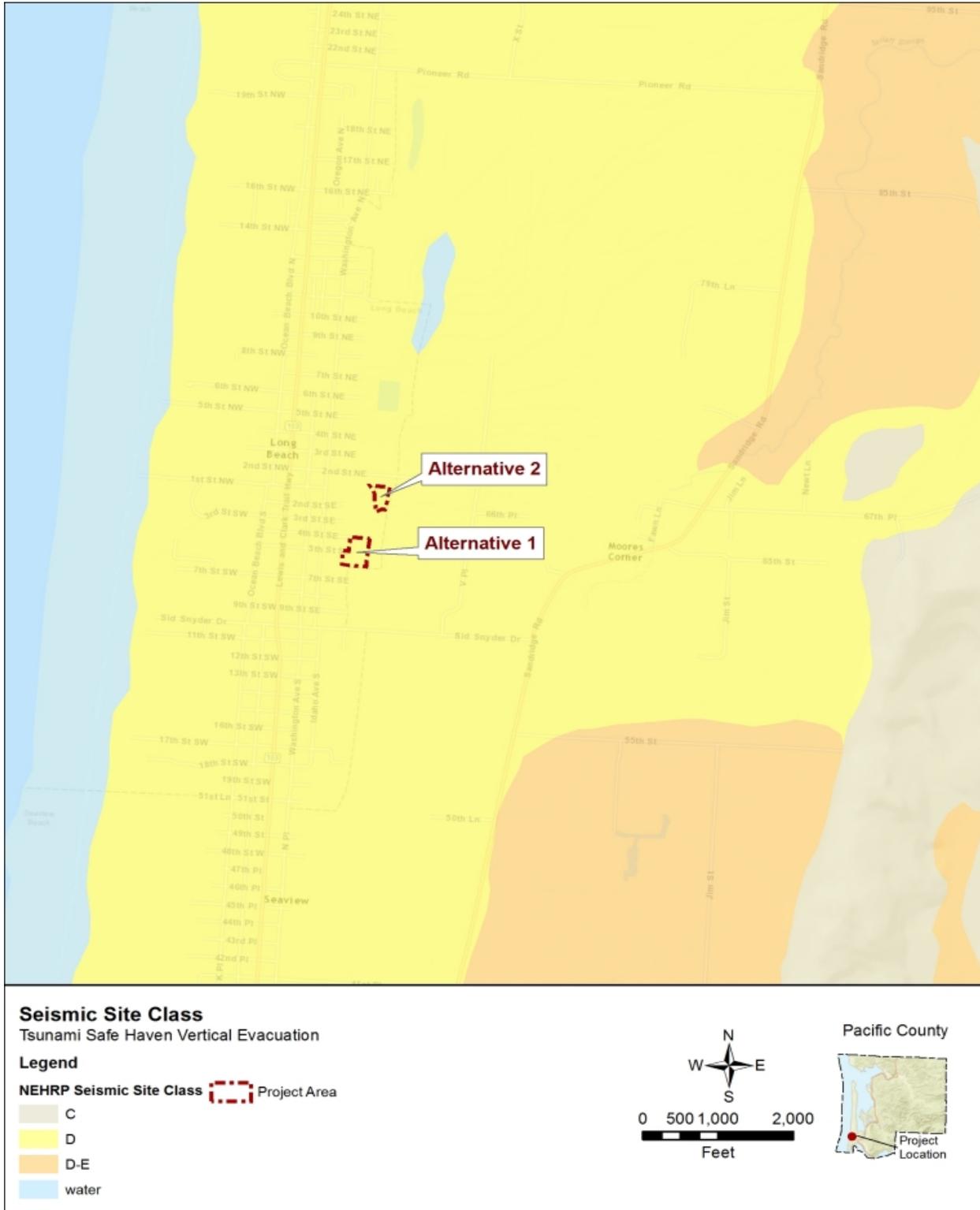
The Washington State Department of Natural Resources (DNR) maps both the National Earthquake Hazards Reduction Program (NEHRP) seismic site class and liquefaction susceptibility statewide. Seismic site class is a simplified method for characterizing the ground-motion amplifying effects of soft soils during an earthquake by evaluating the relation of average shear-wave velocity in the upper 100 feet of the soil–rock column to the amplification of shaking at ground surface. Shear waves are the earthquake waves that create the strongest horizontal shaking and are the most damaging to buildings and structures. Seismic site class provides some measure of the potential for strong shaking in a particular area during an earthquake. Site class B represents a soft rock condition, where earthquake shaking is neither amplified nor reduced by the near-surface geology. Site classes C, D, and E represent increasingly softer soil conditions which result in a progressively increasing amplification of ground shaking (DNR 2016). The study area has a seismic site class of D (**Figure 4.5**).

Liquefaction occurs when water-saturated sandy soil loses strength during severe shaking and behaves like quicksand. Movement of liquefiable soils can cause sand blows, rupture pipelines and waterlines, move bridge abutments and road and railway alignments, and pull apart the foundations and walls of buildings (DNR 2016). The study area has a moderate to high liquefaction susceptibility (**Figure 4.6**).

Hart Crowser performed site-specific analysis for seismic site class and liquefaction at the project area of Alternative 1 (Hart Crowser 2016). Without regard to liquefaction potential, Hart Crowser determined that the site is class D. Since a liquefaction hazard is identified as present in some of the sandy soil underlying the site, the standards in the American Society of Civil Engineers (ASCE) *Minimum Design Loads for Buildings and Other Structures* (ASCE 7-10) indicates that the site should be represented as site class F. Based on Hart Crowser’s analysis, it appeared that varying magnitudes of liquefaction induced strength loss would occur throughout the soil column, especially near the ground surface. In general, their explorations identified that the most hazardous liquefiable sands are encountered in the upper 5 to 10 feet of the soil column (Hart Crowser 2016). The study found that 3 to 4 inches of liquefaction-induced settlement could occur during an earthquake.

Alternatives are evaluated for the potential to cause erosion and sedimentation impacts both during construction and following construction and to withstand the effects of liquefaction and tsunami-generated erosion. Potential impacts on geology and topography are assessed qualitatively by comparison to the surrounding environment.

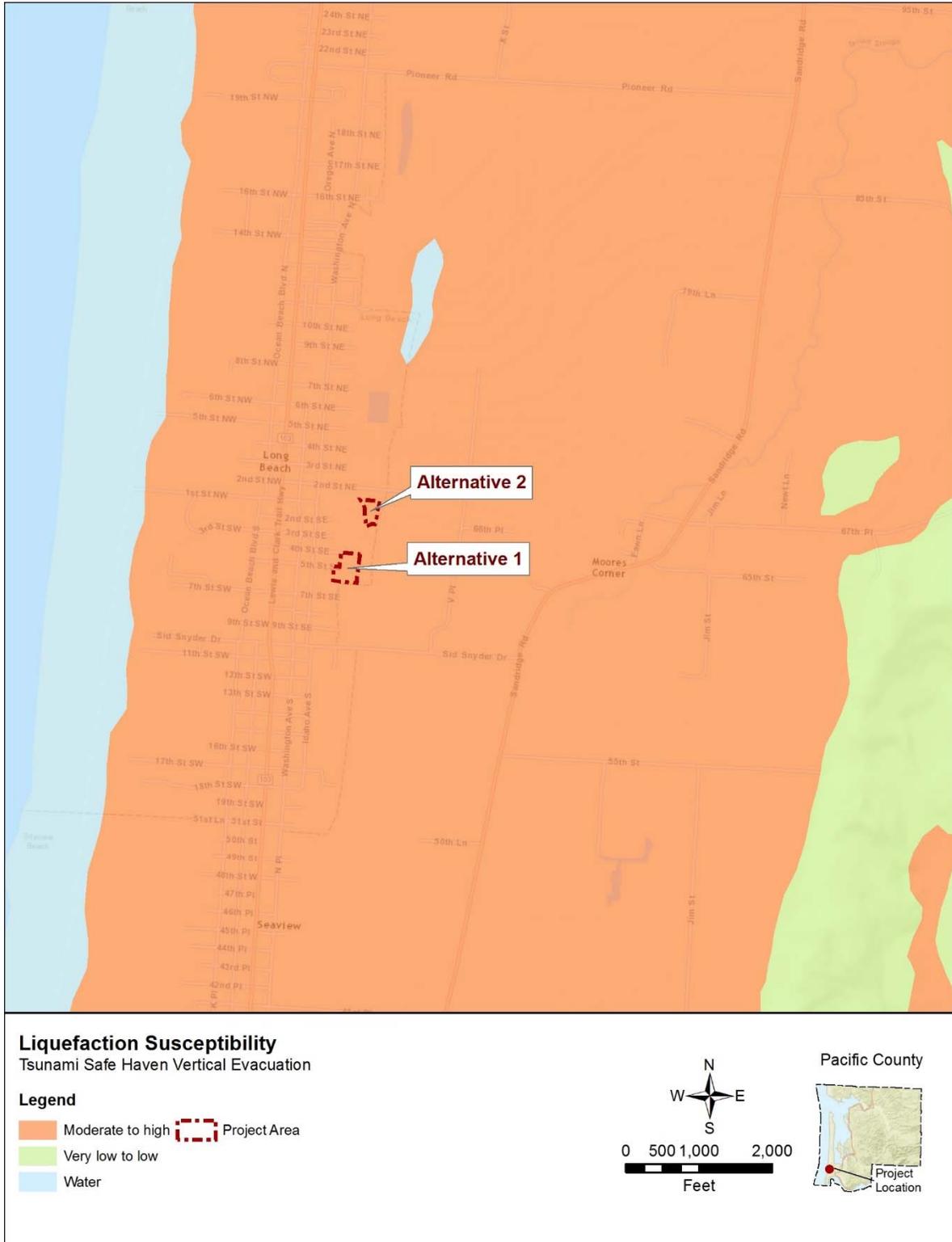
# Affected Environment, Potential Impacts, and Mitigation



Data Sources: WA DNR 2010 (<http://www.dnr.wa.gov/programs-and-services/geology/publications-and-data/gis-data-and-databases/>); Background: ESRI World Street Map

**Figure 4.5. Seismic Site Class Map**

# Affected Environment, Potential Impacts, and Mitigation



Data Sources: WA DNR 2010 (<http://www.dnr.wa.gov/programs-and-services/geology/publications-and-data/gis-data-and-databases>); Background: ESRI World Street Map

**Figure 4.6. Liquefaction Susceptibility Map**

### **No Action Alternative**

The No Action Alternative would have no effect on geology, soils, and topography because no project-related disturbances would occur and there would be no changes to soils and topography in the project area. Without refuge, school students and staff, and residents and tourists in the surrounding area would remain vulnerable to a major tsunami.

### **Alternative 1: Proposed Action (Modified Prow)**

The proposed action would impact soils and topography locally at the proposed location. The armored, hardened earth berm would be approximately 32 feet high, changing the relatively flat topography at the proposed location into a small hill. The elevation at the top of the berm would be approximately 48 feet above sea level, which is considerably lower than the nearby hills east of the City that are over 200 feet above sea level. The elevation of the berm would be a negligible change in the topography similar to the elevation achieved along Highway 101 between Sandridge Road and Highway 101 Alternate, which is barely noticeable.

At 32 feet high, the proposed berm would be much higher than the modeled tsunami wave height of 14.4 feet at the Long Beach Elementary School. In addition, the armored interior core of the berm would be comprised of concrete footings, mechanically stabilized earth, and structural fill to prevent wall failure during an earthquake and subsequent major tsunami.

The top two to three feet of soil (the in-situ organic/peat layer) would be removed. Then structural fill would be placed over an area of approximately 30,500 square feet to restore the original grade. Due to the weight of fill that would be imported to the site, the berm must be designed to account for initial settlement. This settlement is estimated to be on the order of 6 to 7 inches and is included in the initial construction height in addition to the 3 to 4 inches of liquefaction-induced settlement that could occur during an earthquake. Although the construction methods (removing the top few feet of soil) are intended to minimize the potential for liquefaction under the berm, the design height includes these settlement amounts. These localized changes to the soil would facilitate the proposed location's capability to support a berm that would withstand the forces of an earthquake and the resulting major tsunami.

There would be approximately 21,650 cubic yards of soil hauled to and from the site during construction. Although the site is very flat and disturbed areas would not be expected to generate much sediment runoff, stockpiled material waiting removal or placement in the berm could result in sedimentation. Best management practices (BMPs) would be implemented to prevent erosion and reduce any potential impacts to a negligible level. Following construction, the mechanically stabilized earth with a concrete facing on the exterior of the berm, along with native plants, would stabilize the berm against erosion and would act as armoring to prevent scour and debris impact in the event of a major tsunami.

### **Alternative 2**

The berm design for Alternative 2 would mimic that of the proposed action; it is sized to rise above the modeled tsunami wave height and would be designed to prevent wall failure during an earthquake and subsequent major tsunami. Alternative 2 would impact soils and topography

locally in the same manner as the proposed action. Since the project area for Alternative 2 is entirely Seastrand mucky peat, it's likely that a thicker layer of organic/peat soil exists than at the Alternative 1 location; therefore, it is likely that more soil would need to be excavated prior to berm construction. As a result, more fill material would also be required. As with the proposed action, BMPs would mitigate against erosion during construction and the berm design would prevent erosion and sedimentation impacts following construction.

### 4.2.2 Air Quality and Climate Change

The National Ambient Air Quality Standards (NAAQS) established by the U.S. Environmental Protection Agency (EPA) define the concentrations of air pollutants that may not be exceeded within a given period to protect human health (primary standards) and welfare (secondary standards) with a reasonable margin of safety. These standards include maximum concentrations of ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, lead, and particulate matter.

The study area is in Pacific County, Washington, which EPA has designated as being in attainment of all NAAQS (EPA 2016c). Activities that would cause an exceedance of the NAAQS or cause an area to fall out of attainment status would be considered a significant impact.

CEQ guidance on how federal agencies should evaluate impacts on climate and how climate change affects a proposed action recommends that the level of analysis be proportional to the action and follow the 'rule of reason' (CEQ 2016). Climate change refers to changes in Earth's climate caused by a general warming of the atmosphere. Its primary cause is emissions of carbon dioxide and methane. Climate change is capable of affecting species distribution, temperature fluctuations, sea level dynamics, and weather patterns. As a coastal city, Long Beach and the surrounding area would be prone to the effects from sea level rise. In PND's design criteria report, the 100-year sea level rise in the study area was estimated at 1.8 feet (PND 2016).

The climate in the City is characterized by cool, relatively dry summers and moderate winters with considerable rainfall. The annual rainfall is around 80 inches. Rain averages about 9-12 inches per month from November through March and in the range of 2-6 inches for the rest of the year. The mean monthly temperatures vary from 40 degrees Fahrenheit in January to nearly 60 degrees Fahrenheit during summer (City of Long Beach 2008).

Alternatives are evaluated for their potential to contribute to climate change and for their resiliency against the effects of climate change such as sea level rise.

### No Action Alternative

The No Action Alternative would have no effect on air quality and climate change, as current conditions would not change and construction equipment, which can produce emissions, would not be required.

### Alternative 1: Proposed Action (Modified Prow)

Under the proposed action, the use of equipment to construct the berm could result in low levels of particulate matter and vehicle exhaust emissions. Emissions would be temporary and localized, and only minor adverse impacts on air quality in the project area would occur. To reduce emissions, the idling of construction equipment engines would be minimized to the extent practicable and engines would be kept properly maintained. Post-construction, the berm would have no impact on air quality. Periodic maintenance activities such as mowing would be the same as the current conditions where the field is maintained through regular mowing. The proposed action would not adversely impact climate change because it would contribute a negligible amount of greenhouse gases during construction.

Approximately 1,520 truck trips would be needed during construction to bring in material for the berm. Fill material is assumed to come from Naselle Rock and Asphalt Company, approximately 23 miles away. From EPA's MOVES2014 program, the estimated on-road haul truck emission factor for carbon monoxide is 7.08 grams per mile. The proposed action would involve 34,960 haul truck miles equating to 247,516.8 grams (0.27 tons) of carbon monoxide emitted. This is well below a 1,213 tons threshold commonly used for construction emissions by air districts in California, as well as significantly below a 11,023 tons of greenhouse gas per year threshold used for stationary sources in Washington.

The proposed height of the berm accounts for projected sea level rise over the next 100 years. The local hydrodynamic modeling of the berm's performance in the event of a large scale tsunami confirms that there is sufficient height above projected wave run-up to account for potential sea level rise along this portion of the Washington coast.

### Alternative 2

Alternative 2 would impact air quality in the project area the same as the proposed action. As with the proposed action, BMPs would mitigate exhaust emissions from construction equipment engines. There would be no adverse impact to climate change and a berm at this location would also be designed to account for sea level rise.

### 4.2.3 Visual Quality and Aesthetics

The City's beaches are one of the City's greatest assets, drawing a large seasonal and visitor population during the summer. As identified by the community, conservation of the natural views towards the ocean to the west is extremely important. This includes the grand vistas at the two main historic access points (Sid Snyder Drive and Bolstad Avenue), and some of the public street ends that lead to the shoreline dunes, wetlands, and beaches (City of Long Beach 2008).

The study area is on the eastern edge of the City limits (**Figure 4.1**). The project area of Alternative 1 is behind and to the east of the Long Beach Elementary School. The proposed site is a mowed, maintained field, surrounded by woods on two sides. **Figure 4.7** shows the existing visual conditions of the proposed site and **Figure 4.8** shows the existing visual conditions of the adjacent school. **Figure 4.9** shows the existing conditions at the Alternative 2 site; in the photo, the berm would be located in the trees in the background to the right of the ball field.

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The project area of Alternative 2 is behind and to the east of the baseball fields at Culbertson Park. The site is partially cleared and contains numerous trees.

### **No Action Alternative**

The No Action Alternative would have no impact on the existing visual resources in the City, as current conditions would not change.

### **Alternative 1: Proposed Action (Modified Prow)**

The proposed action would construct a berm that would permanently alter the visual condition at the proposed site, but it would not affect any of the community's identified natural views towards the ocean. The majority of the berm would be screened by the existing two-story school. The berm would be approximately the same height as the school. Elementary school gyms typically require at least 20 feet of clear space and the Long Beach Elementary School gym has a peaked roof which adds additional height. The berm would not be visible from most points to the west, although it would be visible as a structure at the end of 5<sup>th</sup> Street South. Because of the flat topography and existing trees, it is unlikely that the berm would be visible from residences to the east, and areas to the east of the project area would not have views of the ocean that could be impacted. Adverse effects on visual quality and aesthetics would be negligible.

### **Alternative 2**

The design of the berm for Alternative 2 would mimic that of the proposed action. As with the proposed action, the visual condition at the site would be permanently altered, but the berm would not affect any of the natural views towards the ocean. Unlike the proposed action, the berm for Alternative 2 would not be screened since the adjacent land use to the west is baseball fields. It is likely that a berm at the Alternative 2 location would be very visible from Washington Avenue, but it also would likely not be visible to residences to the east due to the flat topography and intervening tree cover. Adverse effects on visual quality and aesthetics would be minor due to the greater visibility from a public street, but would not be significant as natural views to the ocean would not be affected.

