3. EXISTING CONDITIONS

In order to evaluate project-related hazardous materials impacts, analysts first evaluated characteristics of the natural and built environment in the vicinity of the project area. For purposes of this report, the project area is the footprint of all four project alternatives, taken together. Analysts then identified sensitive receptors, the areas that typically contain populations that could be particularly sensitive to hazardous materials released by project-related activities occurring within the project area. Next, analysts defined the area to be studied for this report. This area, called the study area, is the area within which hazardous materials, if released, might affect the project area. Finally, analysts evaluated the study area for properties that could be contaminated with hazardous materials in such a way that they could affect the project area. Such properties are termed hazardous materials sites.

Figure 7 shows significant characteristics of the natural and built environment, the project area, hazardous materials sensitive receptors, and the hazardous materials study area.

3.1 Characteristics of the Natural and Built Environment

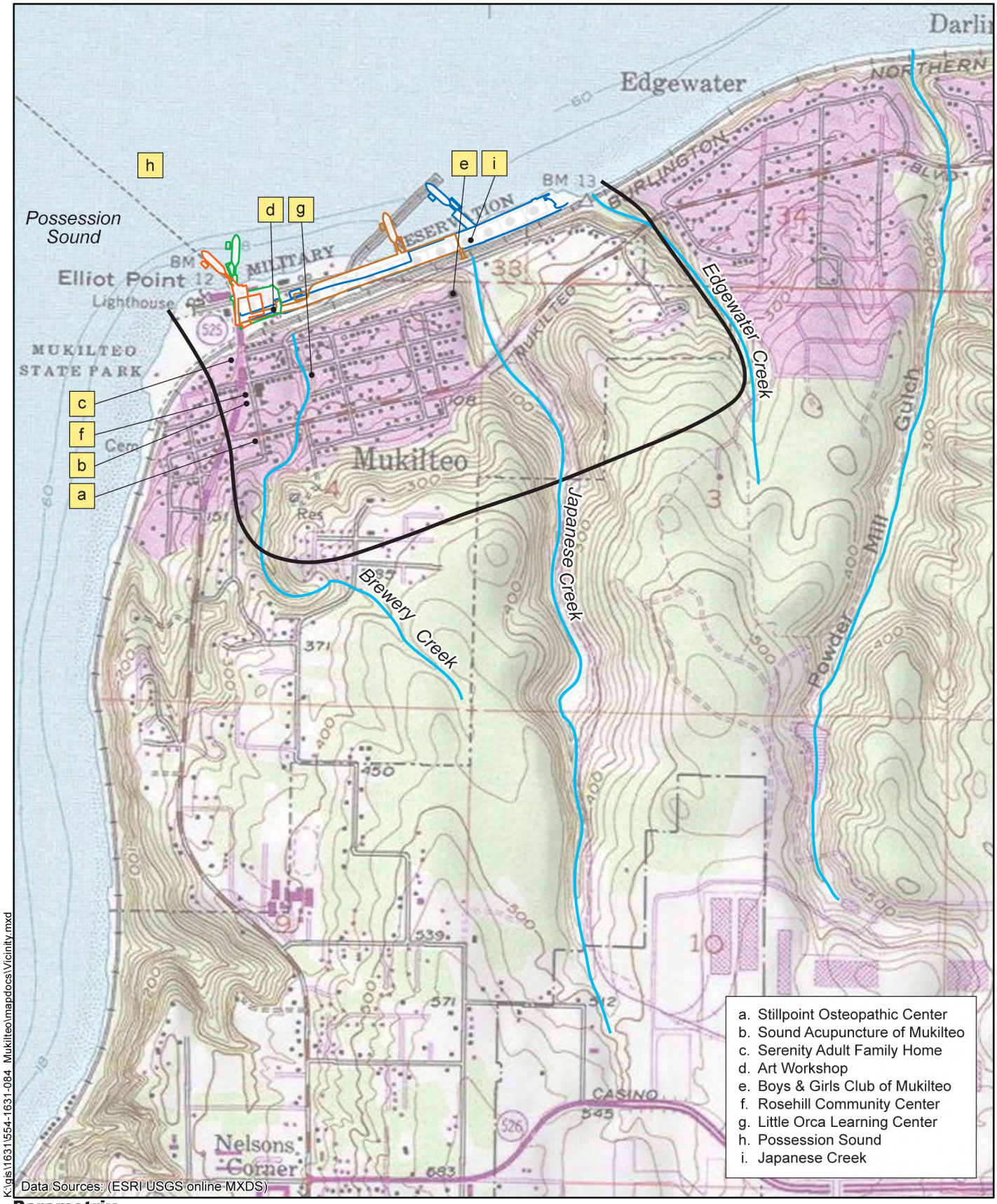
Analysts evaluated the following characteristics of the natural and built environment in the vicinity of the project area: topography, drainage pathways, waterbodies, geology, groundwater characteristics, and land uses. Each of these characteristics is described below.