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**Figure 4.7. Existing Conditions at Proposed Site (Facing Southeast)**



**Figure 4.8. Existing Conditions at Adjacent School (Facing Northwest)**



**Figure 4.9. Existing Conditions Looking East Towards Alternative 2 Site**

### **4.3 Water Resources**

This section provides an overview of the affected environment and potential environmental effects of the alternatives on water resources, including water quality, wetlands, floodplains, and coastal resources.

#### **4.3.1 Water Quality**

The water quality effects analysis includes both surface water and groundwater resources. Alternatives are evaluated for their potential to degrade existing water quality conditions or affect water supplies.

##### **4.3.1.1 Surface Water**

Long Beach is a small coastal city located on a peninsula. The Pacific Ocean is approximately 4,000 feet west of the Long Beach Elementary School. An unnamed pond is approximately 300 feet from Alternative 1 and immediately adjacent to Alternative 2. An unnamed drainage ditch to the east is approximately 280 feet from Alternative 1 and approximately 100 feet from Alternative 2. The area between these surface waters and the alternative sites is vegetated, which provides filtration of surface runoff and protects the water quality of these water bodies. Buffers of as small as 25 to 50 feet can be effective at protecting water quality, particularly in flat terrain (Yuan, *et al.* 2009; Hook 2003, Lee, Isenhardt, and Schultz 2003).

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The City pumps and treats raw surface water obtained from two impoundments located east of the City, the Yeaton/Baker Impoundment and the Dohman Creek Impoundment (City of Long Beach 2008). During the summer months, Matticks Creek augments the water supply to the City.

### **No Action Alternative**

The No Action Alternative would have no effect on surface water quality because inputs to receiving waters would not change.

### **Alternative 1: Proposed Action (Modified Prow)**

The proposed action would not directly affect surface waters or alter stream flows. The distance to the unnamed pond and drainage ditch along with the implementation of BMPs would prevent sedimentation from affecting these surface waters both during and after construction. The proposed action would have no effect on surface water quality. Stormwater runoff from the berm following construction could also affect surface waters by increasing the velocity of flows to nearby receiving surface waters. Although the structure's design has some hardened surfaces it will be partially vegetated, so once built most of the stormwater will continue to be absorbed on site. The top of the berm would be surfaced with pavers that allow stormwater to infiltrate. The perimeter walls would have drain rock and drain holes to prevent build-up of groundwater pressure within the berm. The wall drains from the berm would be directed toward small rain gardens around the base of the berm. The materials used in constructing the berm are expected to have a minor amount of fines that could move out of the berm as water infiltrates through it. This fine sediment would be trapped both in the berm, as well as in the small rain gardens.

In addition, the berm is approximately 300 feet from the nearest surface water. The distance in between the berm and the nearest surface water is vegetated, which also allows for infiltration and filtration of stormwater runoff. There would be negligible adverse effects on nearby surface waters from stormwater runoff from new hardened or impervious surfaces.

### **Alternative 2**

Alternative 2 may directly impact surface waters, but would not alter stream flows. The proximity to the unnamed pond and drainage ditch may result in sedimentation during construction. BMPs would reduce the potential for sedimentation to affect nearby surface waters, but the proximity to the unnamed pond would make it difficult to completely avoid impacts. Stormwater runoff from the berm following construction could also affect surface waters by increasing the velocity of flows off the hardened or impervious surfaces of the berm into the adjacent pond. The top of the berm would be surfaced with pavers, allowing for infiltration of stormwater. The perimeter walls would have drain rock and drain holes to prevent build-up of groundwater pressure within the berm. The wall drains from the berm would be directed toward small rain gardens. Fine sediments from the materials used in constructing the berm would be trapped both in the berm, as well as in the small rain gardens. The additional stormwater runoff would not exceed the capacity of the pond, thus potential adverse effects from Alternative 2 would be minor.

### 4.3.1.2 Groundwater

Groundwater in the study area consists of a sand aquifer with some lenses of silt and clay that may act as confining beds in local areas. Average annual groundwater recharge is estimated at 58 inches. The median depth to water from the ground surface is 1.5 feet and median maximum depth is 8.7 feet (Long Beach 2008). During a geotechnical exploration at the project area for Alternative 1, groundwater was encountered at a depth of approximately 6 to 12 inches below the ground surface (Hart Crowser 2016).

The study area is not near any designated sole source aquifers (EPA 2016d). The Central Pierce County Aquifer, approximately 80 miles away, is the nearest designated sole source aquifer.

### No Action Alternative

The No Action Alternative would have no effect on groundwater quality because current conditions would remain the same.

### Alternative 1: Proposed Action (Modified Prow)

The construction of an armored, hardened earth berm would have a negligible, localized impact on infiltration rates around the structure. Because of the small footprint of the project, the proposed action would have a negligible adverse effect on groundwater recharge, and would not affect groundwater quality.

### Alternative 2

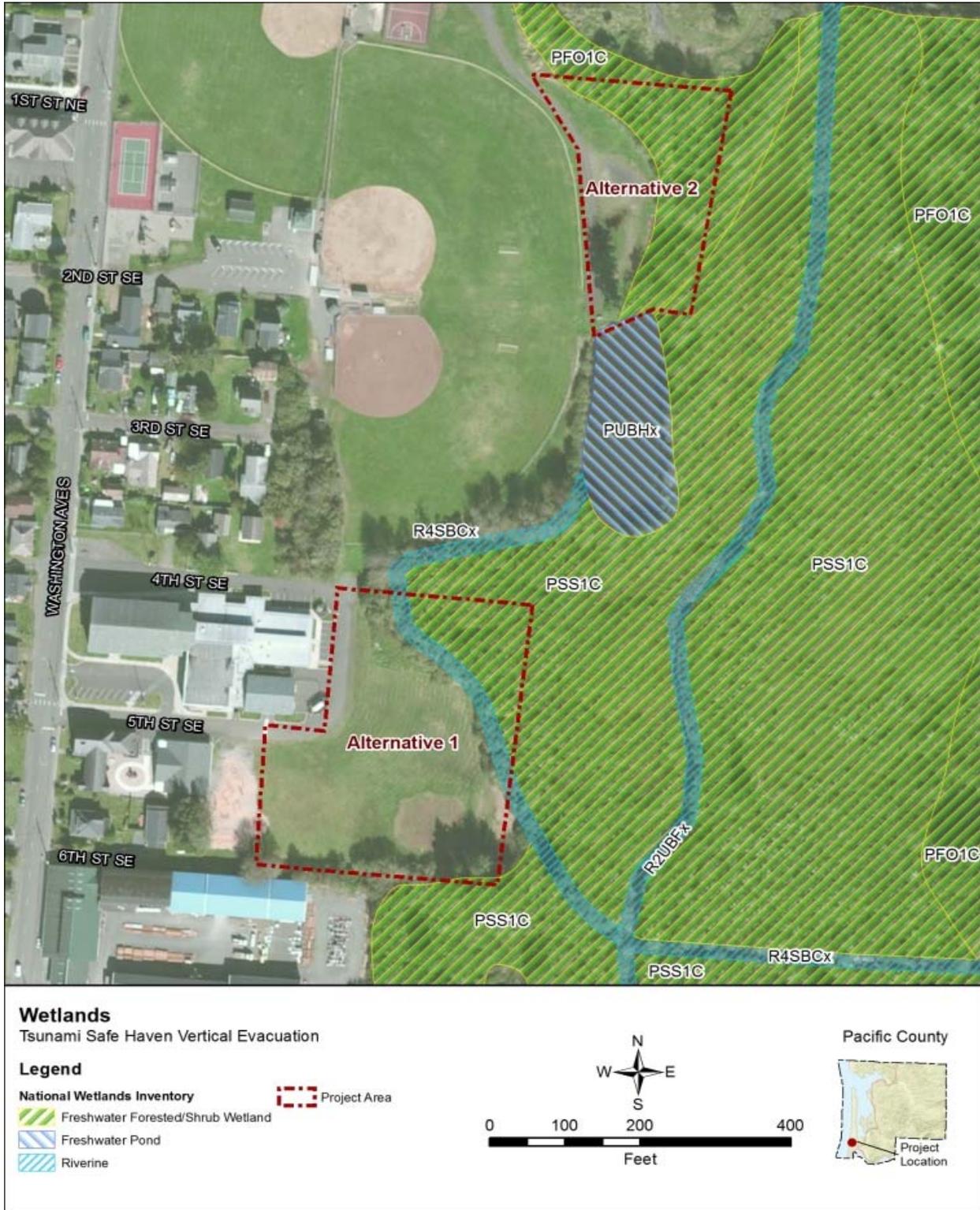
Alternative 2 would have the same potential groundwater impacts as the proposed action. The construction of an armored, hardened earth berm would have a negligible, localized impact on infiltration rates. Alternative 2 would have a negligible adverse impact on groundwater recharge, and would not affect groundwater quality.

### 4.3.2 Wetlands

Executive Order (EO) 11990, Protection of Wetlands, requires federal agencies to take action to minimize the loss of wetlands. Activities that disturb jurisdictional wetlands require a permit from the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act of 1977 (33 U.S.C. 1344).

The U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) map indicates that wetlands are present onsite and in the immediate vicinity of the study area (**Figure 4.10**) (USFWS 2016b). The project area for Alternative 1 contains riverine and freshwater forested/shrub wetlands. The project area for Alternative 2 contains freshwater forested/shrub wetlands. The unnamed pond adjacent to the project area for Alternative 2 is classified as a freshwater pond wetland and the unnamed drainage ditch to the east of both project areas is classified as a riverine wetland. Freshwater forested/shrub wetlands are to the north, south, and east of the project area for Alternative 1 and to the north and east of the project area for Alternative 2. The NWI mapping indicates that the freshwater pond and riverine wetlands are channels or basins that were excavated by humans.

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Source Data: NAIP 2015, National Wetlands Inventory 2016 (<https://www.fws.gov/wetlands/Data/State-Downloads.html>)

**Figure 4.10. Wetlands Map**

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A wetland delineation was completed for the project area of Alternative 1 (Critical Areas Consulting 2013). The delineation used the Wetland Rating Form – Western Washington, revised October 2008, to categorize wetlands in the project area. The mowed, maintained field was categorized as a Category IV depressional wetland. The forested area surrounding the field on two sides was categorized as a Category III freshwater scrub-shrub wetland.

The wetland rating was updated in February 2016 in accordance with current Western Washington wetlands rating guidelines (effective January 1, 2015) and the project area of Alternative 1 is the same wetland categorization (Category IV) as the 2013 wetland rating (Ecological Land Services 2016). However, it was determined that there is not a topographic break between the previously delineated Category IV and Category III wetlands and the Category III wetlands were re-categorized as Category IV wetlands. The wetland delineation is shown on **Figure 4.11**. Category IV wetlands have the lowest levels of functions and are often heavily disturbed (Washington State Department of Ecology 2014).

Because the topography, soils, and vegetation at the Alternative 2 site are very similar to those at the Alternative 1 location, much of the Alternative 2 site that is shown as non-wetland on the NWI maps would likely also be classified as wetlands upon more detailed evaluation.

### No Action Alternative

The No Action Alternative would have no effect on wetlands because current conditions would not change. The school district would likely continue to mow and maintain the field behind the elementary school and the wetland conditions would likely remain Category IV.

### Alternative 1: Proposed Action (Modified Prow)

In compliance with EO 11990, the wetland eight-step process for the proposed action is summarized here.

- **Step 1 – Determine if the proposed action is located in a wetland.** The proposed action would occur in a Category IV depressional wetland.

**Step 2 – Provide early public notice.** The City published a notice in the *Chinook Observer*, a newspaper of general circulation, on October 31, 2012. The notice was also posted at the post office and city hall.

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Source Data: Aerial Map from Google Earth 2016; Drawing provided by Ecological Land Services, Inc., February 15, 2016.

**Figure 4.11. Wetland Delineation**

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- **Step 3 – Identify and evaluate alternatives to locating in wetlands.** Alternatives to the proposed action are discussed in detail in Section 3 of the EA. Much of eastern Long Beach where a tsunami safe haven vertical evacuation structure would need to be built has wetland characteristics. Most of the peninsula is very flat and the soils are similar; therefore, most undeveloped locations can be expected to encounter some wetlands.

The No Action Alternative would not impact any wetlands, but it would not meet the purpose and need for the project.

There are no practicable alternative undeveloped locations within the Long Beach peninsula that would both meet the need to provide a tsunami safe haven and avoid wetlands.

- **Step 4 – Identify impacts of the proposed action associated with occupancy or modification of the wetland.** The Category IV depressional wetland would be impacted by the proposed action. The footprint of the berm would be approximately 30,500 square feet and would correspond to the amount of wetland permanently filled-in. The open grassy wetland areas to the north and west of the proposed berm would serve as construction staging areas and would be temporarily impacted. Approximately 24,800 square feet of wetlands would be temporarily impacted. Construction would not occur in the Category IV freshwater scrub-shrub wetlands to the north, east, and south. However, erosion from the proposed site could cause sedimentation in these adjacent wetlands. The proposed action would not cause additional development or modification of wetlands.
- **Step 5 – Design or modify the proposed action to minimize the potential adverse impacts to lives, property, and natural values within the wetland and to restore and preserve the values of the wetland.** The proposed action incorporates several design elements to reduce wetland impacts. The proposed action reduced the berm footprint from 37,900 square feet to 30,500 square feet, a reduction of 7,400 square feet. In addition, the berm is being positioned on the proposed site to avoid the Category IV freshwater scrub-shrub wetlands. BMPs would reduce erosion and sedimentation that could potentially affect the adjacent wetlands during construction.

The City would be required to obtain a Clean Water Act Section 404 permit from the USACE prior to the start of construction. To mitigate the wetland loss, the City would purchase credits from the Long Beach Wetland Mitigation Bank as part of this permit process. The proposed site is within the service area of the mitigation bank and credits are currently available. Based on the mitigation banking instrument for the Long Beach Wetland Mitigation Bank, the typical credit-debit ratio for a Category IV wetland is 0.85 bank credits for each acre impacted. The final ratio for the proposed action would be determined by the USACE in permitting.

- **Step 6 – Reevaluate the proposed action to determine: (1) Whether it is still practicable in light of its exposure to wetlands, the extent to which it will aggravate**

**the current hazards to other wetlands, and its potential to disrupt wetland values; and (2) Whether alternatives preliminarily rejected in Step 3 of this section are practicable in light of the information gained in Steps 4 and 5 of this section.** The analysis in Steps 4 and 5 provides no basis for modifying the preliminary conclusion reached in Step 3 that the proposed action is the only practicable alternative.

- **Step 7 – Provide findings and public explanation.** The draft EA will be released for public review and comment in the local community. A public notice will be published, the draft EA will be posted on FEMA’s website, a 30-day public comment period will be provided, and a public meeting will take place during the comment period.

The final EA and decision document (FONSI or Notice of Intent) will provide the public with a final decision regarding the proposed action.

- **Step 8 – Implement the proposed action.** The proposed action will be implemented in accordance with all applicable wetland regulations and mitigation measures.

Based on this analysis, adverse impacts to wetlands would be considered moderate, locally.

### Alternative 2

For Alternative 2, the extent of wetlands impacted is unknown since the site has not been assessed using the Western Washington wetlands rating guidelines. However, about half of the site is classified as wetlands based on the USFWS NWI. These wetlands likely would be classified as the Category IV freshwater scrub-shrub wetlands, based on their similar characteristics and interconnection to the Category IV wetlands rated as part of the proposed action. However, because of the greater amount of forest cover at the Alternative 2 site wetlands, it is possible that they could be classified as Category III wetlands, which would require a higher mitigation ratio to offset losses.

The same mitigation measures would be implemented as for the proposed action, including compliance with Section 404 permitting requirements, BMPs to control erosion and sedimentation, and purchase of credits from the Long Beach Wetland Mitigation Bank. Thus, adverse wetland impacts would also be considered moderate, locally.

### 4.3.3 Floodplains

EO 11988, Floodplain Management, requires federal agencies to take actions to minimize occupancy of and modifications to floodplains. FEMA regulations in 44 CFR Part 9, Floodplain Management and Protection of Wetlands, set forth the policy, procedures, and responsibilities to implement and enforce EO 11988 and prohibit FEMA from funding improvements in the 100-year floodplain unless no practicable alternative is available.

EO 11988 guidelines prepared by the Interagency Task Force on Floodplain Management describe an 8-step process that agencies should carry out as part of their decision-making on projects that have potential impacts to or within the floodplain. The eight steps reflect the

## Affected Environment, Potential Impacts, and Mitigation

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decision-making process required in Section 2(a) of the EO and are reflected in FEMA regulations at 44 CFR 9.6. The first step is to determine if the proposed action is in the 100-year floodplain.

FEMA Flood Insurance Rate Maps (FIRMs) delineate floodplain areas and illustrate the extent of the 100-year floodplain. The FIRM showing the study area is panel 53049C0710D dated May 18, 2015. **Figure 4.12** shows a FEMA FIRMette, a full-scale section of a FIRM (FEMA 2015). The small unnamed pond located between the two alternative project areas is classified as Zone A, a 100-year floodplain. Alternative 1 is approximately 300 feet from the pond and Alternative 2 is immediately adjacent to the pond. Both alternatives are outside the 100-year floodplain.

### **No Action Alternative**

The No Action Alternative would have no effect on floodplains because current conditions would continue unchanged and there would be no construction within floodplains.

### **Alternative 1: Proposed Action (Modified Prow)**

No activities would occur in or near a 100-year floodplain under the proposed action; therefore, there would be no impact on floodplains in the project area.

### **Alternative 2**

Although Alternative 2 is outside a 100-year floodplain, its immediate proximity to a 100-year floodplain could have short-term construction impacts. BMPs would mitigate against erosion and sedimentation affecting the pond, but there might be minor impacts on floodplain functions.

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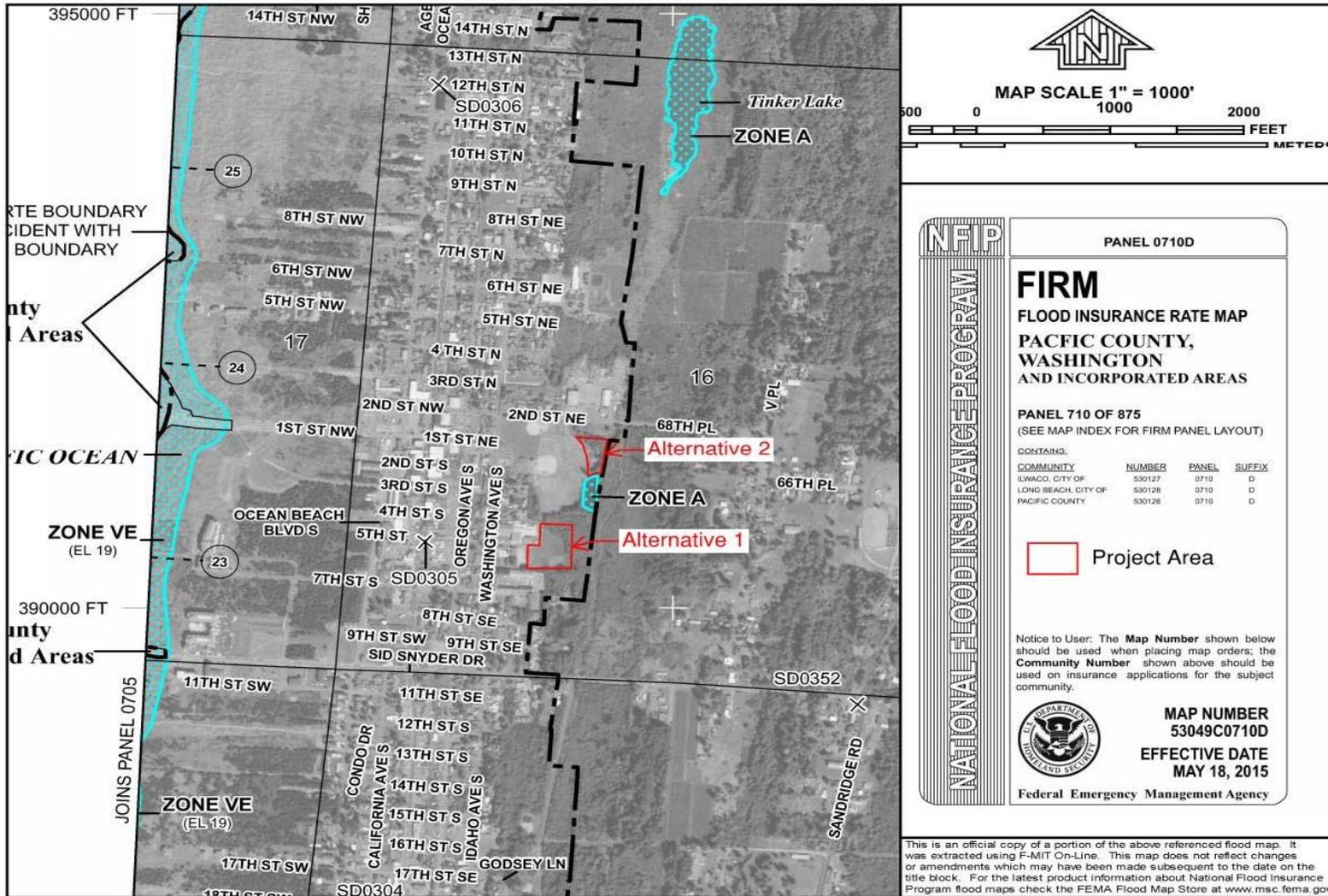


Figure 4.12. FEMA FIRMapette

### 4.3.4 Coastal Resources

The Coastal Zone Management Act (CZMA) is administered by states with shorelines that delineate coastal zones and develop a Coastal Zone Management Plan to manage coastal development. Projects falling within designated coastal zones must be evaluated to ensure they are consistent with the state plan. Washington's coastal zone management program applies to the fifteen coastal counties which front on salt water. The study area is in Pacific County, which is one of the fifteen coastal counties covered by the program. Activities that affect any land use, water use, or natural resource of the coastal zone require a consistency determination.

The study area is outside the seashore conservation line and the Shoreline Management Act jurisdiction (**Figure 4.13**). The seashore conservation line corresponds to the most landward line of the seashore conservation area that establishes an area for the recreational use and enjoyment of the public. Proposals within the shoreline management zone are subject to additional state permit requirements. Although the study area is outside of these specialized protection zones, the entire City is within the coastal zone regulated under the CZMA.

The alternatives are assessed for compliance with coastal zone management plans and policies.

#### **No Action Alternative**

The No Action Alternative would have no effect on coastal resources because current conditions would continue unchanged.

#### **Alternative 1: Proposed Action (Modified Prow)**

The proposed action would affect a land use, water use, or natural resource of the coastal zone and would require a consistency determination. The City has completed a review of consistency with the CZMA and coordination was initiated with the Washington State Department of Ecology (Ecology) on October 6, 2016. The proposed action is expected to be consistent with the State's Plan, thus adverse impacts to coastal resources would be negligible.

#### **Alternative 2**

As with the proposed action, Alternative 2 would affect a land use, water use, or natural resource of the coastal zone and would require a consistency determination. Because it is located a similar distance from coastal resources and would have similar impacts, it is likely that this alternative would also be found to be consistent with the CZMA, and thus adverse impacts to coastal resources also would be negligible.



### 4.4 Biological Resources

This section provides an overview of the affected environment and potential environmental effects of the alternatives on vegetation, wildlife, and threatened and endangered species.

#### 4.4.1 Vegetation

The project area of Alternative 1 is a mowed, maintained field surrounded by woods on two sides. As part of the wetland delineation, Critical Areas Consulting detailed the plant communities (Critical Areas Consulting 2013). The field is dominated by *Holcus lanatus* (common velvetgrass), *Agrostis sp.* (bent grass), *Ranunculus repens* (creeping buttercup), and *Carex obnupta* (slough sedge). The wooded area is scrub-shrub vegetation dominated by *Salix hookeriana* (Hooker willow), *Carex obnupta*, *Spiraea douglasii* (Douglas spirea), *Juncus effuses* (common rush), *Alnus rubra* (red alder), and invasive *Phallus arundinacea* (reed canary grass).

The project area of Alternative 2 is partially cleared and contains woods. Although a detailed assessment of plant communities at this site was not completed, the wooded area is expected to be dominated by similar scrub-shrub vegetation as is found in the wooded area surrounding the maintained field of Alternative 1.

Alternatives are evaluated for their potential to degrade or alter existing vegetation.

#### No Action Alternative

The No Action Alternative would have no effect on vegetation because current conditions would continue unchanged.

#### Alternative 1: Proposed Action (Modified Prow)

The proposed action, including construction staging areas, would be confined to within the boundary of the mowed field. Tree clearing would not be necessary and the scrub-shrub vegetation of the surrounding woods would be protected by BMPs. Native plants would be used as part of the berm slope protection. The proposed action would have a negligible adverse impact on vegetation.

#### Alternative 2

Alternative 2 would require tree clearing to facilitate construction of the berm. The scrub-shrub vegetation not cleared would be protected by BMPs. Native plants would be used as part of the berm slope protection. Alternative 2 would have a minor adverse impact on vegetation because the area that would be affected is relatively small compared to the extent of the scrub-shrub stand along the eastern edge of the City.

#### 4.4.2 Wildlife

In addition to the listed species discussed in Section 4.4.3, common wildlife species, including migratory birds, and their habitats have the potential to be impacted. The mowed and maintained field would support minimal wildlife habitat in the project area of Alternative 1. The wooded

## Affected Environment, Potential Impacts, and Mitigation

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area of the project area of Alternative 2 would have a greater diversity and support a greater density of common wildlife species that would be found along the edges of forested areas. These species would be well adapted to habitats that are heavily influenced by human activities.

Alternatives are evaluated for their potential to degrade habitats or affect existing wildlife.

### No Action Alternative

The No Action Alternative would have no effect on wildlife because current conditions would continue unchanged.

### Alternative 1: Proposed Action (Modified Prow)

The proposed action, including construction staging areas, would be confined to within the boundary of the mowed field. Nesting birds would not be expected to use the mowed field and other species would only pass through the project area. Tree clearing would not be necessary; therefore, the higher quality, adjacent, wooded habitat would not be impacted. The proposed action would have a negligible adverse impact on wildlife.

### Alternative 2

Alternative 2 would require tree clearing to facilitate construction of the berm; therefore, there would be an impact on forested habitat and potentially affect a greater number of species. Because the area impacted is relatively small compared to the extent of the scrub-shrub habitat in the project vicinity, Alternative 2 would have a minor adverse impact on wildlife. Measures would need to be taken to avoid disturbance of birds and active bird nests. If vegetation removal, trimming, or other disturbance should occur during the migratory bird nesting season (approximately February 15 to August 15), a pre-construction nesting bird survey of trees or other suitable nesting habitat should be conducted. If an active bird nest is found, construction should be delayed until the nest is no longer active, or other measures implemented in coordination with appropriate resource agencies.

### 4.4.3 Threatened and Endangered Species and Critical Habitat

The Endangered Species Act (ESA) of 1973 gives USFWS and the National Marine Fisheries Service (NMFS) authority for the protection of threatened and endangered species. This protection includes a prohibition of direct take (e.g., killing, harassing) and indirect take (e.g., destruction of habitat). The USFWS Information for Planning and Conservation (IPaC) was used to identify proposed, candidate, threatened, and endangered species in the study area. In addition, information available from NMFS was used to identify potential marine species that could occur near the study area. All federally listed species that may be in the vicinity of the study area are listed in **Table 4.3**. In addition, the IPaC report does not identify any critical habitats in the study area. The IPaC report is included in **Appendix B** (USFWS 2016a).

## Affected Environment, Potential Impacts, and Mitigation

**Table 4.3 Federally Listed Species in the Study Area**

Common Name	Scientific Name	Status	Effect Determination
<b>Fish</b>			
Southern DPS Pacific eulachon	<i>Thaleichthys pacificus</i>	FT	No Effect
Bull trout	<i>Salvelinus confluentus</i>	FT	No Effect
<b>Reptiles</b>			
Green turtle	<i>Chelonia mydas</i>	FE	No Effect
Loggerhead turtle	<i>Caretta caretta</i>	FE	No Effect
Leatherback turtle	<i>Dermochelys coriacea</i>	FE	No Effect
<b>Birds</b>			
Marbled murrelet	<i>Brachyramphus marmoratus</i>	FT	No Effect
Western snowy plover	<i>Charadrius alexandrinus nivosus</i>	FT	No Effect
Streaked horned lark	<i>Eremophila alpestris strigata</i>	FT	No Effect
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	FT	No Effect
<b>Mammals</b>			
Southern Resident DPS of killer whale	<i>Orcinus orca</i>	FE	No Effect
Blue whale	<i>Balaenoptera musculus</i>	FE	No Effect
Fin whale	<i>Balaenoptera physalus</i>	FE	No Effect
Humpback whale	<i>Megaptera novaeangliae</i>	FE	No Effect
North Pacific right whale	<i>Eubalaena japonica</i>	FE	No Effect
Sei whale	<i>Balaenoptera borealis</i>	FE	No Effect
Sperm whale	<i>Physeter macrocephalus</i>	FE	No Effect

Source: U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC), September 28, 2016. National Marine Fisheries Service (NMFS), West Coast Region, October 6, 2016.

Key:

DPS = Distinct Population Segment

FE = Federally Endangered

FT = Federally Threatened

There is no habitat for most listed species within the study area. The unnamed ditch that runs near the study area has a low potential to provide some habitat for juvenile eulachon. The ditch is connected to the ocean and likely contains brackish water. It would be accessible to species that normally use estuary habitats; however, because of the lack of riparian cover along much of the ditch's length its value as habitat would be low. Alternatives are evaluated for their potential to affect threatened and endangered species.

### **No Action Alternative**

The No Action Alternative would have no effect on threatened and endangered species and critical habitat because current conditions would continue unchanged.

### **Alternative 1: Proposed Action (Modified Prow)**

The unnamed ditch is approximately 280 feet from Alternative 1 and there would be no effect on surface water quality. Therefore, there would be no effect on any federally listed species from construction or operation of the evacuation berm. A more detailed no effect determination is included in a memorandum in **Appendix B**.

### **Alternative 2**

Alternative 2 is closer to the unnamed ditch than Alternative 1 and there is a minor potential for sediment to reach the ditch during construction. The use of BMPs would reduce this potential effect and Alternative 2 would be not likely to adversely affect euchalon. There would be no effect on other federally listed species from construction of an evacuation berm at the Alternative 2 site due to the lack of suitable habitat.

## **4.5 Cultural Resources**

This section provides an overview of the affected area and potential environmental effects of the alternatives on cultural resources, including historic structures and archeological resources. Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended (16 U.S.C. § 470f), requires that activities needing federal permits or using federal funds undergo a review process to consider historic properties that are listed in or may be eligible for listing in the National Register of Historic Places. The State Historic Preservation Office (SHPO) is the federal agency's primary Section 106 partner. Alternatives are evaluated for their potential to impact cultural resources.

A cultural resources survey and report for the project area of Alternative 1 was completed by Transect Archaeology (Transect Archaeology 2016). The report provides an overview of the area's cultural setting and development history. Historic maps and aerial photographs indicate that the project area of Alternative 1 was undeveloped pastureland up to the point that a baseball field was created in the mid-1960s. The report identified three historic properties within a mile of the project area of Alternative 1, but the closest historic structure is 0.73 miles away. The study area does not contain any buildings.

Transect Archaeology performed an archaeological field survey for the project area of Alternative 1. No pre-contact artifacts or debris were identified in the shovel test pits, but modern fill with bits of historic structural demolition debris was found (Transect Archaeology 2016). Transect Archaeology did not locate any pre-contact or historic archaeological sites in the project area of Alternative 1.

### **No Action Alternative**

The No Action Alternative would have no effect on cultural resources because current conditions would continue unchanged.

### **Alternative 1: Proposed Action (Modified Prow)**

The Confederated Tribes of the Chehalis Reservation and the Shoalwater Bay Indian Tribe were notified about the proposed action on November 23, 2015. In an email response on November 24, 2015, the Shoalwater Bay Indian Tribe requested to be updated when the cultural resources survey was completed. The completed cultural resources report was provided to both Tribes and no additional response from the Tribes has been received.

Transect Archaeology's cultural resources report was submitted to the Washington State Department of Archaeology and Historic Preservation (DAHP). In a letter dated March 1, 2016, DAHP concurred with the determination of no historic properties affected by the proposed action. To ensure that archaeological resources are not inadvertently affected an archaeological monitor must be on site during ground disturbing activities associated with construction.

Copies of the correspondence letters are provided in **Appendix C**.

### **Alternative 2**

Alternative 2 would have no effect on historic structures as there are no structures within the alternative's project area; however, it is unknown if any of the known historic structures could be affected visually by the placement of a berm at this site. Because the site is bordered by a baseball field to the west it is more visible from public rights-of-way and potentially historic structures than the Alternative 1 site. Only a portion of the site has been developed for recreational uses, and it is unknown if intact archaeological resources may be present. An archaeological survey would be needed to confirm the potential presence or absence of any archaeological resources.

## **4.6 Socioeconomics**

This section provides an overview of the affected environment and potential environmental effects of the alternatives on socioeconomic resources, including environmental justice, land use and zoning, hazardous materials, noise, traffic, public services and utilities, and public health and safety.

### **4.6.1 Environmental Justice**

Environmental justice is defined by EO 12898 (59 *Federal Register* 7629) and CEQ guidance (1997). Under EO 12898, demographic information is used to determine whether minority populations or low-income populations are present in the areas potentially affected by the project. If so, a determination must be made whether implementation of the project may cause disproportionately high and adverse human health or environmental impacts on those populations. Alternatives are evaluated for their potential to cause disproportionately high and

adverse human health or environmental impacts on minority populations and low-income populations.

### **Low-Income Populations**

Persons living with an income below the poverty level are identified as "low-income," according to the annual statistical poverty thresholds established by the U.S. Census Bureau. Using the EPA EJScreen, the percentage of the population living below the poverty level in the study area was evaluated using the 2010-2014 American Community Survey (ACS) data. The study area fell within the 20-40 percent range, more specifically 24.62 percent (**Figure 4.14**) (EPA 2016a). The surrounding areas of Pacific County is 14.9 percent low income (Appendix A, Figure A.1).

### **Minority Populations**

CEQ (1997) defines the term "minority" as persons from any of the following groups: Black, Asian or Pacific Islander, American Indian or Alaskan Native, and Hispanic. Using the EPA EJScreen, the percentage of minority population in the study area was evaluated using the 2010-2014 ACS data. The study area fell within the 0-20 percent range, more specifically 14.23 percent (**Figure 4.15**) (EPA 2016a). The study area is within the same range as most of the rest of Pacific County in terms of percent minority population (Appendix A, Figure A.2).

### **No Action Alternative**

Under the No Action Alternative, all persons within the project area regardless of income or race would continue to lack a tsunami refuge within a 15-minute walking distance in the event of a major tsunami. The No Action Alternative would not have a disproportionately high and adverse human health or environmental effect on low-income or minority populations and meets the requirements of EO 12898.

### **Alternative 1: Proposed Action (Modified Prow)**

The proposed action would have a beneficial effect on all people living in the vicinity of the project area, including any low-income or minority persons, as it would provide a tsunami refuge within a 15-minute walking distance in the event of a major tsunami. No disproportionately high and adverse impacts to low-income or minority populations would result from the proposed action. Therefore, the proposed action would comply with EO 12898.

### **Alternative 2**

Alternative 2 would have a beneficial effect on all people living in the vicinity of the project area, including any low-income or minority persons, as it would provide a tsunami refuge within a 15-minute walking distance in the event of a major tsunami. No disproportionately high and adverse impacts to low-income or minority populations would result from Alternative 2. Therefore, Alternative 2 would comply with EO 12898.

Environmental Justice - Low Income Populations



EJSCREEN 2016

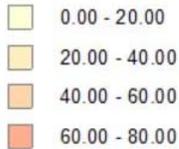
Figure 4.14. Low-Income Populations

Environmental Justice - Minority Populations

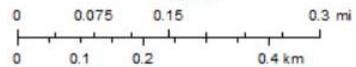


September 30, 2016

by Block Group



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EPA

EJSCREEN 2016

Figure 4.15. Minority Populations

### 4.6.2 Land Use and Zoning

The study area is along the eastern edge of the City within the corporate boundaries. Land outside the corporate limits to the east is zoned rural residential by Pacific County. The parcel for Alternative 1 is zoned P, public (**Figure 4.1**). The proposed site is relatively flat and is a mowed, maintained field, surrounded by woods on two sides. The field is currently not used for any purpose. Land uses surrounding the site include Culbertson Park, an active recreation park to the north; woods and wetlands and a drainage ditch to the east; a lumber yard and woods to the south; and Long Beach Elementary School and preschool to the west.

The Alternative 2 site is zoned PR, parks and recreation (**Figure 4.1**). The site is partially cleared and adjacent to maintained baseball fields. Land uses surrounding the site include baseball fields and other park facilities of Culbertson Park to the west; woods, wetlands, and a small pond to the south; woods and wetlands and a drainage ditch to the east; and partially cleared undeveloped land to the north, which is zoned for residential use.

Alternatives are evaluated for their compatibility with existing land uses and zoning.

#### No Action Alternative

The No Action Alternative would have no effect on land use and zoning because current conditions would continue unchanged.

#### Alternative 1: Proposed Action (Modified Prow)

An earthen berm would be an allowable use under the current zoning at the proposed site and it would be compatible with the existing surrounding land uses.