3.1.1 Topography

The project area is located at the northern, shoreline edge of an east-west oriented toe of land that slopes generally northward into Possession Sound. This land lies just north and at the base of a northwest facing escarpment that rises about 250 feet to a plateau. The escarpment and plateau are known as the Intercity Plateau 2. The top edge of the escarpment is approximately 380 feet above mean sea level (USGS 1978; EDR 2011).

3.1.2 Drainage Pathways

Drainage in the vicinity of the project area is largely provided by several ravines and creeks. Two south-to-north trending ravines exist in the project area vicinity. Both ravines are several miles long and drain to the north into Possession Sound.



Data Sources: (ESRI USGS online MXDS)

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Parametrix 554-1631-088/01(4A) 5/11 (B)

- No Build
- Existing Site Improvements
- Elliot Point 1
- Elliot Point 2
- Study Area
- a Sensitive Receptor

N

0 1,500 Feet

Figure 7
Environmental Characteristics, Project Area, Sensitive Receptors, and Study Area

One ravine, Japanese Gulch, extends to the southern side of the BNSF Railway corridor opposite the Tank 7 containment area, an area located near the eastern end of the Mukilteo Tank Farm. At that point, Japanese Creek enters a culvert that runs beneath the railway corridor and apparently also beneath the Tank 7 containment area. Coho salmon, a species of concern under the Endangered Species Act (ESA), has been documented to use the lower reach of Japanese Creek. The other ravine, Powder Mill Gulch, drains into Possession Sound more than a mile east of the project area. Two roughly south-to-north trending creeks are also located in the project area vicinity and drain north into Possession Sound. One of the creeks, Brewery Creek, is located west of Japanese Gulch. Close to the south of the project area Brewery Creek is a ditch. The creek then enters a storm drain line that underlies the western boundary of the Mukilteo Tank Farm and eventually drains into Possession Sound. The other creek, Edgewater Creek, located between Japanese Gulch and Powder Mill Gulch, enters Possession Sound east of the project area (Herrera 2003; Ritchotte and Hagedorn 2011).

3.1.3 Waterbodies

The only waterbody in the vicinity of the project area is Possession Sound, the portion of the Puget Sound that separates Island County (Whidbey Island) from the central Puget Sound mainland.

3.1.4 Geology

In the vicinity of the Mukilteo Tank Farm, the project area consists of 8 to 15 feet of well-drained fill material overlying Holocene beach deposits. The fill material consists of unconsolidated, poorly to moderately well-graded sand and gravel. The source of the fill is unknown. The Holocene beach sediments are exposed at low tide on tidal flats and intertidal beaches along the northern edge of the property. Underlying the fill and beach sediments are Pleistocene glacial drift deposits. The contact between the beach deposits and the glacial drift has been estimated to be 20 to 45 feet below grade near the south edge of the property and to 80 feet below grade closer to the shoreline (Herrera 2006; Ecology and Environment 2010).

An escarpment is located south of the project area. It consists of cross-bedded sands of the Whidbey Formation overlain by Vashon glacial drift. The Whidbey Formation (pre-Fraser glaciation) consists of nonglacial river floodplain deposits. These nonglacial deposits are described as 2- to 4-foot-thick beds of sand, silt, and clay. The upper part of the Whidbey Formation consists of compacted cross-bedded sands with localized peat beds or organic-rich sand layers, with clay beds present in the lower part. The overall thickness of the Whidbey Formation ranges from 30 to 100 feet. Vashon till (Fraser glaciation) mantles upland surfaces and is described as

poorly sorted nonstratified lodgement till. Vashon till consists of an extremely compacted mixture of clay, silt, sand, pebbles, and cobbles with occasional large boulders (Herrera 2003).

3.1.5 Groundwater Characteristics

Groundwater has been encountered across the Mukilteo Tank Farm between 7 and 10 feet below ground surface (BGS). Water levels fluctuate between 1 and 3 feet daily in response to tidal variations in Possession Sound. At low tide, groundwater flows toward Possession Sound, emerging through marine sediment in the tidal zones. At high tide, groundwater flow direction is to the south, away from Possession Sound. Groundwater beneath the property is recharged by precipitation infiltration and by the Intercity Plateau Aquifer, a regional aquifer extending from the south. Although groundwater beneath the property is generally used neither for domestic supply, because of saltwater intrusion, nor for industrial purposes, a public water supply system well has been identified 0.25 to 0.5 miles southwest and upgradient of the project area close to SR 525 (Well ID WA 5346287) and a water well has been identified 0.5 to 1.0 miles southeast and upgradient of the project area close to Edgewater Creek (Well ID USGS 3281864) (Herrera 2003; Herrera 2006; EDR 2011).

3.1.6 Land Uses

Land uses within and in the vicinity of the project area are varied. Land uses within the project area include the existing Mukilteo ferry terminal, a public fishing pier, bus transit facilities, Mukilteo Station, and the Mukilteo Tank Farm with the NOAA Mukilteo Research Station and the Tank Farm Pier.

Land north of the project area includes residential and commercial buildings, including a condominium, several restaurants and retail businesses, and a hotel (the Silver Cloud Inn).