#### Alternative 2

An earthen berm would be an allowable use under the current zoning at the Alternative 2 site and it would be compatible with the existing surrounding land uses.

### 4.6.3 Hazardous Materials

Hazardous materials are those substances identified by the Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act, and the Toxic Substances Control Act. The Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act, which was further amended by the Hazardous and Solid Waste Amendments, defines hazardous wastes. In general, both hazardous materials and waste include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, may present substantial danger to public health or to the environment when released or otherwise improperly managed.

To determine whether any hazardous waste facilities exist within the vicinity of the study area or whether there is a known and documented environmental issue or concern that could affect the project site, a search for Superfund sites, toxic release inventory sites, industrial water

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dischargers, hazardous facilities or sites, and multi-activity sites was conducted using EPA's Envirofacts database.

According to the database, three hazardous sites and one water discharge site are reported within the vicinity of the study area (**Figure 4.16**). The water discharge site is the City's wastewater treatment plant. The three hazardous waste sites are Chinook Observer, WA DA Pacific 1, and Picture Attic. The hazardous waste sites are all identified as being in an inactive state for the Resource Conservation and Recovery Act (EPA 2016b). The facility detail reports of the identified Envirofacts sites are provided in **Appendix D**.

Alternatives are evaluated for their potential to be impacted by hazardous sites and for their potential to cause hazardous conditions or generate hazardous wastes.

### **No Action Alternative**

Under the No Action Alternative, existing conditions with respect to hazardous materials would not change; therefore, there would be no effect related to hazardous materials or sites.

### **Alternative 1: Proposed Action (Modified Prow)**

Under the proposed action, no impacts from hazardous sites would occur. The proposed site is not identified in the EPA's Envirofacts database and none of the identified sites within the vicinity of the project area would impact the proposed action.

The proposed action would involve the use of mechanical equipment during construction, and there is always a minor threat of leaks of oil, fuels, and lubricants from the use of such equipment. The short-term nature of the project construction and use of equipment in good condition would reduce any potential effect to a negligible level. BMPs would address any potential effects from spills during construction.

### **Alternative 2**

Under Alternative 2, no impacts from hazardous sites would occur. The Alternative 2 site is not identified in the EPA's Envirofacts database and none of the identified sites within the vicinity of the project area would impact the alternative project.

Alternative 2 would involve the use of mechanical equipment during construction, and there is always a minor threat of leaks of oil, fuels, and lubricants from the use of such equipment. The short-term nature of the project construction and use of equipment in good condition would reduce any potential effect to a negligible level. BMPs would address any potential effects from spills during construction.

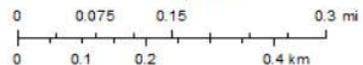
Hazardous Materials



October 3, 2016

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- Superfund
- Brownfields
- Toxic releases
- Water dischargers
- Air pollution
- Hazardous waste



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EJSCREEN 2016

Figure 4.16. Hazardous Materials

### 4.6.4 Noise

Sounds that disrupt normal activities or otherwise diminish the quality of the environment are considered noise. Noise events that occur during the night (10 p.m. to 7 a.m.) are more disturbing than those that occur during normal waking hours (7 a.m. to 10 p.m.). Noise is typically associated with climatic conditions (wind, rain), transportation (traffic on roads, airplanes), and other "life sounds" (people talking, children playing, dogs barking). The potential effects of noise are related to distance from the source, background levels, and the randomness of a noise.

Assessment of noise impacts includes the proximity of the project to sensitive receptors. A sensitive receptor is defined as an area of frequent human use that would benefit from a lowered noise level. Typical sensitive receptors include residences, schools, churches, hospitals, and libraries. The project area of Alternative 1 is adjacent to the Long Beach Elementary School and preschool. The project area of Alternative 2 is not adjacent to any sensitive receptors. Residences are nearby the study area and residences would be along the truck routes for accessing the sites during construction.

The City has an adopted noise code to provide noise control within the City. Sounds created by external construction between 7:30 A.M. and 6:30 P.M. weekdays and between 9:00 A.M. and 5:00 P.M. on weekends is exempt from regulation under the noise control code (City of Long Beach Municipal Code 5-5-5).

Alternatives are evaluated for their potential to impact existing noise levels or result in violations of the local noise control code, particularly at sensitive receptors.

#### **No Action Alternative**

Under the No Action Alternative, there would be no change in existing noise levels that could affect sensitive receptors in the study area.

#### **Alternative 1: Proposed Action (Modified Prow)**

Under the proposed action, noise would be generated during construction by operation of equipment, such as excavators, caterpillars, and haul trucks. Noise would also be generated during the soil compaction process for the foundation of the berm. The proposed action would increase noise levels in the immediate vicinity of the project area during construction (approximately six months). The proposed action would comply with the City's nuisance noise code, by limiting construction to working hours allowed by the code. Increases in noise levels would be short-term and would occur during normal waking hours; therefore, impacts from increased noise levels on sensitive receptors in the project area would be minor. Construction is proposed to occur during the summer months when school is out, thereby avoiding the potential for noise impacts on school children. In addition, all equipment and machinery used would meet all applicable local, state, and federal noise control regulations.

There would be no long-term noise impacts from the proposed action. Maintenance of the berm would be minimal, primarily consisting of mowing, which would generate occasional noises similar to the existing condition.

### **Alternative 2**

Under Alternative 2, noise would be generated during construction by operation of equipment, such as excavators, caterpillars, and haul trucks and during soil compaction for the foundation. Alternative 2 would increase noise levels in the immediate vicinity of the project area during construction of the berm (approximately six months). Alternative 2 would comply with the City's noise control code, by limiting construction to working hours allowed by the code. Increases in noise levels would be short-term and would occur during normal waking hours; therefore, impacts from increased noise levels on sensitive receptors in the project area would be minor. Because of the proximity of the alternative site to the infield areas of two baseball fields in Culbertson Park, it is possible that construction activities and recreational activities could occur at the same time and that noise levels could disrupt some games. The construction area would be within 300 to 350 feet of the infield area and accounting for typical sound attenuation with distance, it would still likely be audible over normal active recreation noises. This would be a temporary impact that would be unlikely to affect late afternoon and evening uses. In addition, all equipment and machinery used would meet all applicable local, state, and federal noise control regulations.

There would be no long-term noise impacts from Alternative 2. Maintenance of the berm would be minimal, primarily consisting of mowing.

### **4.6.5 Traffic**

The study area includes both city and county roadways. The ingress to the project area of Alternative 1 would be via 4<sup>th</sup> Street South and the egress would be via 5<sup>th</sup> Street South to loop around the elementary school. The project area of Alternative 2 would be accessed via 2<sup>nd</sup> Street Northeast. Both alternatives would require material to be brought into Long Beach via U.S. 101 and State Route 103. Alternatives are evaluated for their potential to impact traffic.

### **No Action Alternative**

Under the No Action Alternative, existing traffic levels would not change and there would be no increase in heavy truck traffic.

### **Alternative 1: Proposed Action (Modified Prow)**

Under the proposed action, vehicle traffic would be generated by work crews traveling to and from the proposed site and trucks hauling soil and construction materials to and from the proposed site. Approximately 1,520 truck trips over a period of six months would be needed during construction to bring in material for the berm. However, the heavy civil work involving truck traffic would be limited to the 10-week timeframe in the summer when school is out. More than 100,000 tourists visit the Long Beach peninsula during the summer months and all of those visitors need to travel the same routes. The truck trips generated by the proposed project would represent a less than 2 percent increase in traffic through the City. During the summer months, weekends are somewhat more congested by visitors than weekdays, which would reduce the impact of the weekday construction traffic on traffic congestion overall. This increase in traffic would be temporary and would represent a moderate, short-term, localized impact on local

residents or people traveling in the vicinity of the study area. However, it is not anticipated that this truck traffic would reduce the level of service at any intersection in the City; therefore, impacts from increased traffic in the project area would not be significant. Access to adjacent facilities, including residential properties, would be maintained. Residences and businesses along the truck haul route would be notified prior to the start of construction activities.

There would be no long-term traffic impacts related to the operation or maintenance of the proposed action.

### **Alternative 2**

Under Alternative 2, vehicle traffic would be generated by work crews traveling to and from the site and trucks hauling soil and construction materials to and from the site. The amount of material that would need to be imported and the construction duration would be similar to the proposed action and potential effects on traffic would also be similar. This increase in traffic would be temporary and would represent a moderate, short-term, localized impact on local residents or people traveling in the vicinity of the study area. However, it is not anticipated that this truck traffic would reduce the level of service at any intersection in the City; therefore, impacts from increased traffic in the project area would not be significant. Access to adjacent facilities, including residential properties, would be maintained. Residences and businesses along the truck haul route would be notified prior to the start of construction activities. There would be no long-term traffic impacts from Alternative 2.

## **4.6.6 Public Services and Utilities**

### **4.6.6.1 Utilities**

The Pacific County Public Utility District No. 2 serves the City with electricity. The majority of the power is hydroelectric, purchased from the Bonneville Power Association (City of Long Beach 2008). The City provides water and wastewater services. There are no existing utilities within the footprint of either alternative. Alternatives are evaluated for their potential to impact utilities.

### **No Action Alternative**

Under the No Action Alternative, utilities in the project area would not be affected.

### **Alternative 1: Proposed Action (Modified Prow)**

Under the proposed action, lighting on the constructed berm would be solar powered. The constructed berm would not use wastewater services. Irrigation would be used to establish vegetation around the perimeter of the berm after construction. Therefore, there would be a short-term minor impact on city water usage.

### **Alternative 2**

Under Alternative 2, lighting on the constructed berm would be solar powered and there would be no wastewater services needed. Irrigation would be used to establish vegetation around the

perimeter of the berm after construction. Therefore, there would be a short-term minor impact on city water usage.

### 4.6.6.2 Emergency Services

Emergency services are provided by the City's volunteer fire department and the City of Long Beach Police Department. Ocean Beach Hospital in the City of Ilwaco provides emergency medical and diagnostic services to the City's residents. The City has a mutual aid agreement with Pacific County Fire District No. 1 for emergency medical services and additional fire response (City of Long Beach 2008). Alternatives are evaluated for their potential to impact emergency services.

#### No Action Alternative

Under the No Action Alternative, there would be no change in emergency services or response times. The potential for injury and loss of life in the event of a major tsunami would remain high, overloading the capabilities of the existing emergency services. A tsunami refuge that is close to the City's population center would continue to be unavailable to residents and visitors in the event of a major tsunami.

#### Alternative 1: Proposed Action (Modified Prow)

Under the proposed action, people could be directed to the emergency evacuation berm, reducing the loss of life and injuries requiring emergency services. First responders may also be able to take refuge on the berm, allowing them to be available to provide assistance once the waters recede. The constructed berm would benefit emergency services in the event of a major tsunami and reduce the potential loss of life.

#### Alternative 2

Under Alternative 2, the benefits for emergency evacuation and emergency services would be similar but somewhat less than under the proposed action. Because the Alternative 2 site is further away from the school and the City center, it is likely that some people and children would be unable to reach the berm in time. Overall, Alternative 2 would benefit emergency services and reduce potential loss of life in the event of a major tsunami.

### 4.6.7 Public Health and Safety

As described in Section 2, the Long Beach peninsula is along the Cascadia Subduction Zone, which is capable of producing earthquakes of magnitude 9.0 or greater. Earthquakes of this size are predicted to generate tsunamis that could result in wave heights over 14 feet at the elementary school location. The entire City is within the projected tsunami inundation zone of such an event (**Figure 2.1**). An event of this magnitude is predicted to have a 10 to 14 percent chance of occurring in the next 50 years (Pacific County 2010).

The Tsunami Warning System (TWS) in the Pacific is comprised of many international member states and monitors seismological and tidal stations throughout the Pacific basin. The TWS evaluates earthquakes for their potential to generate tsunamis and disseminates tsunami warning

information. The West Coast/Alaska Tsunami Warning Center in Palmer, Alaska, is responsible for tsunami warning in Washington (Pacific County 2010). Eleven All Hazard Alert Broadcast (AHAB) sirens are installed on the Long Beach peninsula. The AHAB sirens would sound a wailing tone for three continuous minutes to warn of a tsunami event that may be followed by a verbal message (Pacific County Emergency Management Agency 2016). The closest AHAB siren to the study area is located off 2<sup>nd</sup> Street Northeast, adjacent to the project area of Alternative 2. The AHAB siren can be seen behind the ball field dugout near the center of the photo in **Figure 4.9**.

In addition, Pacific County has identified and provided signs for evacuation routes and safe areas. The City's existing tsunami evacuation route is along 67<sup>th</sup> Place outside the City to naturally occurring high ground. The Pacific County Emergency Management Agency (PCEMA) provides public outreach and education for earthquake and tsunami risks and the associated response and evacuation plans for such hazards.

Following a major earthquake, people in the Long Beach area would have about 15 to 20 minutes to reach a safe haven where they could find refuge from a tsunami wave and shelter for up to 10 hours. The average person can travel by foot about 0.7 miles in that time. The closest designated tsunami evacuation assembly area is approximately 2.0 miles away from the elementary school (**Figure 2.1**).

FEMA P-646 – *Guidelines for Design of Structures for Vertical Evacuation from Tsunamis* provides guidelines for berm height, size, and siting of vertical evacuation structures. The guidelines specify that an evacuation structure should:

- Provide 10 square feet per person
- Be at least 10 feet above the tsunami run-up elevation

Alternatives are evaluated for their potential to affect public health and safety.

### **No Action Alternative**

Under the No Action Alternative, the nearest safe haven would remain the natural high ground approximately 2 miles from the elementary school. The City's tsunami evacuation route would remain along 67<sup>th</sup> Place outside the City. Based on current understanding of the tsunami potential in the Long Beach area, this would be too far away for most people to reach before becoming overwhelmed by a tsunami wave. The potential for injuries and loss of life in the event of a major tsunami would remain high. Residents and visitors would lack a tsunami refuge that is close to the City's population center. Without a vertical evacuation structure, the death rate from a major tsunami could exceed 90 percent with a few survivors able to evacuate in vehicles or by surviving in a few more than one-story buildings that may be robust enough to withstand both the very strong earthquake ground motions and the tsunami inundation forces (Goettel & Associates 2013). At a 90 percent death rate, approximately 9,000 people could be killed should a major seismic event occur during a summer day when approximately 10,000 residents and visitors could be present.

### **Alternative 1: Proposed Action (Modified Prow)**

Under the proposed action, a vertical evacuation berm would be constructed that meets the criteria identified in FEMA P-646. The berm would be sized to provide approximately 10 square feet for 850 persons. The site is centrally located and adjacent to the Long Beach Elementary School and the preschool, providing a safe haven within the walking capabilities of young children. The structure would be designed to withstand damage from the shaking of the initial earthquake and the force of the tsunami wave against the structure as well as the battering of debris carried by the tsunami wave. Public safety would be improved and the potential for injuries and loss of life in the event of a major tsunami within the “service area” of the structure would be greatly reduced. If an earthquake occurs during a school day, it is likely that most of the school children would be able to reach refuge on the berm. The proposed action would provide a major benefit to public safety.

After construction, PCEMA would conduct an exercise on behalf of the City to familiarize the public with the berm. PCEMA would also revise the current tsunami evacuation signage program and provide the City with new evacuation signage.

### **Alternative 2**

Under Alternative 2, the vertical evacuation structure would also be designed to meet the requirements of FEMA P-646. However, because it is about 3 times further away from the elementary school and the preschool, it is likely that a greater number of students would be unable to reach the berm in time to avoid a tsunami wave. The Alternative 2 location is slightly closer to the main beach access at Bolstad Avenue and might be more accessible to visitors less familiar with the City, but the difference is negligible. Overall, public safety would be improved and the potential loss of life in the event of a major tsunami would be reduced. Alternative 2 would provide a major benefit to public safety although it would not perform as well at meeting the purpose of the project to protect school-aged children.

After construction, PCEMA would conduct an exercise on behalf of the City to familiarize the public with the berm. PCEMA would also revise the current tsunami evacuation signage program and provide the City with new evacuation signage.

## **4.7 Summary of Effects and Mitigation**

This section provides a summary by resource topic of the potential environmental effects associated with implementation of the alternatives and mitigation or BMPs that would be implemented to minimize impacts.