Land west and southwest of the project area is used for the Mukilteo Lighthouse Park, consisting of a public beach, picnic facilities, the Mukilteo Lighthouse and associated structures, and parking. South of the project area are the BNSF Railway corridor and then residential and commercial areas consisting of numerous single- and multi-family residences, retail and commercial businesses, churches and other community services, and restaurants.

East of the project area is the Port of Everett's Mount Baker Terminal, a marine-to-rail intermodal facility, which includes a small public shoreline park and associated parking.

3.2 Hazardous Materials Sensitive Receptors

Sensitive receptors are areas that typically contain populations that could be particularly sensitive to hazardous materials released by project-related activities that occur within the project area. Such populations include people who are sick, elderly, or young and species that are endangered or threatened. Areas that typically contain sick, elderly, or young people are hospitals, medical centers, nursing homes, schools, and day care centers. Areas that typically contain endangered or threatened species are wildlife refuges, wetlands, waterbodies, and other recognized habitat. The following hospitals, medical centers, nursing homes, schools, and day care centers were identified in the vicinity of the project area:

- Stillpoint Osteopathic Center, 631 Fifth Street #200, Mukilteo, Washington
- Sound Acupuncture of Mukilteo, 315 Lincoln Ave #A1, Mukilteo, Washington
- Serenity Adult Family Home, Third Street, Mukilteo, Washington
- Art Workshop, 724 First Street, Mukilteo, Washington
- Boys & Girls Club of Mukilteo, 1134 Second Street, Mukilteo, Washington
- Rosehill Community Center, 304 Lincoln Avenue, Mukilteo, Washington
- Little Orca Learning Center, 823 Second Street, Mukilteo, Washington

For purposes of this report, these facilities are deemed to be sensitive receptors typically containing people who are sick, elderly, or young. Such people could be particularly sensitive to hazardous materials released by project-related activities that occur within the project area.

The following two wildlife refuges, wetlands, waterbodies, and other recognized habitat that contain endangered or threatened species were identified in the vicinity of the project area:

- the lower reach of Japanese Creek
- the portion of Possession Sound within and in the vicinity of the project area

Coho salmon, a species of concern under the ESA, have been documented to use the lower reach of Japanese Creek. Numerous species protected under the ESA and Washington State laws exist or are likely to be found in the portion of the Possession Sound within and in the vicinity of the project area, including bocaccio, the Puget

Sound subpopulation of killer whales, marbled murrelets, Puget Sound Chinook salmon, bull trout, Puget Sound steelhead, canary rockfish, yelloweye, Pacific harbor porpoise, harbor seals, and Dall's porpoise. The project area also comprises critical habitat for the Puget Sound Chinook salmon and the Puget Sound subpopulation of killer whales (Ritchotte and Hagedorn 2011).

For purposes of this report, these two areas are deemed to be sensitive receptors typically containing endangered or threatened species. Such species could be particularly sensitive to hazardous materials released by project-related activities that occur within the project area.

3.3 Hazardous Materials Study Area

A hazardous materials study area is the area studied for a hazardous materials discipline report. It is the area within which hazardous materials, if released, might affect the project area. Hazardous materials released in the study area could reach and therefore affect the project area by flowing over the ground surface, migrating through soils or groundwater, or being drawn into the project area by project construction activities such as dewatering.

Analysts considered topography, drainage pathways, geology, and groundwater characteristics in the project area vicinity and defined the hazardous materials study area for the project, and therefore the area to be studied for this discipline report, to be bounded on the north by the project area's northern boundary, on the west by the western drainage shed of Brewery Creek, on the east by Edgewater Creek, and on the south by a distance of a half mile from the project area boundary. The conditions that most influenced analysts' definition of the study area were

- The drainage sheds formed by the ravines and creeks in the project area vicinity
- The general permeability of the units forming the plateau, escarpment, and project area
- The recharge of the project area groundwater by the Intercity Plateau Aquifer extending from the south
- The general northward flow of groundwater in the project area vicinity and the southward flow of groundwater in the project area during high tides

In defining the study area, analysts recognized that any hazardous materials released on properties south of the study area could have percolated into the Intercity Plateau Aquifer and then into the project area. However, analysts concluded that the impact of

any such hazardous materials on the project area was too theoretical to evaluate and likely too small to be noticeable. Accordingly, analysts did not further extend the southern study area boundary.

3.4 Hazardous Materials Sites

Using its methodology, analysts identified the hazardous materials sites in the study area. As is discussed in detail in the methodology, hazardous materials sites are sites in the study area that might have affected or might affect the project area because they: 1) might be acquired in whole or in part for the project; 2) have structures that might be renovated, demolished, or excavated for the project; or 3) are or reasonably might be contaminated.

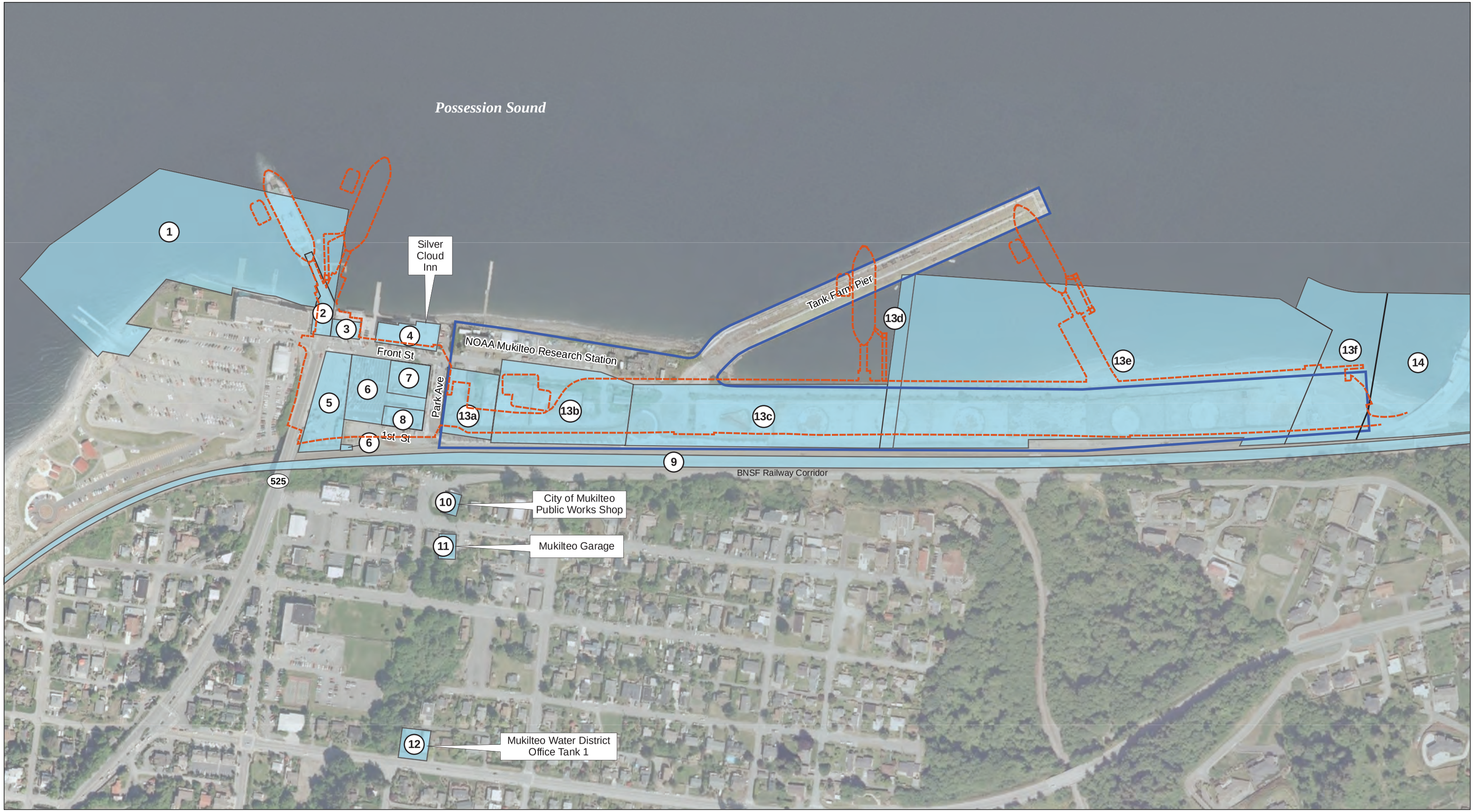
Because it has not yet been determined which properties might be acquired rather than leased for the project, all of the properties that might be acquired or leased for the project are treated in this report as properties that might be acquired for the project.

Analysts identified a total of 14 hazardous materials sites in the study area. Figure 8 shows the locations of all 14 sites. One of these sites is the Mukilteo Tank Farm. Because of the extensive use and hazardous materials history of the Mukilteo Tank Farm, this section first discusses hazardous materials sites unrelated to the Mukilteo Tank Farm and then discusses the Mukilteo Tank Farm.

3.4.1 Hazardous Materials Sites Unrelated to the Mukilteo Tank Farm

The relevant historical and current uses and the hazardous materials use, contamination, and remediation history for each of the 13 hazardous materials sites unrelated to the Mukilteo Tank Farm are presented in Table C-1 in Attachment C. A placeholder line for the Mukilteo Tank Farm, identified as Site 13, is included in Table C-1. Salient information regarding the 13 sites unrelated to the Mukilteo Tank Farm is summarized below.

- Site 1, City of Mukilteo: Waterfront property within the project area. It is expected that a portion of this property would be acquired for the Existing Site Improvements Alternative. This property could contain structures requiring renovation, demolition, or excavation that could have or require the disturbance of LBP, ACM, PCBs, mercury, creosote-treated timber and piles, and sediment contaminated with creosote.