## Affected Environment, Potential Impacts, and Mitigation

**Table 4.4 Summary of Impacts and Mitigation**

<b>Resource Area</b>	<b>No Action Alternative</b>	<b>Alternative 1: Proposed Action (Modified Prow)</b>	<b>Alternative 2</b>
Geology, Soils, and Topography	Impacts: No impacts.	<p>Impacts: Short-term negligible localized impacts of erosion and sedimentation. Long-term negligible localized impacts of topography change and soil replacement.</p> <p>Mitigation: BMPs to prevent erosion. Slope stabilization of the berm with native plants and mechanically stabilized earth.</p>	<p>Impacts: Same as Alternative 1, except more excavation and fill would likely be needed.</p> <p>Mitigation: Same as Alternative 1.</p>
Air Quality and Climate Change	Impacts: No impacts.	<p>Impacts: Short-term minor localized impacts of vehicle and equipment exhausts.</p> <p>Mitigation: Minimization of idling engines and proper maintenance of engines.</p>	<p>Impacts: Same as Alternative 1.</p> <p>Mitigation: Same as Alternative 1.</p>
Visual Quality and Aesthetics	Impacts: No impacts.	<p>Impacts: Long-term negligible localized impacts of berm massing and height.</p> <p>Mitigation: N/A</p>	<p>Impacts: Long-term minor localized impacts of berm massing and height.</p> <p>Mitigation: N/A</p>

## Affected Environment, Potential Impacts, and Mitigation

Resource Area	No Action Alternative	Alternative 1: Proposed Action (Modified Prow)	Alternative 2
Surface Water	Impacts: No impacts.	<p>Impacts: Short-term and long-term negligible localized impacts of runoff to surface waters.</p> <p>Mitigation: BMPs to reduce sedimentation. Pavers on top of berm allowing for infiltration of stormwater.</p>	<p>Impacts: Short-term and long-term minor localized impacts of sedimentation and runoff to surface waters.</p> <p>Mitigation: Same as Alternative 1.</p>
Groundwater	Impacts: No impacts.	<p>Impacts: No impacts.</p> <p>Mitigation: N/A</p>	<p>Impacts: No impacts.</p> <p>Mitigation: N/A</p>
Wetlands	Impacts: No impacts.	<p>Impacts: Short-term negligible localized impacts on adjacent wetlands and long-term moderate localized impacts due to wetland loss.</p> <p>Mitigation: Purchase of wetland credits through a mitigation bank and BMPs to reduce erosion and sedimentation to adjacent wetlands.</p>	<p>Impacts: Same as Alternative 1, except some of the wetlands impacted likely would be classified as higher quality wetlands.</p> <p>Mitigation: Same as Alternative 1 although more credits may need to be purchased due to impacts on higher quality wetlands.</p>
Floodplains	Impacts: No impacts.	<p>Impacts: No impacts.</p> <p>Mitigation: N/A</p>	<p>Impacts: Short-term minor localized impacts of erosion and sedimentation on floodplain.</p> <p>Mitigation: BMPs to reduce erosion and sedimentation.</p>
Coastal Resources	Impacts: No impacts.	<p>Impacts: Long-term negligible localized impact.</p> <p>Mitigation: N/A</p>	<p>Impacts: Same as Alternative 1.</p> <p>Mitigation: N/A</p>

## Affected Environment, Potential Impacts, and Mitigation

Resource Area	No Action Alternative	Alternative 1: Proposed Action (Modified Prow)	Alternative 2
Vegetation	Impacts: No impacts.	<p>Impacts: Long-term negligible localized impacts of vegetation removal (grassy field).</p> <p>Mitigation: BMPs to protect adjacent vegetation. Native plants used for berm slope protection.</p>	<p>Impacts: Long-term minor localized impacts of vegetation removal, including tree clearing. Permanent loss of trees and shrubs.</p> <p>Mitigation: Same as Alternative 1.</p>
Wildlife	Impacts: No impacts.	<p>Impacts: Long-term negligible localized impacts of habitat alteration (grassy field).</p> <p>Mitigation: N/A</p>	<p>Impacts: Long-term minor localized impacts of habitat alteration, including tree/shrub clearing.</p> <p>Mitigation: Pre-construction nesting bird survey if vegetation removal, trimming, or other disturbance occurs during the migratory bird nesting season.</p>
Threatened and Endangered Species and Critical Habitat	Impacts: No impacts.	<p>Impacts: No impacts.</p> <p>Mitigation: N/A</p>	<p>Impacts: No impacts.</p> <p>Mitigation: N/A</p>
Cultural Resources	Impacts: No impacts.	<p>Impacts: No impacts.</p> <p>Mitigation: Draft monitoring plan. Work stoppage in the event that archaeological materials are discovered.</p>	<p>Impacts: Unknown visual impact on known historic structures and unknown impact on archaeological sites.</p> <p>Mitigation: Conduct archaeological survey before construction. Other measures same as Alternative 1.</p>

## Affected Environment, Potential Impacts, and Mitigation

Resource Area	No Action Alternative	Alternative 1: Proposed Action (Modified Prow)	Alternative 2
Environmental Justice	Impacts: Continued lack of a walking distance tsunami refuge for all groups, including environmental justice groups.	Impacts: Long-term benefit by providing all groups, including environmental justice groups, a walking distance tsunami refuge.  Mitigation: N/A	Impacts: Same as Alternative 1.  Mitigation: N/A
Land Use and Zoning	Impacts: No impacts.	Impacts: No impacts.  Mitigation: N/A	Impacts: No impacts.  Mitigation: N/A
Hazardous Materials	Impacts: No impacts.	Impacts: Short-term negligible localized impacts of leaks of oil, fuels, and lubricants from use of equipment.  Mitigation: Use of equipment in good working order and BMPs to clean up any spills.	Impacts: Same as Alternative 1.  Mitigation: Same as Alternative 1.
Noise	Impacts: No impacts.	Impacts: Short-term minor localized impacts of noise from operation of equipment.  Mitigation: Construction during the summer months when school is out. Use of equipment and machinery that meets applicable noise control regulations. Limit construction to hours allowed by the local noise code.	Impacts: Short-term minor impacts from operation of equipment could affect some activities in the park.  Mitigation: Use of equipment and machinery that meets applicable noise control regulations. Limit construction to hours allowed by the local noise code.

## Affected Environment, Potential Impacts, and Mitigation

Resource Area	No Action Alternative	Alternative 1: Proposed Action (Modified Prow)	Alternative 2
Traffic	Impacts: No impacts.	<p>Impacts: Short-term moderate localized impacts of traffic from construction vehicles and haul trucks.</p> <p>Mitigation: Notification of residences and businesses along the corridor of the truck route prior to the start of construction activities. Maintain access to adjacent facilities, including residential properties.</p>	<p>Impacts: Same as Alternative 1.</p> <p>Mitigation: Same as Alternative 1.</p>
Utilities	Impacts: No impacts.	<p>Impacts: Short-term minor localized impacts of water usage for irrigation to establish vegetation.</p> <p>Mitigation: N/A</p>	<p>Impacts: Same as Alternative 1.</p> <p>Mitigation: N/A</p>
Emergency Services	Impacts: Lack of a walking distance tsunami refuge will result in significant loss of life.	<p>Impacts: Long-term beneficial effect by providing safe haven to first responders who may find refuge and by reducing the loss of life and injuries they need to address following a tsunami.</p> <p>Mitigation: N/A</p>	<p>Impacts: Same as Alternative 1</p> <p>Mitigation: N/A</p>
Public Health and Safety	Impacts: Potential loss of life in the event of a major tsunami due to lack of a tsunami refuge close to the City's population center.	<p>Impacts: Long-term benefit by providing residents and visitors a tsunami refuge close to the City's population center; particularly beneficial to school population.</p> <p>Mitigation: N/A</p>	<p>Impacts: Same as Alternative 1 except that this location is further from the schools and would provide a lesser benefit to the school population.</p> <p>Mitigation: N/A</p>

## SECTION 5 Cumulative Impacts

This section addresses the potential cumulative impacts associated with implementation of the proposed project. Cumulative impacts are the impacts of a project when combined with the impacts of other past, present, or reasonable foreseeable future actions undertaken by any agency or person. Cumulative impacts can result from individually minor but collectively significant actions.

Based on a review of the City's recent and planned actions near the project area, including the City's six-year Capital Facilities Plan for 2017 through 2022 up for adoption in late November 2016, no significant cumulative impacts are foreseen from implementation of the project and other past, present, and future actions. Most of the potential impacts of the proposed action are associated with short-term, localized construction activities. While the City's Capital Facilities Plan identifies other public construction projects that could result in construction-related traffic on local road systems and air emissions, the timing of these projects is subject to the availability of funding. Therefore, it is unlikely that these projects would occur in the same time or place as the construction-related effects from the Proposed Action and cumulative impacts would not occur. There is a potential for cumulative impacts related to wetlands.

Due to the City's confined geography with the Pacific Ocean to the west and wetland areas to the east, the City has anticipated that there will be future projects impacting wetlands. The Long Beach Wetland Mitigation Bank was established to provide compensatory mitigation for unavoidable impacts to wetlands. The proposed action is within the service area of the mitigation bank and credits are available. In addition, there are no other known projects that could contribute to a cumulative impact on wetlands. Therefore, the proposed action would not contribute to significant cumulative impacts on this resource.

Temporary noise, traffic, and air quality impacts of the proposed action could combine with similar impacts of other projects occurring at the same time. However, there are currently no capital improvement projects underway or proposed by the City within the project area that in combination with the proposed project would cause significant cumulative effects related to noise, traffic, or air quality.

Climate change is by its nature a cumulative impact. Carbon dioxide emissions from the proposed action would make a very small, negligible and temporary contribution to climate change.

The proposed action would have a cumulative benefit on public health and safety. The berm would provide a refuge for approximately 850 people. Pacific County has implemented earthquake and tsunami preparedness activities such as developing informational brochures with evacuation maps, placement of evacuation signage along main roads, and installation of AHAB sirens on the Long Beach peninsula. When combined, these activities would result in a cumulative reduction in injuries and loss of life among people in the City.

## **SECTION 6 Agency Coordination, Public Involvement, and Permits**

This section provides a summary of the agency coordination efforts and public involvement process for the proposed City of Long Beach Tsunami Safe Haven Vertical Evacuation Project EA. In addition, an overview of the permits that would be required under the proposed action is included.

### **6.1 Agency Coordination**

As part of its project development and siting studies, the City completed early coordination with USACE and Ecology regarding project permit needs. **Appendix C** provides copies of all agency coordination and response letters for this EA. As noted in Section 4.5, Cultural Resources, the Confederated Tribes of the Chehalis Reservation and the Shoalwater Bay Indian Tribe were contacted regarding the potential for impacts on cultural resources. The finding of no effect on historic properties was received from DAHP on March 1, 2016. As noted in Section 4.3.4, Coastal Resources, the City submitted a Certification of Consistency with Washington's Coastal Zone Management Program to Ecology.

### **6.2 Public Participation**

As discussed in more detail in Section 1 Introduction and Section 3.1 Alternative Development of this EA, the City undertook a comprehensive, iterative, community-driven process to arrive at the proposed action. The process involved numerous public meetings and roundtables that began in January 2010, which included EMD, DNR, the University of Washington, and members of congress and staff. Numerous newspaper articles have also been written about earthquake risks in the area and the project. Recently, on June 20, 2016, at the advertised City Council meeting, the Council chose the modified prow design as the proposed action.

The draft EA will be released for public review and comment in the local community. A public notice will be published in the *Chinook Observer*, the local general circulation newspaper that covers the City. The draft EA will additionally be posted on both FEMA's and the City of Long Beach's websites. Hardcopies of the Draft EA will be available for public review at the Long Beach City Hall, PCEMA offices in South Bend, WA, and at the Ilwaco Timberland Public Library. A 30-day public comment period, extending from November 28 to December 30, 2016 will be provided. A public meeting will be scheduled during the comment period on December 8, 2016 and held at the City Hall. FEMA will consider and address all substantive public comments in the final EA as necessary and in coordination with the City. If no substantive comments are received, the draft EA will become final and a FONSI will be issued for the project.

### **6.3 Permits**

In addition to local permits, the City will be required to obtain a Clean Water Act Section 404 permit from the USACE prior to the start of construction for impacts on wetlands. If site work exceeds one acre, the City will also have to secure coverage under Ecology's Construction Stormwater General Permit.

## SECTION 7    References

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## SECTION 8 List of Preparers

The following is a list of preparers who contributed to the development of the City of Long Beach Tsunami Safe Haven Vertical Evacuation Project EA for FEMA. The individuals listed below had principal roles in the preparation of this document. Many others had significant roles and contributions as well, and their efforts were no less important to the development of this EA. These others include senior managers, administrative support personnel, and technical staff.

### CDM Smith

Preparers	Experience and Expertise	Role in Preparation
Dunn, Patrick	Environmental Planner	NEPA Documentation
Foster, Malena	GIS Specialist	GIS
Jones, Jennifer	Senior Environmental Scientist	Threatened and Endangered Species
Stenberg, Kate Ph.D.	Senior Biologist, Senior Planner	Project Manager, Technical Review

### Federal Emergency Management Agency

Reviewers	Role in Preparation
Kilner, Science	Technical Review and Approval

## **Appendices**

Appendix A Regional Figures

A.1 Low Income Populations in Pacific County

A.2 Minority Populations in Pacific County

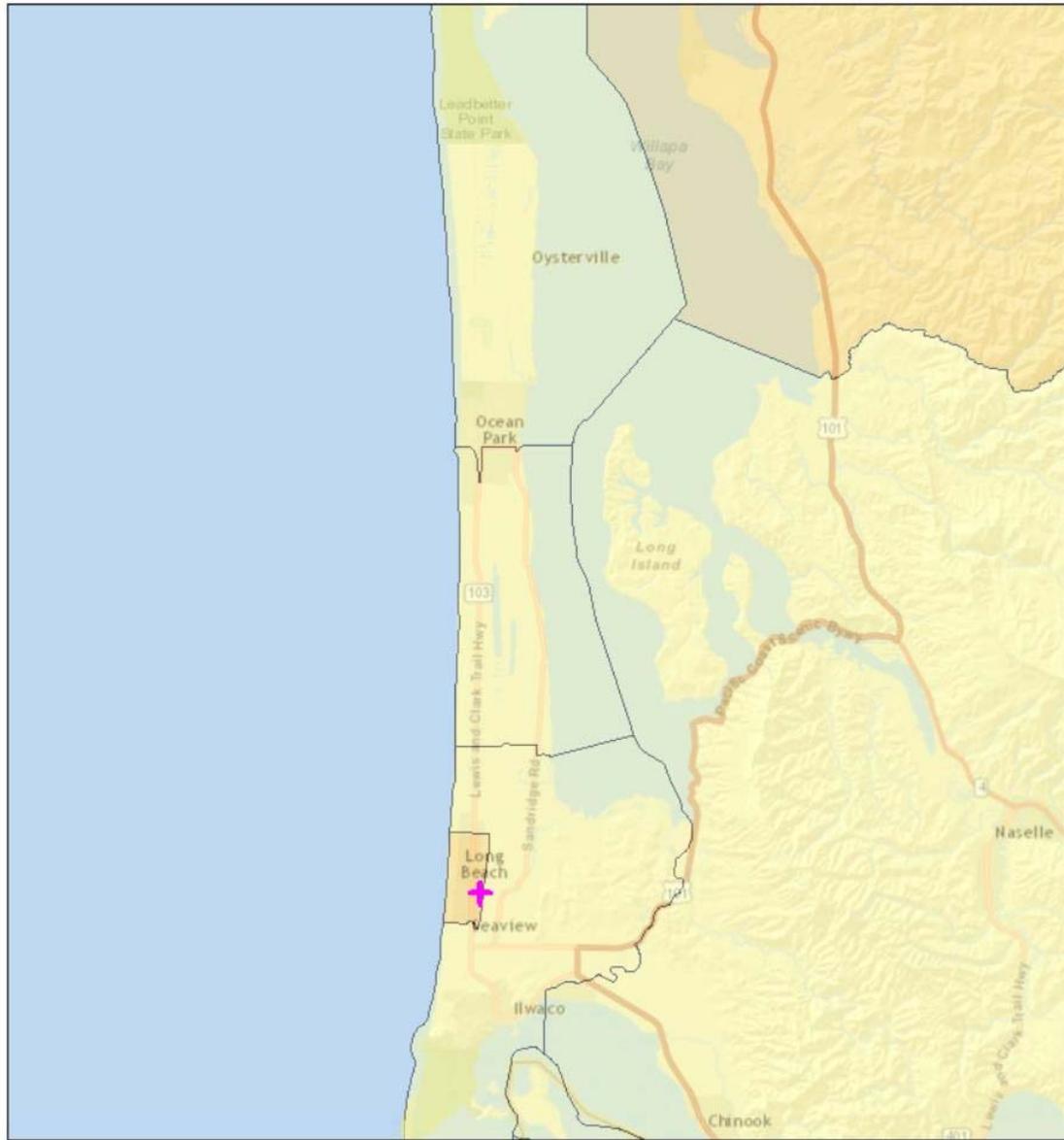
Appendix B Endangered Species Act No Effect Determination

Appendix C Agency Correspondence

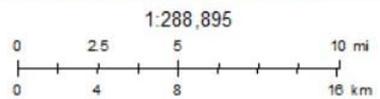
Appendix D Hazardous Materials Sites

## **Appendix A Regional Figures**

## Low-Income Populations - Long Beach Peninsula



October 6, 2016

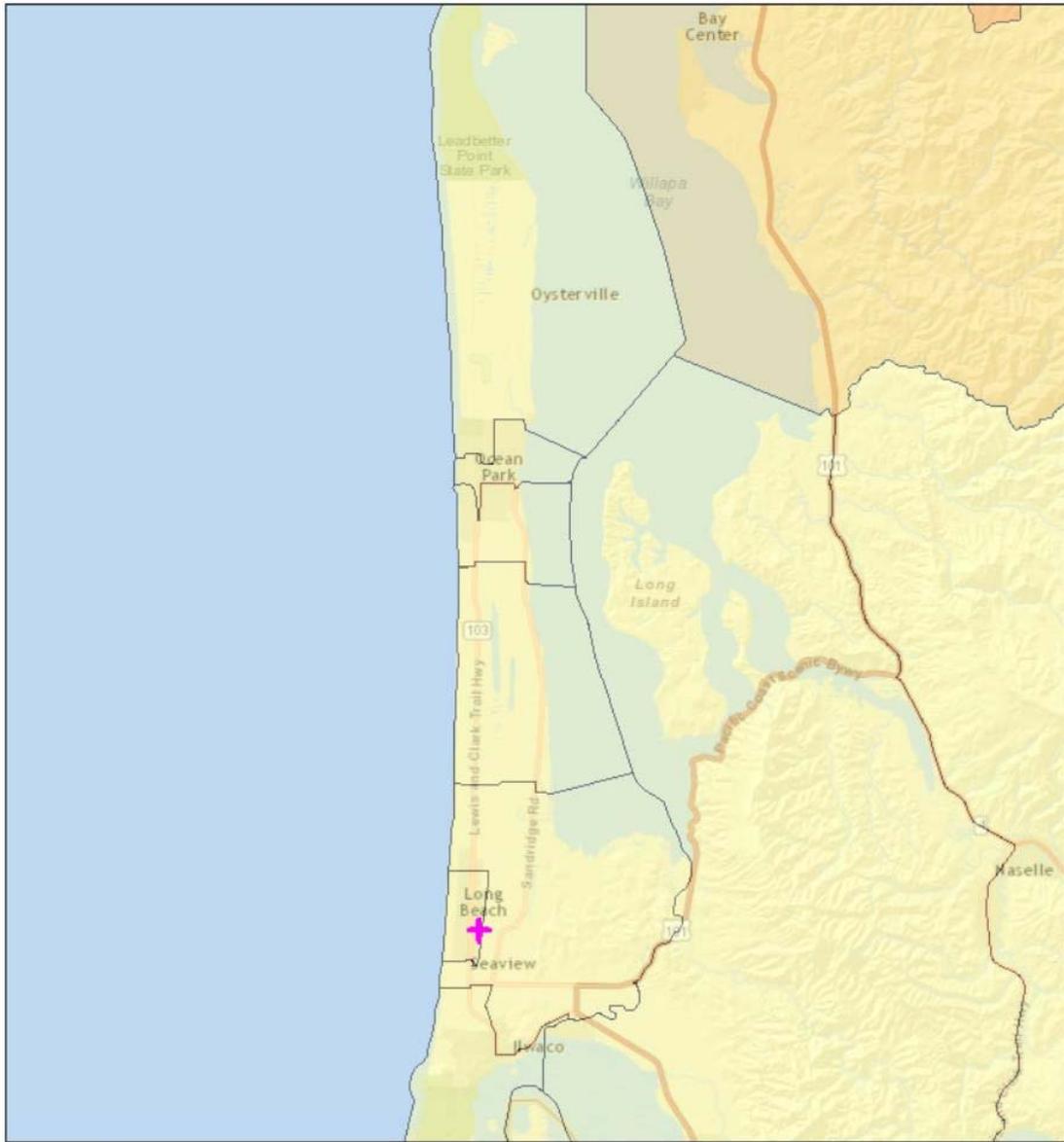


EPA  
 Sources: Esri, HERE, DeLorme, USGS, Intermap, Inorem P Corp.,  
 NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand),  
 MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

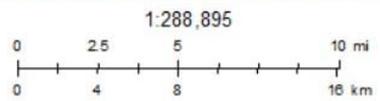
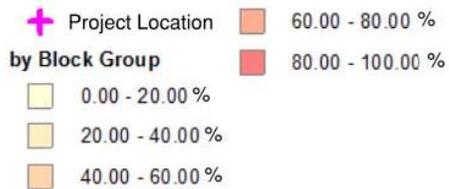
EJSCREEN 2016

**Figure A.1. Low-Income Populations in Pacific County**

## Minority Populations - Long Beach Peninsula



October 6, 2016



EPA  
 Sources: Esri, HERE, DeLorme, USGS, Intermap, Inrement P Corp.,  
 NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand),  
 MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

EJSCREEN 2016

**Figure A.2. Minority Populations in Pacific County**

**Appendix B    Endangered Species Act No Effect  
Determinations**

# **Tsunami Safe Haven Vertical Evacuation Project**

## **Determination of No Effect**

### **on Federally-Listed Species**

This memorandum describes the potential for federally listed species and designated critical habitat to occur and be adversely affected by the Tsunami Safe Haven Vertical Evacuation Project proposed for construction behind the Long Beach Elementary School at 400 Washington Avenue South, Long Beach, Washington.

A list of federally-status species with the potential to occur in the project vicinity is provided in the table below. The list is based on a search of the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) on-line database and species lists and maps from the National Marine Fisheries Service (NMFS) West Coast Region. There are no species proposed for listing under the Endangered Species Act in or near the project area.

The proposed project site consists of a mowed, maintained field of grass that does not support habitat for listed species. Construction of the proposed tsunami safe haven footprint would occur completely within the mowed field. Staging would occur within the mowed field, on a paved road, and/or within a playground area to the west of the project footprint as described in the Environmental Assessment. There are no trees, shrubs, or other vegetation within proposed construction or staging areas. A forested area is located adjacent to the project site to the north, east, and west. Trees and other vegetation within the forested area would not be removed or disturbed during construction.

An unnamed drainage ditch is located approximately 280 feet from the project site. This unnamed ditch has a low potential to provide some habitat for juvenile eulachon. The ditch is connected to the ocean and likely contains brackish water. It would be accessible to species that normally use estuary habitats; however, because of the lack of riparian cover along much of the ditch's length, its value as habitat would be low. Best Management Practices (BMPs) would be used to prevent erosion and sedimentation impacts on surface waters.

An effect determination for each listed species is provided in the table below and was based on the habitats present, as determined by visual observation of aerial and ground-level photography, a desktop review of available vegetation and/or habitat maps for the project vicinity, a site visit, land use, and information on the life histories and distribution of species identified in federal databases. Based on this review, there would be no effect on federally listed species from the project.

#### **Critical Habitat**

The attached figure shows the nearest designated critical habitat for federally listed species in the project vicinity. There is no designated critical habitat within the project construction area. Designated critical habitat for coho salmon is located approximately 2.5 miles southeast of the project site and would not be affected by construction as they are in different watersheds and there is no surface water connection between the project area and this designated habitat.

## **Essential Fish Habitat**

Essential Fish Habitat (EFH) for Pacific salmon, Pacific coast groundfish, and coastal pelagic species is designated in the Pacific Ocean near the project site. There would be no in-water work associated with the proposed project, and BMPs would be implemented to prevent erosion and sedimentation impacts on surface waters; therefore, there would be no effect on EFH.

## **Migratory Birds**

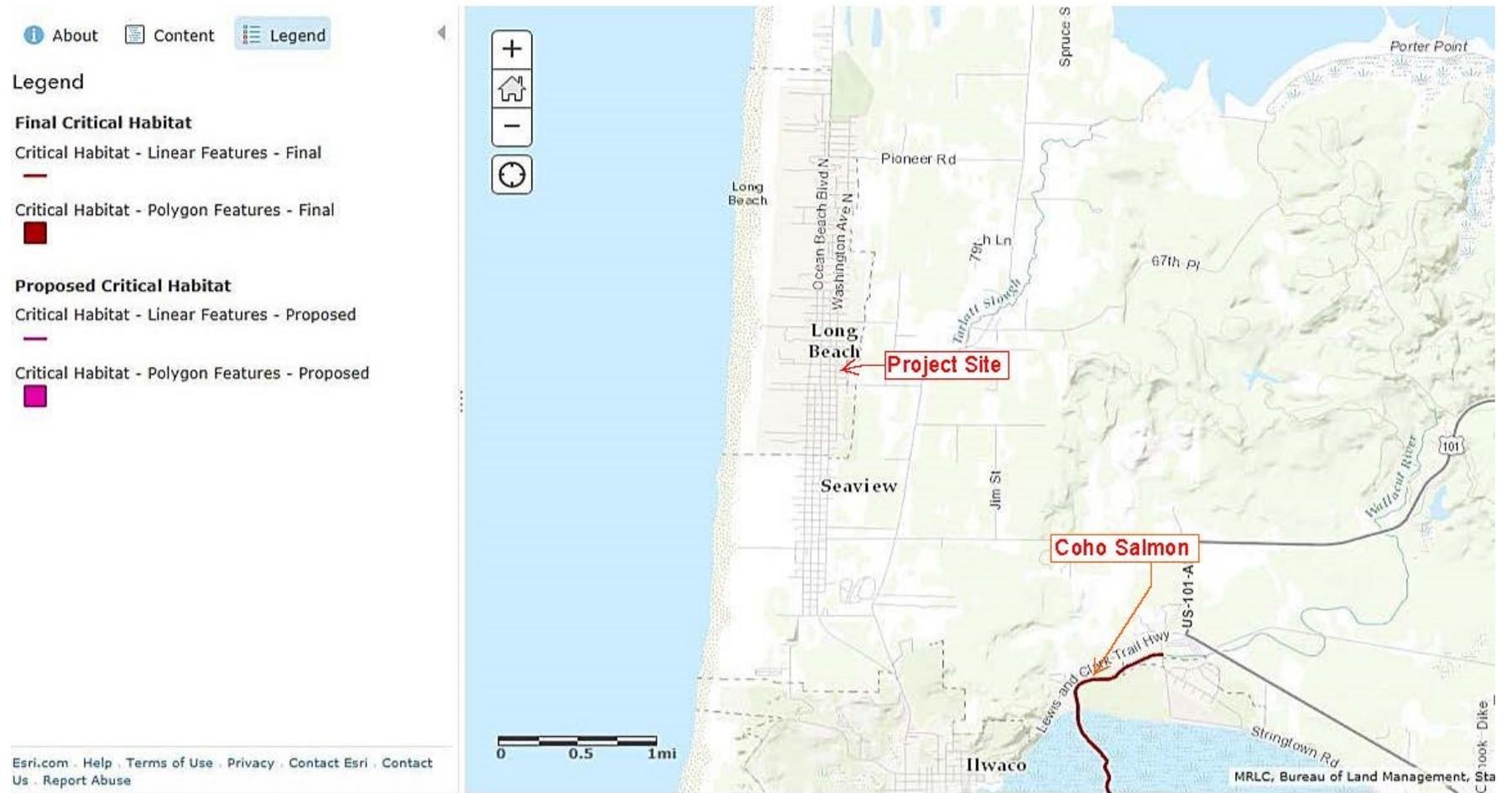
Although the project site is a grassy field it is surrounded on three sides by trees and shrub-scrub vegetation. Migratory birds may be present in this surrounding habitat. In compliance with the Migratory Bird Treaty Act (MBTA), measures must be taken to avoid disturbance of birds and active bird nests. If the project ultimately requires any vegetation removal, trimming, or other disturbance during the migratory bird nesting season (approximately February 15 to August 15), a pre-construction nesting bird survey of trees or other suitable nesting habitat should be conducted. If an active bird nest is found, construction should be delayed until the nest is no longer active, or other measures implemented in coordination with appropriate resource agencies.

## **Sensitive Habitats**

The project construction and staging areas are located within riverine and freshwater forested/shrub wetlands as mapped by the USFWS National Wetland Inventory. Based on the Washington State Department of Ecology wetland rating system, the mowed, maintained field is categorized as a Category IV depressional wetland. The forested area surrounding the field on three sides is categorized as a Category III freshwater scrub-shrub wetland. Category IV wetlands are heavily disturbed and have the lowest levels of wetland functions. There would be temporary and permanent impacts on these wetlands. Construction would not occur in the higher quality Category III freshwater scrub-shrub wetlands to the north, east, and south. However, erosion from the proposed site could cause sedimentation in these adjacent wetlands.

BMPs would be used to prevent erosion and sedimentation impacts, and construction areas would be restored to pre-construction conditions to the extent feasible. In addition, the City would purchase credits from the Long Beach Wetland Mitigation Bank to mitigate the wetland loss from construction within the Category IV wetland.

Figure 1: Designated Critical Habitat near the Study Area

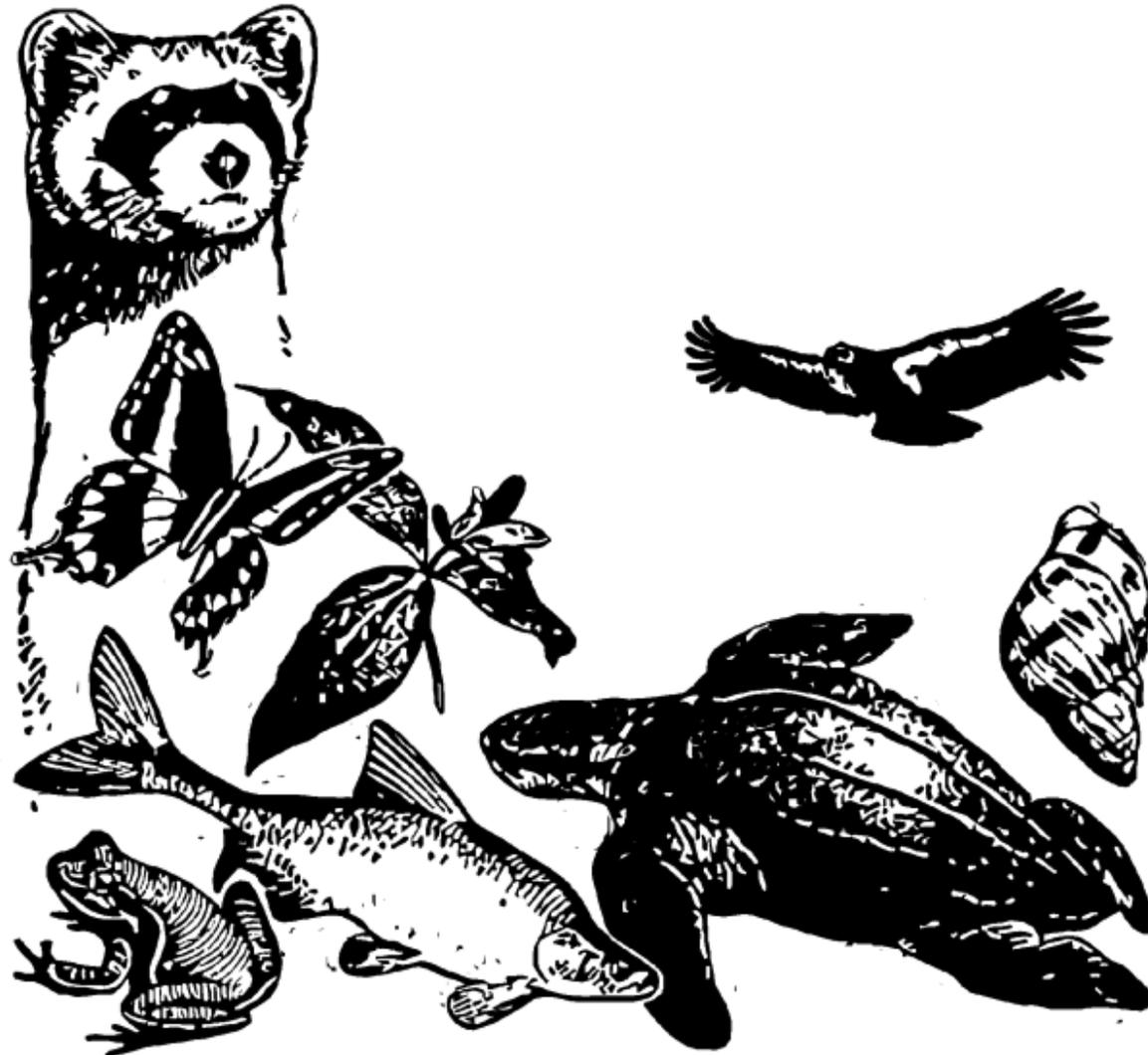


# Tsunami Safe Haven Vertical Evacuation

## *IPaC Trust Resources Report*

Generated September 28, 2016 01:46 PM MDT, IPaC v3.0.9

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



# Table of Contents

- IPaC Trust Resources Report ..... [1](#)
- Project Description ..... [1](#)
- Endangered Species ..... [2](#)
- Migratory Birds ..... [4](#)
- Refuges & Hatcheries ..... [6](#)
- Wetlands ..... [7](#)

U.S. Fish & Wildlife Service

# IPaC Trust Resources Report



NAME

Tsunami Safe Haven Vertical  
Evacuation

LOCATION

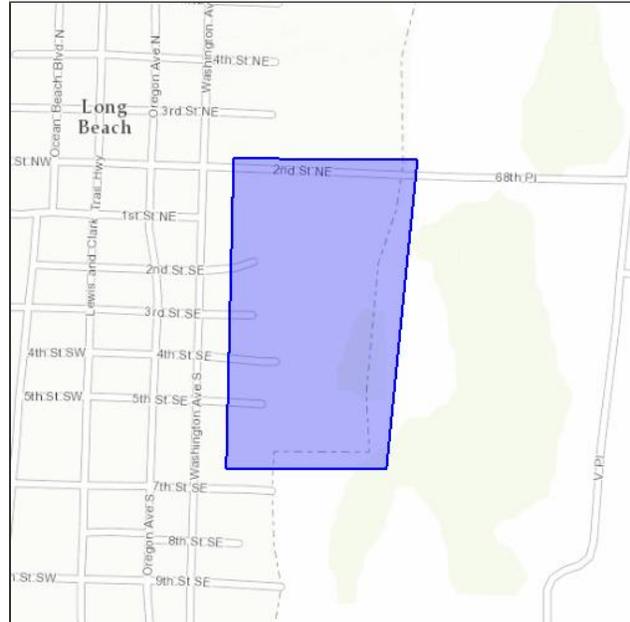
Pacific County, Washington

DESCRIPTION

Construction of a berm.

IPAC LINK

[https://ecos.fws.gov/ipac/project/  
MYF3H-PQPZJ-DDRKW-ZPUJR-GFY2RQ](https://ecos.fws.gov/ipac/project/MYF3H-PQPZJ-DDRKW-ZPUJR-GFY2RQ)



## U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

**Washington Fish And Wildlife Office**

510 Desmond Drive Se, Suite 102

Lacey, WA 98503-1263

(360) 753-9440

## Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the [Endangered Species Program](#) of the U.S. Fish & Wildlife Service.

**This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.**

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

[Section 7](#) of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

**A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.**

The list of species below are those that may occur or could potentially be affected by activities in this location:

### Birds

**Marbled Murrelet** *Brachyramphus marmoratus* Threatened

CRITICAL HABITAT

There is **final** critical habitat designated for this species.

[http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?sPCODE=B08C](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B08C)

**Streaked Horned Lark** *Eremophila alpestris strigata* Threatened

CRITICAL HABITAT

There is **final** critical habitat designated for this species.

[http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?sPCODE=B0B3](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0B3)

**Western Snowy Plover** *Charadrius alexandrinus nivosus* Threatened

CRITICAL HABITAT

There is **final** critical habitat designated for this species.

[http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?sPCODE=B07C](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B07C)

**Yellow-billed Cuckoo** *Coccyzus americanus* Threatened

CRITICAL HABITAT

There is **proposed** critical habitat designated for this species.

[http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?sPCODE=B06R](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B06R)

## Fishes

**Bull Trout** *Salvelinus confluentus*

Threatened

### CRITICAL HABITAT

There is **final** critical habitat designated for this species.

[http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?sPCODE=E065](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=E065)

## Critical Habitats

**There are no critical habitats in this location**

## Migratory Birds

Birds are protected by the [Migratory Bird Treaty Act](#) and the [Bald and Golden Eagle Protection Act](#).

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.<sup>[1]</sup> There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

---

1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern  
<http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Conservation measures for birds  
<http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Year-round bird occurrence data  
<http://www.birdscanada.org/birdmon/default/datasummaries.jsp>

The following species of migratory birds could potentially be affected by activities in this location:

<b>Bald Eagle</b> <i>Haliaeetus leucocephalus</i>	Bird of conservation concern
Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B008">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B008</a>	
<b>Black Oystercatcher</b> <i>Haematopus bachmani</i>	Bird of conservation concern
Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0KJ">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0KJ</a>	
<b>Caspian Tern</b> <i>Hydroprogne caspia</i>	Bird of conservation concern
Season: Breeding	
<b>Fox Sparrow</b> <i>Passerella iliaca</i>	Bird of conservation concern
Season: Wintering	
<b>Long-billed Curlew</b> <i>Numenius americanus</i>	Bird of conservation concern
Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B06S">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B06S</a>	

<b>Marbled Godwit</b> <i>Limosa fedoa</i>	Bird of conservation concern
Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JL">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JL</a>	
<b>Olive-sided Flycatcher</b> <i>Contopus cooperi</i>	Bird of conservation concern
Season: Breeding <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0AN">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0AN</a>	
<b>Peregrine Falcon</b> <i>Falco peregrinus</i>	Bird of conservation concern
Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU</a>	
<b>Purple Finch</b> <i>Carpodacus purpureus</i>	Bird of conservation concern
Season: Year-round	
<b>Rufous Hummingbird</b> <i>selasphorus rufus</i>	Bird of conservation concern
Season: Breeding <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0E1">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0E1</a>	
<b>Short-eared Owl</b> <i>Asio flammeus</i>	Bird of conservation concern
Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD</a>	
<b>Snowy Plover</b> <i>Charadrius alexandrinus</i>	Bird of conservation concern
Season: Breeding	
<b>Western Grebe</b> <i>aechmophorus occidentalis</i>	Bird of conservation concern
Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0EA">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0EA</a>	
<b>Willow Flycatcher</b> <i>Empidonax traillii</i>	Bird of conservation concern
Season: Breeding <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F6">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F6</a>	

## Wildlife refuges and fish hatcheries

**There are no refuges or fish hatcheries in this location**

# Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

## DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

## DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

## DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

This location overlaps all or part of the following wetlands:

## Freshwater Emergent Wetland

[PEM1C](#)

## Freshwater Forested/shrub Wetland

[PFO1C](#)

[PSS1C](#)

## Freshwater Pond

[PUBHx](#)

## Riverine

[R2UBFx](#)

[R4SBCx](#)

A full description for each wetland code can be found at the National Wetlands Inventory website: <http://107.20.228.18/decoders/wetlands.aspx>

## **Appendix C Agency Correspondence**



Allyson Brooks Ph.D., Director  
State Historic Preservation Officer

March 1, 2016

Mr. Mark Eberlein  
FEMA – Region X  
130 – 228th Street SW  
Bothell, Washington 98021-9796

Re: Safe Haven Program Project # 1: Vertical Evacuation Berm Project  
Log No: 112315-65-FEMA

Dear Mr. Eberlein:

Thank you for contacting our Department. We have reviewed the professional archaeological survey report you provided for the proposed City of Long Beach Safe Haven Program Project # 1: Vertical Evacuation Berm Project, Pacific County, Washington.