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1 Hazardous Materials Site

Mukilteo Tank Farm

Project Area

Figure 8
Hazardous Materials Site Locations

- Site 2, Port of Everett: Waterfront property where the Mukilteo ferry terminal is currently located. It is expected that a portion of this property would be acquired for the Existing Site Improvements Alternative. This property contains structures requiring renovation, demolition, or excavation that could have or require the disturbance of LBP, ACM, PCBs, mercury, creosote-treated timber and piles, and sediment contaminated with creosote.
- Site 3, Ivar's Real Estate Associates LP: Waterfront property within the project area. This property is occupied by Ivar's Restaurant. It is expected that a portion of the property would be acquired for the Existing Site Improvements Alternative. This property contains structures requiring renovation, demolition, or excavation that could have or require the disturbance of LBP, ACM, PCBs, mercury, creosote-treated timber and piles, and sediment contaminated with creosote.
- Site 4, Silver Cloud Inn: Hotel north of and immediately adjacent to the project area. This property was McConnells Boathouse, a marine boat storage, rental, and repair service, from the early 1960s through the late 1990s. Two gasoline USTs existed on the property. The western UST was closed in place in 1983. Investigations performed 1993 and thereafter detected gasoline-range petroleum hydrocarbons in soil and groundwater in the vicinity of the western UST, and gasoline- and heavy oil- range petroleum hydrocarbons in soil and groundwater in the vicinity of the eastern UST. The eastern UST was removed in 1998. Ecology issued a "No Further Action" determination for the site in 1999.
- Site 5, Washington State Department of Parks and Recreation: Property within the project area that is already owned by WSDOT. This property is paved, primarily used as a ferry holding area, and contains the three ferry toll booths and the terminal supervisor's building. Some or all of this property would be used for each of the four project alternatives. This property might contain structures requiring renovation, demolition, or excavation that could have LBP, ACM, PCBs, and mercury.
- Site 6, A & J Enterprises: Paved property within the project area that is currently leased by WSF and used as a ferry holding area. All or part of the property might be acquired for the No-Build Alternative. It is expected that all or part of the property would be acquired for the Existing Site Improvements, Elliot Point 1, and Elliot Point 2 alternatives. Light standards, the only structures on the property except for a stormwater infiltration pond, could have ACM and PCBs. This property was a gas station from the late 1940s to the mid-1950s. Diesel-range organic contamination was found on the eastern leg

of the property during archeological trenching conducted in 2009. USTs and additional petroleum hydrocarbon contamination may exist on this site.

- Site 7, Ivar's Real Estate Associates LP: Paved property within the project area that is currently leased by WSF and used as a parking lot. It is expected that a portion of the property would be acquired for the Existing Site Improvements Alternative. Light standards, the only structures on the property, could have ACM and PCBs. Low level diesel-range organic contamination was found at the southern boundary of the site during archeological trenching conducted in 2009.
- Site 8, James Mongrain: Glass blowing manufacturing shop within the project area. It is expected that all or part of the property would be acquired for the Existing Site Improvements, Elliot Point 1, and Elliot Point 2 alternatives. This property contains structures requiring renovation, demolition, or excavation that could have LBP, ACM, PCBs, and mercury.
- Site 9, BNSF Railway Corridor: Railroad tracks adjacent to and immediately south of the project area. No available information indicates whether loading of hazardous materials, including petroleum products from the Mukilteo Tank Farm, occurred along these tracks.
- Site 10, Mukilteo City: City of Mukilteo Public Works shop building located about 260 feet south of the project area. Two USTs were located on the property. Petroleum products were observed seeping up from the ground in 1998. The tanks were removed in 1999 and all reasonably accessible contaminated soil was removed. Subsequent investigations found no soil or groundwater exceeding Washington State Model Toxics Control Act (MTCA) Method A levels. Ecology issued a "No Further Action" determination for the site in 2006.
- Site 11, Mukilteo Garage: Automotive repair shop and former gasoline service station located approximately 300 feet south of the project area. The automotive repair service operated from at least the late 1940s through the early 1970s. Two fuel dispensers were observed in front of the garage in December 2002 but were gone by May 2011.
- Site 12, Mukilteo Water District Office Tank 1: Office building located about 1,250 feet south of the project area. The site had a gasoline UST. The UST has been removed. No release has been reported for the site.
- Site 13, Mukilteo Tank Farm: See details in *Section* ⊠, the next section in this Report, and in Table C-2.
- Site 14, WSDOT: Property owned by WSDOT of which part lies in the project area and the balance WSDOT leases to the Port of Everett for the

Mount Baker Terminal. It is expected that a portion of the property would be used for the Elliot Point 1 Alternative. The property contains structures that may require renovation, demolition, or excavation and that could have ACM and PCBs. Because this site is immediately adjacent to the Mukilteo Tank Farm, residual contamination may exist on this site.