We concur with the determination of No Historic Properties Affected. Please provide the draft monitoring plan when available.

We would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4).

In the event that archaeological or historic materials are discovered during project activities, work in the immediate vicinity must stop, the area secured, and the concerned tribes and this department notified.

These comments are based on the information available at the time of this review and on the behalf of the State Historic Preservation Officer in conformance with Section 106 of the National Historic Preservation Act and its implementing regulations 36CFR800. Should additional information become available, our assessment may be revised. Thank you for the opportunity to comment and a copy of these comments should be included in subsequent environmental documents.

Sincerely,

Robert G. Whitlam, Ph.D.  
State Archaeologist  
(360) 890-2615  
email: [rob.whitlam@dahp.wa.gov](mailto:rob.whitlam@dahp.wa.gov)





**FEMA**

March 1, 2016

David Burnett  
Confederated Tribes of the Chehalis Reservation  
P.O. Box 536  
Oakville, WA 98568

Re: FEMA 4056 DR WA Hazard Mitigation Grant Program  
Safe Haven Program: Project #1 Vertical Evacuation Berm, City of Long Beach

Dear Chairman Burnett:

Please consider this follow up to consultation initiated with you on November 23, 2015 regarding the above undertaking. The proposed undertaking remains as previously described, as does the Area of Potential Effects (APE). The Federal Emergency Management Agency's (FEMA) sub-applicant, the City of Long Beach, sponsored a cultural resources evaluation of the APE. The enclosed report prepared by Transect Archaeology describes results from identification and evaluation efforts. The survey identified no historic properties that would be impacted by the proposed undertaking. Consultation has also been initiated with the WA Department of Archeology and Historic Preservation.

Based on identification and evaluation efforts and barring further information or comment from the Tribe or DAHP, FEMA has determined that the proposed undertaking will result in No Historic Properties Affected. Additionally to further protect historic properties, FEMA will condition its grant approval with archeological monitoring during site work consistent with the enclosed report's recommendations.

To assist your review please find attached a copy of the cultural resources report. We respectfully request any comment you have with this report or our findings. Should you have any questions please contact Ms. Science Kilner at (425) 487-4713 or [science.kilner@fema.dhs.gov](mailto:science.kilner@fema.dhs.gov). Thank you.

Sincerely,

  
Mark Eberlein  
Regional Environmental Office

Enclosure

## Dunn, Patrick

---

**From:** Earl Davis <edavis@shoalwaterbay-nsn.gov>  
**Sent:** Tuesday, November 24, 2015 3:44 PM  
**To:** Kilner, Science  
**Subject:** RE: FEMA DR4056 City of Long Beach Project

Good Afternoon Science,

In regards to the proposed Long Beach project please keep me updated when the Cultural resource survey is completed.  
Hiyu Masi (many thanks)  
Earl Davis

---

**From:** Kilner, Science [mailto:Science.Kilner@fema.dhs.gov]  
**Sent:** Monday, November 23, 2015 3:17 PM  
**To:** Earl Davis  
**Subject:** FEMA DR4056 City of Long Beach Project

Hello Mr. Davis – Let us know if you have any comments regarding the attached, our initial consultation for this project. Thank you.

*Science Kilner*

Deputy Regional Environmental Officer  
FEMA Region 10  
130 228th St SW  
Bothell, WA 98021-9796  
(425) 487-4713 ofc  
(425) 487-4613 fax  
(425) 686-5794 cell



**FEMA**

November 23, 2015

David Burnett  
Confederated Tribes of the Chehalis Reservation  
P.O. Box 536  
Oakville, WA 98568

Re: FEMA 4056 DR WA Hazard Mitigation Grant Program  
Safe Haven Program: Project #1 Vertical Evacuation Berm, City of Long Beach

Dear Chairman Burnett:

The U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) proposes to fund the City of Long Beach (City), through the Washington Emergency Management Division (EMD), for a tsunami mitigation project (Undertaking). This funding is available from FEMA's Hazard Mitigation Grant Program (HMGP) through the Presidentially-declared FEMA-4056-DR-WA disaster. The proposed Undertaking is being reviewed pursuant to Section 106 of the National Historic Preservation Act. Additionally, FEMA intends to prepare an Environmental Assessment for this project.

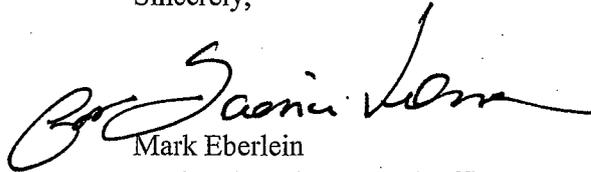
The Undertaking is located on and adjacent to the campus of Long Beach Elementary School, 400 Washington Avenue South, in Long Beach, Pacific County (Latitude 46.3487 North and Longitude -124.0506 West), as shown on the enclosed maps. The City proposes to help address the tsunami hazard risk by building an engineered vertical evacuation berm which will be about 32 feet above ground level, as depicted on the enclosed rendering. The Area of Potential Effects (APE) for the Undertaking is illustrated on the enclosed aerial and topographic maps. The APE consists of the area where the proposed evacuation structure is to be built, inclusive of site access improvements, staging, and a buffer to account for possible increases in size or movement of the structure footprint on the site.

An initial review of available cultural resources information from the Department Archaeology and Historic Preservation in and proximate to the APE, indicates there are no historic properties recorded. A cultural resources survey is planned to further identify and evaluate cultural resources that may be impacted by the proposed Undertaking. In the interim, we respectfully request comment or further information you may wish to share regarding historic properties in the project vicinity that are of religious or cultural interest to the Tribe. This information, subject to Tribe-requested dissemination restrictions, will be used to help inform further identification and evaluation efforts and to determine potential project effects. Once the survey and report are complete, we will provide you with a draft for review and comment.

David Burnett  
November 23, 2015  
Page two

Should you have any questions please contact Ms. Science Kilner at (425) 487-4713 or [science.kilner@fema.dhs.gov](mailto:science.kilner@fema.dhs.gov). Thank you.

Sincerely,

A handwritten signature in black ink, appearing to read "Mark Eberlein". The signature is fluid and cursive, with a large initial "M" and "E".

Mark Eberlein  
Regional Environmental Officer

Enclosures

Cc: Richard Bellon (via email)



**FEMA**

November 23, 2015

Doug Davis  
Shoalwater Bay Indian Tribe  
P.O. Box 130  
Tokeland, WA 98590

Re: FEMA 4056 DR WA Hazard Mitigation Grant Program  
Safe Haven Program: Project #1 Vertical Evacuation Berm, City of Long Beach

Dear Chairman Davis:

The U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) proposes to fund the City of Long Beach (City), through the Washington Emergency Management Division (EMD), for a tsunami mitigation project (Undertaking). This funding is available from FEMA's Hazard Mitigation Grant Program (HMGP) through the Presidentially-declared FEMA-4056-DR-WA disaster. The proposed Undertaking is being reviewed pursuant to Section 106 of the National Historic Preservation Act. Additionally, FEMA intends to prepare an Environmental Assessment for this project.

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Doug Davis  
November 23, 2015  
Page two

Should you have any questions please contact Ms. Science Kilner at (425) 487-4713 or [science.kilner@fema.dhs.gov](mailto:science.kilner@fema.dhs.gov). Thank you.

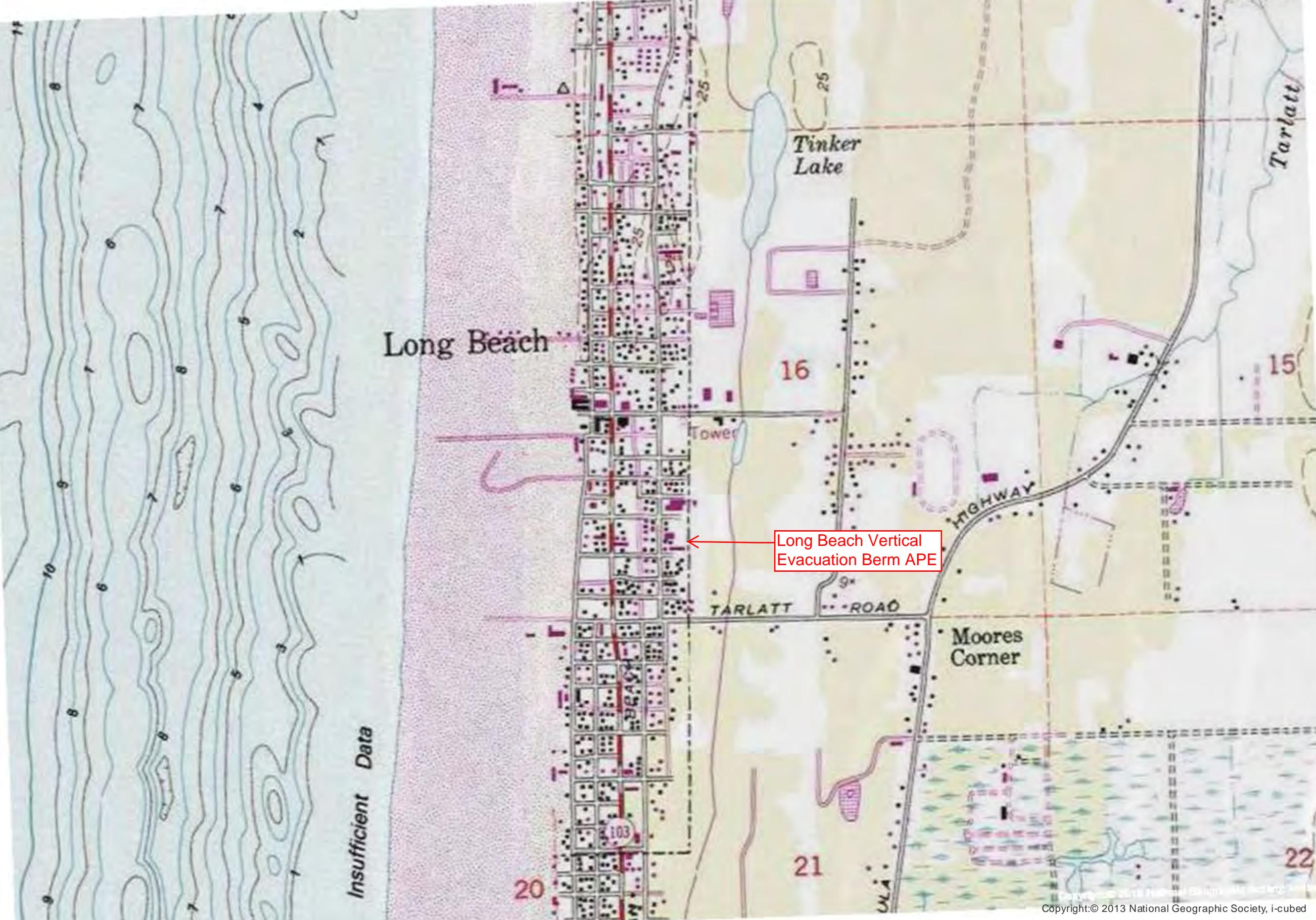
Sincerely,

A handwritten signature in black ink, appearing to read "Mark Eberlein", with a long horizontal flourish extending to the right.

Mark Eberlein  
Regional Environmental Officer

Enclosures

Cc: Earl Davis (via email)



Long Beach

Long Beach Vertical  
Evacuation Berm APE

Insufficient Data

Tinker  
Lake

Tarlatt

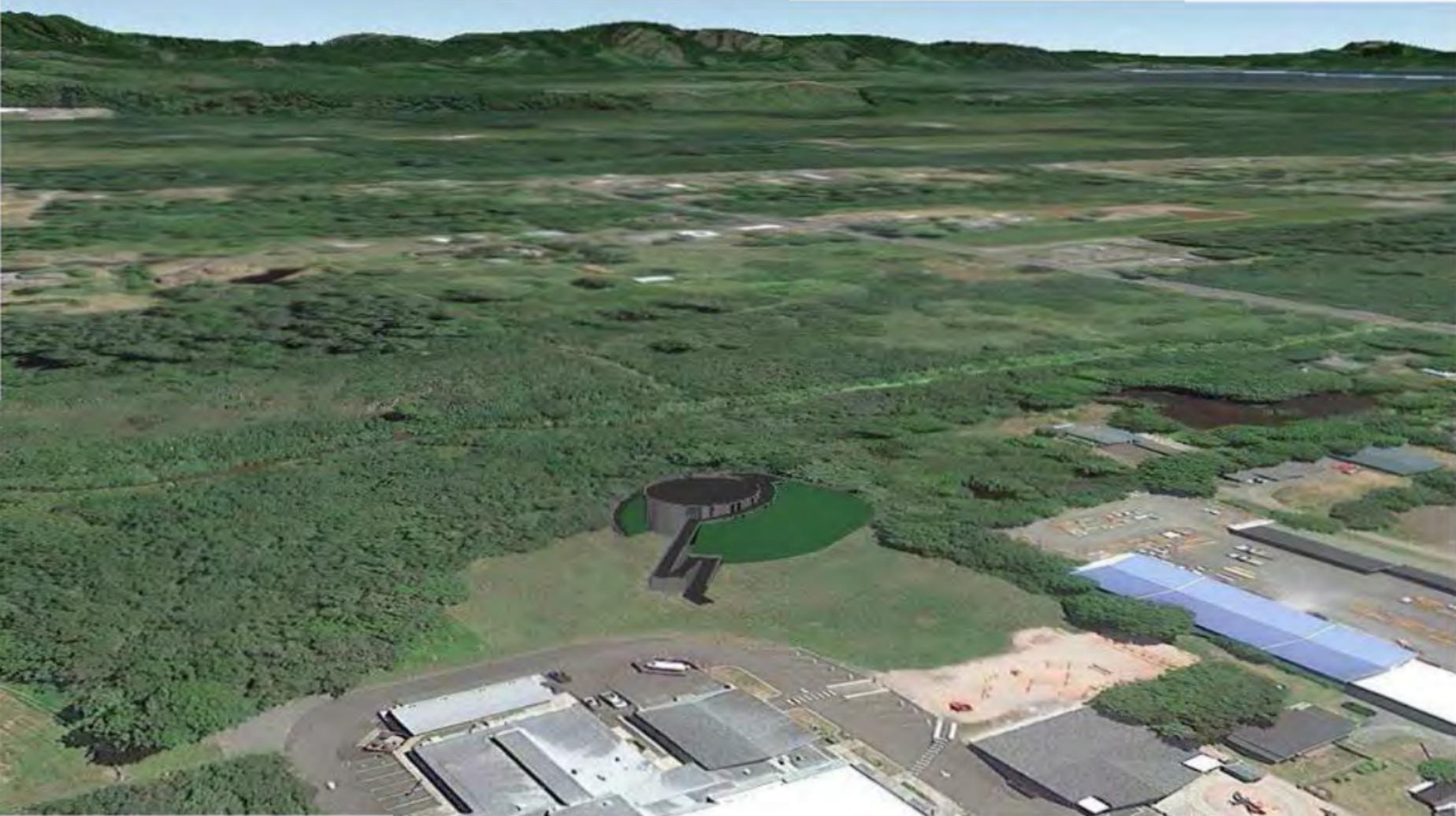
TARLATT  
ROAD

Moores  
Corner

HIGHWAY



**Berm at Long Beach Elementary School  
Preferred Site**



**CERTIFICATION OF CONSISTENCY WITH WASHINGTON'S  
COASTAL ZONE MANAGEMENT PROGRAM FOR  
FEDERALLY FUNDED ACTIVITIES**

Federal Application Number: HMGP-DR-4056-WA

Applicant: City of Long Beach, Washington

Project Description: Safe Haven Tsunami Vertical Evacuation, Long Beach Elementary School

(attach site plans, location (county/city), and proximity to waterbody (name)).

This action under CZMA§307(c)(3) is for a project, which will take place within Washington's coastal zone, or which will affect a land use, water use, or natural resource of the coastal zone. *(The coastal zone includes Clallam, Grays Harbor, Island, Jefferson, King, Kitsap, Mason, Pacific, Pierce, San Juan, Skagit, Snohomish, Thurston, Wahkiakum and Whatcom counties.)*

The project complies with the following enforceable policies of the Coastal Zone Management Program:  
(Check the box describing the current status of each policy)

Enforceable Policies	State requirements have been met			Additional info must be obtained prior to release of funds	
	Does not require a certification or permit	Has received an exemption	Has a valid permit or certification	Has applied for a permit or certification	Will apply as appropriate for a permit or certification
1. Shoreline Management Act **	X				
2. State Water Quality Requirements:				X	
a. Water Quality					
b. Stormwater				X	
3. State Air Quality Requirements	X				
4. State Environmental Policy Act: Project is exempt from SEPA Project will comply with SEPA SEPA checklist submitted SEPA decision issued/adopted NEPA decision adopted by	SEPA Lead Agency is: <u>City of Long Beach</u> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> date <u>October 15, 2016</u> <input type="checkbox"/> DNS <input checked="" type="checkbox"/> MDNS <input type="checkbox"/> EIS <input type="checkbox"/> Other _____ date _____ <input type="checkbox"/> SEPA # _____ date _____				

**\*\*Public Notice must be provided if the project is within the water or within 200 feet of a Shoreline Management Act water body?**

Public Notice is required for the proposed project? No X Yes \_\_\_\_\_ (identify method below)

notice mailed to interested parties using \_\_\_\_\_ mailing list on \_\_\_\_\_ (date)

publication in \_\_\_\_\_ (newspaper) on \_\_\_\_\_ (dates)

other \_\_\_\_\_ (dates) If public notice is required and you have not provided it, CZM staff will publish the notice. You must not initiate the project until you have been notified by CZM.