3.4.2 Mukilteo Tank Farm Hazardous Materials Site

The Mukilteo Tank Farm, Site 13, is owned by the U.S. Air Force. It is located within the city limits of Mukilteo and Everett in Snohomish County, Washington. The property is bounded by Possession Sound to the north, Park Avenue to the west, the BNSF railway corridor to the south, and the Port of Everett's Mount Baker Terminal to the east. Ecology has given two addresses to the Mukilteo Tank Farm, 1 Front Street, Mukilteo, Washington, and 100 Park Street, Mukilteo, Washington, as well as two Ecology ID numbers, 2721 and 6222435. Ecology records refer to the property as US DFSP Mukilteo, Defense Fuel Support Point Mukilteo, DFSP Mukilteo Tank Farm, USAF Defense Fuel Sup Depot, DFSP Mukilteo, Mukilteo Defense Fuel Pt, and Mukilteo DFSP (Ecology Facility/Site Atlas Website 2011; Ecology ISIS Website 2011; EDR 2011; Ecology 2008).

The property consists of approximately 20 acres of upland commercial and waterfront property and 13 acres of adjacent offshore property. The upland portion of the property is about 12 feet above mean sea level and is graded and flat. A protective riprap wall, approximately 10 feet high, separates the property from Possession Sound, with tidal flats and intertidal beaches exposed north of the upland portion of the property during low tide. The upland portion of the property is enclosed by either an 8-foot-high fence topped with barbed wire or 10-foot-high concrete secondary tank containment walls. Access to the property is through the main gated entrance on an extension of Front Street (Herrera 2003; EDR 2011).

In 1903, the Mukilteo Lumber Company established a lumber mill on the Mukilteo Tank Farm waterfront. In 1909, the company was taken over by the Crown Lumber Company. The Crown Mill's main products included untreated lumber and timbers though it could also produce railroad ties and flume stock (NWA and EHC 2008). The Crown Lumber Company also operated several smaller-sized shake shingle mills on the eastern portion of the property. One or more of these mills was also known as the Superior Shingle Mill. Several structures, including two hotels and two grocery stores, occupied the western and southwestern portions of the property adjacent to Park Avenue. The Crown lumber mill closed in 1930. The last of its buildings was destroyed by fire in 1938 (Herrera 2003; NWA and EHC 2008; Ecology and Environment 2010). It is possible that decking from a

burned down structure that is exposed on the beach during some low tides is a remnant of the mill (Ecology 2004).

During World War II, the mill property was sold to the U. S. Army, which established the Mukilteo Explosive Loading Terminal for loading ammunition onto ships bound for the Pacific theater throughout World War II (NWA and EHC 2008; Shaw 2010). Onsite structures existing or built at the time included administration buildings, facilities consistent with vehicle maintenance structures (using oil, diesel, gasoline, and lubricating oils), an ammunition repair shop, several railroad spurs running the length of the property, coal-fired equipment, a pile-retaining wall, and two piers used for ammunition loading. One of the piers, built in 1941 with 3,900 creosote pressure-treated bearing, batter, and fender piles, is the 1,360 foot long by 102 foot wide pier now known as the Tank Farm Pier (Shaw 20101). The other pier was a trestle pier located at the far east end of the property near where the Mount Baker Terminal is now. (Shaw 2010). Crates of ammunition were reportedly lost over the sides of the piers during ship-loading operations. In 1986-1987, U.S. Navy divers recovered several World War II vintage ammunition shells from beneath the Tank Farm Pier. In 1993 and possibly also in 1994, an underwater ordnance survey was conducted of the Tank Farm Pier to a depth of 12 inches from 20 feet under the pier to 50 feet away from the pier; the survey was also performed in the vicinity of the trestle pier. No ordnance was found. (Herrera 2003; USDD 1993).

In 1951, the U.S. Air Force acquired the Mukilteo Tank Farm and converted it to a fuel storage and transfer facility. Fill material was added, as necessary, to allow expansion of the facility. The Tank Farm Pier was reinforced with a concrete deck to allow four railroad spurs to be constructed on the pier. Later, one of the spurs was removed to allow for construction of fuel conveyance pipelines on and extending the full length of the pier. In 1959, approximately 520 of the original 3,900 piles of the Tank Farm Pier were replaced (Shaw 2010). Figure 9 is a map showing the locations of the former and current Mukilteo Tank Farm structures.

The facility began operating, through McChord Air Force Base, in 1953 and continued until 1973, supplying jet propellant number 4 (JP-4) and aviation gasoline fuels to military installations in the Pacific Northwest. Fuel was delivered to the property by barge and was distributed by barge, railcar, and tanker trucks. Barge and railcar deliveries were transferred to and from ten above ground bulk fuel storage tanks (Tanks 1 through 10, the Tank Farm). Tanker truck deliveries were transferred at two truck-loading racks (Herrera 2003).