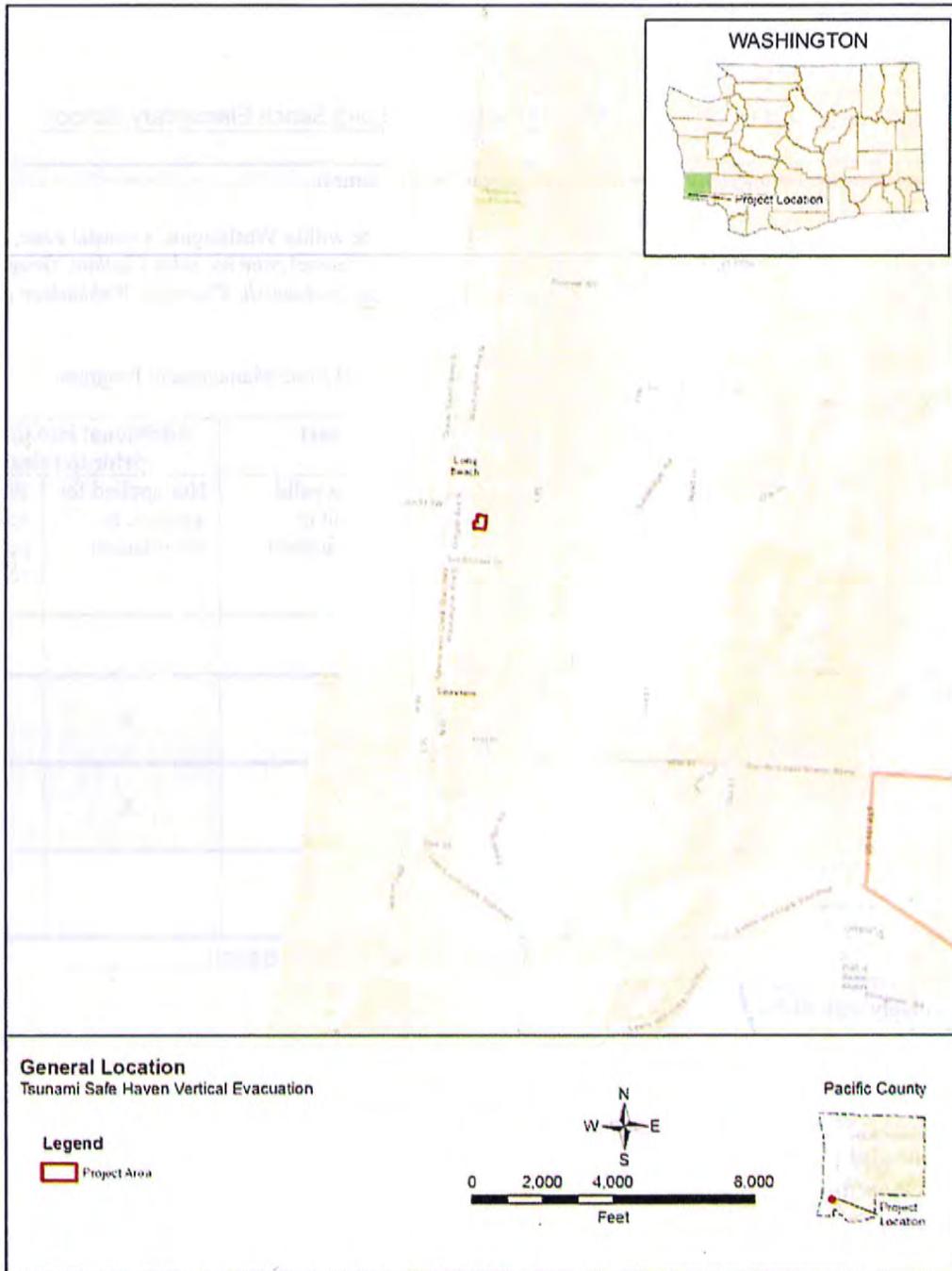
*Therefore, I certify that prior to initiating the project I will obtain applicable permits and certifications as described above and the project will be conducted in a manner consistent with the Coastal Zone Management Program.*

(Signature)  Date 10/16/2016  
(Recipient)

HUD or its designated Responsible Entity concludes this action will not effect coastal resources.

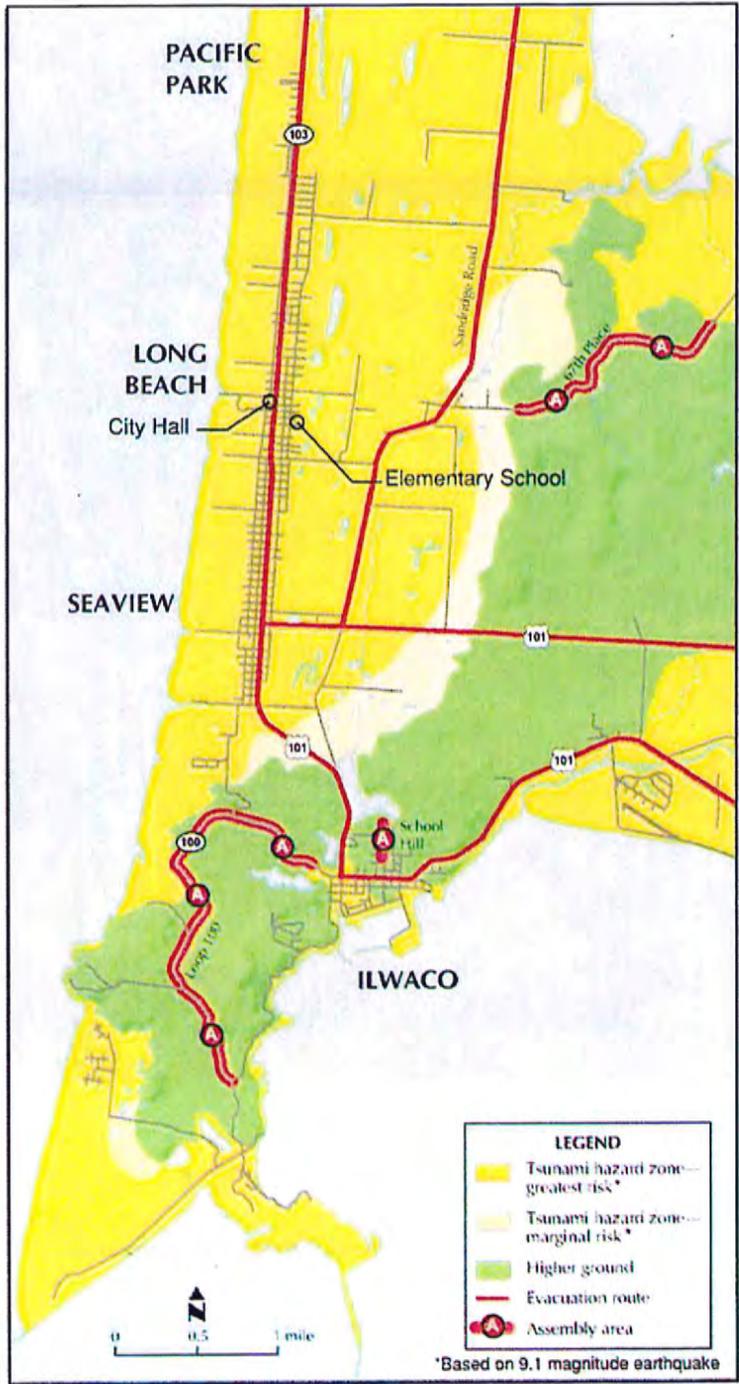
**Funds will not be released until all State Agency requirements have been met.**

(Signature) \_\_\_\_\_ Date \_\_\_\_\_



**Figure 1: Proposed Project Location**

(Source: Camp Dresser McKee (CDM) Smith, 2016)



**Figure 2: Tsunami Inundation**

(Source: Washington State Department of Natural Resources, undated)



Source Data: 10A P 2015

**Figure 3: Proposed Project Site**

(Source: CDM Smith, 2016)

## **Appendix D Hazardous Materials Sites**



Related Topics: Envirofacts

FRS

# FRS Facility Detail Report

## LONG BEACH STP

EPA Registry Id: 110009764807  
313 6TH ST NE  
LONG BEACH, WA 98631



**Facility Registry Service Links:**

- Facility Registry Service (FRS) Overview
- FRS Facility Query
- FRS Organization Query
- EZ Query
- FRS Physical Data Model
- FRS Geospatial Model

### Environmental Interests

Information System	System Facility Name	Information System Id/Report Link	Environmental Interest Type	Data Source	Last Updated Date	Supplemental Environmental Interests:
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (ICIS-NPDES)	LONG BEACH STP	WA0022489	ICIS-NPDES NON-MAJOR	ICIS		ICIS-ENFORCEMENT/COMPLIANCE ACTIVITY
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (ICIS-NPDES)	LONG BEACH STP	WA0022489	NPDES PRETREATMENT PROGRAM	ICIS		ICIS-ENFORCEMENT/COMPLIANCE ACTIVITY
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (ICIS-NPDES)	LONG BEACH STP	WA0022489	POTW	ICIS		ICIS-ENFORCEMENT/COMPLIANCE ACTIVITY
WASHINGTON - FACILITY / SITE IDENTIFICATION SYSTEM	LONG BEACH STP	4400404 <a href="#">[EXIT Disclaimer]</a>	STATE MASTER	WA-FSIS		WATQUAL-WA0022489 NPDES PERMIT W2R-FORMAL ENFORCEMENT ACTION W2R-BIOSOLIDS SWFAP-FORMAL ENFORCEMENT ACTION WATQUAL-WA0022489 NPDES NON-MAJOR

Additional EPA Reports: [MyEnvironment](#) [Enforcement and Compliance](#) [Site Demographics](#) [Facility Coordinates Viewer](#) [Environmental Justice Map Viewer](#) [Watershed Report](#)

#### Standard Industrial Classification Codes (SIC)

Data Source	SIC Code	Description	Primary
WA-FSIS	4952	SEWERAGE SYSTEMS	

#### Facility Codes and Flags

EPA Region:	10
Duns Number:	
Congressional District Number:	03
Legislative District Number:	19
HUC Code/Watershed:	17100106 / WILLAPA BAY
US Mexico Border Indicator:	
Federal Facility:	NO
Tribal Land:	NO

#### Alternative Names

Alternative Name	Source of Data
LONG BEACH STP FAC	CWNS
LONG BEACH WATER AND SEWER	MANUAL ENTRY
LONG BEACH, CITY OF	NPDES PERMIT

#### Organizations

No Organizations returned.

#### National Industry Classification System Codes (NAICS)

No NAICS Codes returned.

#### Facility Mailing Addresses

Affiliation Type	Delivery Point	City Name	State	Postal Code	Information System
MAILING ADDRESS	313 6TH ST N	LONG BEACH	WA	98631	WA-FSIS
MAILING ADDRESS	313 6TH ST NE	LONG BEACH	WA	98631	WA-FSIS

#### Contacts

No Contacts returned.

Query executed on: OCT-03-2016

Last updated on September 24, 2015



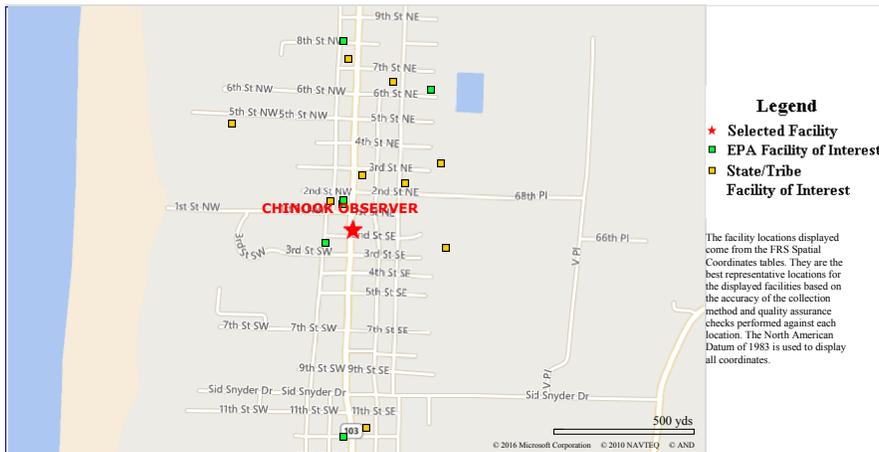
Related Topics: Envirofacts

FRS

# FRS Facility Detail Report

## CHINOOK OBSERVER

EPA Registry Id: 110005314588  
 3 S OREGON ST  
 LONG BEACH, WA 98631



**Facility Registry Service Links:**

- Facility Registry Service (FRS) Overview
- FRS Facility Query
- FRS Organization Query
- EZ Query
- FRS Physical Data Model
- FRS Geospatial Model

### Environmental Interests

Information System	System Facility Name	Information System Id/Report Link	Environmental Interest Type	Data Source	Last Updated Date	Supplemental Environmental Interests:
RESOURCE CONSERVATION AND RECOVERY ACT INFORMATION SYSTEM	CHINOOK OBSERVER	WAD009286303	UNSPECIFIED UNIVERSE (N)	RCRAINFO	02/16/2012	

**Additional EPA Reports:** MyEnvironment Enforcement and Compliance Site Demographics Facility Coordinates Viewer Environmental Justice Map Viewer Watershed Report

#### Standard Industrial Classification Codes (SIC)

No SIC Codes returned.

#### Facility Codes and Flags

EPA Region:	10
Duns Number:	
Congressional District Number:	03
Legislative District Number:	WA
HUC Code/Watershed:	17100106 / WILLAPA BAY
US Mexico Border Indicator:	
Federal Facility:	NO
Tribal Land:	NO

#### Alternative Names

No Alternative Names returned.

#### Organizations

Affiliation Type	Name	DUNS Number	Information System	Mailing Address
OWNER	CHINOOK OBSERVE C		RCRAINFO	View

#### National Industry Classification System Codes (NAICS)

Data Source	NAICS Code	Description	Primary
RCRAINFO	51111	NEWSPAPER PUBLISHERS	

#### Facility Mailing Addresses

Affiliation Type	Delivery Point	City Name	State	Postal Code	Information System
OWNER	3 S OREGON ST	LONG BEACH	WA	98631-0000	RCRAINFO
REGULATORY CONTACT	PO BOX 427	LONG BEACH	WA	98631-0427	RCRAINFO

#### Contacts

Affiliation Type	Full Name	Office Phone	Information System	Mailing Address
REGULATORY CONTACT	CHINOOK OBSERVE CHINOOK OBSERVE	(000)000-0000	RCRAINFO	View

Query executed on: OCT-03-2016

Last updated on September 24, 2015



Related Topics: Envirofacts

FRS

# FRS Facility Detail Report

## WA DA PACIFIC 1

EPA Registry Id: 110008220558  
 WOODGATE RD E OF HWY 103 & 2ND  
 LONG BEACH, WA 98631



**Facility Registry Service Links:**

- Facility Registry Service (FRS) Overview
- FRS Facility Query
- FRS Organization Query
- EZ Query
- FRS Physical Data Model
- FRS Geospatial Model

### Environmental Interests

Information System	System Facility Name	Information System Id/Report Link	Environmental Interest Type	Data Source	Last Updated Date	Supplemental Environmental Interests:
RESOURCE CONSERVATION AND RECOVERY ACT INFORMATION SYSTEM	WA DA PACIFIC 1	WAD988466637	UNSPECIFIED UNIVERSE (N)	RCRAINFO	02/16/2012	

**Additional EPA Reports:** MyEnvironment Enforcement and Compliance Site Demographics Facility Coordinates Viewer Environmental Justice Map Viewer Watershed Report

#### Standard Industrial Classification Codes (SIC)

No SIC Codes returned.

#### Facility Codes and Flags

EPA Region:	10
Duns Number:	
Congressional District Number:	03
Legislative District Number:	WA
HUC Code/Watershed:	17100106 / WILLAPA BAY
US Mexico Border Indicator:	
Federal Facility:	NO
Tribal Land:	NO

#### Alternative Names

No Alternative Names returned.

#### Organizations

Affiliation Type	Name	DUNS Number	Information System	Mailing Address
OWNER	WA DA W		RCRAINFO	View

#### National Industry Classification System Codes (NAICS)

Data Source	NAICS Code	Description	Primary
RCRAINFO	92119	OTHER GENERAL GOVERNMENT SUPPORT	

#### Facility Mailing Addresses

Affiliation Type	Delivery Point	City Name	State	Postal Code	Information System
REGULATORY CONTACT	PO BOX 42589	OLYMPIA	WA	98504-2589	RCRAINFO
OWNER	PO BOX 42589	OLYMPIA	WA	98504	RCRAINFO

#### Contacts

Affiliation Type	Full Name	Office Phone	Information System	Mailing Address
REGULATORY CONTACT	WA DA WA DA	(000)000-0000	RCRAINFO	View

Query executed on: OCT-03-2016

Last updated on September 24, 2015



Related Topics: Envirofacts

FRS

# FRS Facility Detail Report

## PICTURE ATTIC

EPA Registry Id: 110005399700  
711 PACIFIC N  
LONG BEACH, WA 98631



**Facility Registry Service Links:**

- Facility Registry Service (FRS) Overview
- FRS Facility Query
- FRS Organization Query
- EZ Query
- FRS Physical Data Model
- FRS Geospatial Model

### Environmental Interests

Information System	System Facility Name	Information System Id/Report Link	Environmental Interest Type	Data Source	Last Updated Date	Supplemental Environmental Interests:
WASHINGTON - FACILITY / SITE IDENTIFICATION SYSTEM	PICTURE ATTIC	95376677	STATE MASTER	WA-FSIS		HAZWASTE-WAR00002030
BIENNIAL REPORTERS	PICTURE ATTIC	<a href="#">EXIT Disclaimer</a>	HAZARDOUS WASTE BIENNIAL REPORTER	RCRAINFO	12/31/2005	SOQ
RESOURCE CONSERVATION AND RECOVERY ACT INFORMATION SYSTEM	PICTURE ATTIC	WAR00002030	UNSPECIFIED UNIVERSE (N)	RCRAINFO	02/16/2012	

Additional EPA Reports: MyEnvironment Enforcement and Compliance Site Demographics Facility Coordinates Viewer Environmental Justice Map Viewer Watershed Report

#### Standard Industrial Classification Codes (SIC)

Data Source	SIC Code	Description	Primary
WA-FSIS	7384	PHOTOFINISHING LABORATORIES	

#### Facility Codes and Flags

EPA Region:	10
Duns Number:	
Congressional District Number:	03
Legislative District Number:	WA
HUC Code/Watershed:	17100106 / WILLAPA BAY
US Mexico Border Indicator:	NO
Tribal Land:	NO

#### Alternative Names

No Alternative Names returned.

#### Organizations

Affiliation Type	Name	DUNS Number	Information System	Mailing Address
OPERATOR	BILL N		RCRAINFO	View
OWNER	BILL N		RCRAINFO	View

#### National Industry Classification System Codes (NAICS)

Data Source	NAICS Code	Description	Primary
RCRAINFO	812922	ONE-HOUR PHOTOFINISHING	
WA-FSIS	812922	ONE-HOUR PHOTOFINISHING	

#### Facility Mailing Addresses

Affiliation Type	Delivery Point	City Name	State	Postal Code	Information System
OWNER	PO BOX 959	LONG BEACH	WA	98631-0959	RCRAINFO
MAILING ADDRESS	711 PACIFIC N	LONG BEACH	WA	98631	WA-FSIS
OPERATOR	PO BOX 959	LONG BEACH	WA	98631-0959	RCRAINFO
REGULATORY CONTACT	PO BOX 959	LONG BEACH	WA	98631-0959	RCRAINFO

#### Contacts

Affiliation Type	Full Name	Office Phone	Information System	Mailing Address
REGULATORY CONTACT	PICTURE ATTIC PICTURE ATTIC	(000)000-0000	RCRAINFO	View

Query executed on: OCT-03-2016

Last updated on September 24, 2015