POSSESSION SOUND

AREA 1

AREA 2

AREA 3

TANK FARM PIER

Tank Farm Pier

FORMER TRESTLE PIER

SPOILS AREA (TRUCK TURNAROUND AREA)

BEACH PARK

PRODUCT RECOVERY TRENCH

AREA 2 REMEDIATION/TREATMENT SYSTEM COMPOUND

TYPICAL TANK CONTAINMENT OIL/ WATER SEPARATOR AND OUTFALL

BNSF RAILWAY CORRIDOR

APPROXIMATE TANK FARM LIMITS

TYPICAL CONTRETE CONTAINMENT WALL

TANK 1

TANK 2

TANK 3

TANK 4

TANK 5

TANK 6

TANK 7

TANK 8

TANK 9

TANK 10

(FOAM TANK)

MAIN OIL/WATER SEPARATOR

FORMER SLOP TANK LOCATION (Tank 11)

RW-1

HAZARDOUS MATERIAL STORE HOUSE

USAF FUELS LABORATORY

(TANK 18)

FOAM PUMP HOUSE (BUILDING T-408)

HAZARDOUS MATERIAL STORAGE CONTAINER

FORMER TRUCK LOADING RACKS

PUMP FILTERS BUILDING

PIER

NOAA FACILITY

NOAA Mukilteo Research Station

(UNNAMED TANKS)

(TANK 12)

(TANK 13)

(TANK 14)

(TANK 16)

(TANK 15)

(TANK 19)

(TANK 17)

SILVER CLOUD INN

GATE

FRONT STREET

ADMINISTRATION

FIRE STATION (BUILDING T-453)

PARK AVENUE

SMALL COMMERICAL DEVELOPMENT PARKING LOTS

STORAGE BUILDING (BUILDING 405)

MAINTENANCE SHOP (BUILDING 4)

AREA 1 REMEDIATION/ TREATMENT SYSTEM COMPOUND

PUMP SHELTER

IT CORP. BUILDING

Legend

- Existing aboveground and underground storage tanks
- Former underground storage tanks
- Locations of transformers and other electrical equipment
- Outfall
- Tank containment wall
- Oil/water separators

Key

Outfalls to shoreline

1	24” storm drain outfall
2	24” Brewery Creek outfall
3	10”x12” concrete box (culvert from NOAA)
4	2”x4” PVC in 12” box (culvert from NOAA)
5	8” iron pipe (o/w sep. from tanks 1 & 2)
6	8” iron pipe (o/w sep. from Fuel Lab)
7	2x8” iron pipe (may be abandoned water lines, not storm drains)
8	30” storm drain outfall
*9	8” o/w sep. from Tanks 3 & 4
*10	8” o/w sep. from Tanks 5 & 6
*11	8” o/w sep. from Tanks 7 & 8
12	40” Japanese Creek outfall
*13	8” o/w sep. from Tanks 9 & 10
*14	18” storm drain outfall

Outfalls not identified in field survey, but identified in historic reference documents.

Parametrix 554-1631-088/01(4A) 1/12 (Y)

N

0 200

Feet

Source: Herrera Environmental Consultants, Inc. for Jacobs Civil Inc. and Washington State Ferries. December 2003. Hazardous Materials Site Assessment, Former Defense Fuel Support Point Mukilteo Property, Mukilteo, Washington. Figure 3.

Figure 9
Former and Current Mukilteo Tank Farm Structures

In 1955, the U.S. Air Force Fuels Laboratory (fuels laboratory) began operating on-site in a building located near the Possession Sound shoreline north of and between Tanks 2 and 3. The fuel laboratory operation remained on-site until 2003 when it relocated. In 1972, the National Oceanic and Atmospheric Administration (NOAA) began on-site operations by providing a field headquarters for the National Marine Fisheries Service (NMFS) (the NOAA Mukilteo Research Station) in the former administration building on a 1.1 acre tract in the northwest corner of the Mukilteo Tank Farm. The NOAA Mukilteo Research Station is still in operation, in the same location, and the only tenant currently on the Mukilteo Tank Farm (Shaw 2010).

By the mid-1960s, the trestle pier used during World War II for loading ammunition onto ships had been demolished and a small pier extending into Possession Sound was added to the administration building that later housed the NOAA Mukilteo Research Station. This pier was used for mooring rescue boats to retrieve downed pilots training over Puget Sound (Herrera 2003).

In 1973, the U.S. Air Force permitted the Mukilteo Tank Farm land and facility to the Defense Logistics Agency (DLA), which, through the agency now known as the Defense Energy Support Center (DESC), continued operating the facility as a government-owned, contractor-operated fuel storage and transfer terminal. By the late 1970s, the Tank Farm Pier had fallen into disrepair and was no longer used for loading fuel onto railcar tankers. The pier's fuel conveyance pipelines, now empty, remain on the pier (Shaw 2010). By 1979, automatic foam firefighting systems had been added to the bulk fuel storage tanks. In 1987, the government decided to close the Mukilteo Tank Farm and consolidate its mission with a facility in Manchester, Washington. Fuel storage and transfer operations on the property ceased in 1989 (Herrera 2003).

In the late 1970s through the 1980s, hazardous materials were found in the soil, groundwater, surface water, and sediment on the Mukilteo Tank Farm. In 1979, soil contaminated with fuel oil was found in a number of bulk fuel storage tank containments. By 1982, a fuel recovery well (RW1) had been installed between the fuels laboratory and what is known as the main oil/water separator. In 1982, soil and groundwater in the northeastern portion of the property was found to be contaminated with chloroform, methylene chloride, tetrahydrofuran, benzene, ethylbenzene, toluene, and total petroleum hydrocarbons including JP-4. Lead was also found in the groundwater. Several unknown compounds were also identified. In 1983, floating product was observed on the groundwater north of Tank 10. In 1984, floating product was observed in RW1. The suspected source of the product in RW 1 was an unconfirmed UST, possibly the former

Tank 18, east of the fuels laboratory. In 1986-1987, floating product was again observed on groundwater north of Tank 10. During that time, a damaged section of underground distribution pipeline north of Tank 9 led to an estimated loss of 6,700 gallons of JP-4 to the ground, leading to seeps to the beach and a sheen on Possession Sound (Herrera 2003).

Effective August 7, 1990, the Washington State Office of the Attorney General and the DLA entered into Remedial Action Order DE90-N209 requiring DLA to complete a remedial investigation and feasibility study for cleanup of the Mukilteo Tank Farm pursuant to MTCA and its associated cleanup regulations (1990 Remedial Action Order). The property was assigned a Washington Ranking Method (WARM) score of 1[1] (1990 Remedial Action Order; Herrera 2003; Herrera 2006; Ecology 2006; Ecology Facility/Site Atlas Website 2011; Ecology ISIS Website 2011).

During the period of primary operation, fourteen ASTs (including Tanks 1 through 10) and eight USTs existed on the Mukilteo Tank Farm. The ASTS and all above and below ground fuel transfer pipelines were cleaned in 1990 (Shaw 2010).

The following tanks were removed from the property in or after 1991:

- All but the bottoms of Tanks 1 – 10, the bulk fuel storage tanks, were disassembled for scrap in 1999 (Shaw 2010).
- Tank 11, a 12,000-gallon slop UST located between the main oil/water separator and the Tank Farm Pier, removed in 1991; approximately 3,000 gallons of floating product were removed from the tank excavation prior to backfilling (Herrera 2003).
- Tank 13, the 12,000-gallon railcar diesel storage tank, located together with Tank 15 in a containment area southeast of the former Building 405, unknown removal date.
- Tank 14, a 500-gallon diesel UST located adjacent to the former maintenance shop building (Building 4) for emergency generator use, removed in 1991.

[1] Ecology assesses sites requiring investigation or cleanup to estimate their relative potential threat to human health and the environment. Ecology uses the assessment results to assign a Washington Ranking Method (WARM) score to each site. WARM scores range from 1 to 5. A score of 1 represents the highest level of potential threat; 5 represents the lowest. Sites assigned a 1 or 2 have a higher priority for cleanup.

- Tank 15, a 10,000-gallon steel railcar FSII storage tank, located together with Tank 13 in a containment area southeast of the former Building 405, unknown removal date.
- Tank 17, a 500-gallon heating oil UST located west of the fire station, removed in 1991.
- Tank 18, a 3,000-gallon heating oil UST located east of the fuels laboratory, removed in 1991.
- Tank 19, a 1,500-gallon heating oil UST located west of the NOAA Mukilteo Research Station building, unknown removal date.
- Unnamed tank, a 2,500-gallon slop UST located on the southwest side of the easternmost former truck-loading rack, held waste products drained from tanker trucks prior to loading, removed in 1991.
- Unnamed tank, a slop UST of unknown capacity located west of the fuels laboratory, held waste products drained from tanker trucks, removed in 1991 (Herrera 2003; Shaw 2010; Ecology and Environment 2010).

Petroleum hydrocarbons, metals, PAHs, and PCBs were detected in the samples collected during the removal of the tanks in 1991 (1994 Enforcement Order).

The following tanks may still exist or are known to exist on the property:

- Tank 12, a 12,000-gallon empty concrete diesel tank located immediately southeast of Building 405, the former storage building. (Shaw 2010).
- Tank 16, a 2,000-gallon empty FSII AST located south of the pump shelter
- Foam Tank, a rectilinear firefighting foam chemical AST adjacent to the foam pump house (Building T-408).
- Unnamed tank, a 4,280 (4,400?) gallon empty fiberglass heating oil UST located south of the fuels laboratory.[2]

Site assessments, a remedial investigation and feasibility study (RI/FS), and risk assessment activities conducted in the early 1990s led to the division of the property into three operable units or areas for petroleum substance remediation purposes:

[2] The descriptions of the tanks that were removed from the property and were otherwise known to have existed on the property may have some errors. It has been reported that the bulk fuel storage and transfer facility had 16 ASTs to contain JP-4 and other products (Ecology and Environment 2010). Not all of these tanks were clearly accounted for in the information reviewed for this report.

- Area 1 (fuels laboratory area): the area between the west end of the property and the eastern portion of the Tank 3 containment area. This area was found to have soil, groundwater, and floating product contamination, with a floating product plume and an associated dissolved groundwater contaminant plume being centered west of the fuels laboratory, the release area from Tank 11, the laboratory, and the Tank Farm Pier.
- Area 2 (Tanks 8, 9, and 10): the area from the midline of Tank 7 to the east end of the property, including Tanks 8, 9, and 10. This area was found to have soil and groundwater contamination, with a dissolved groundwater contaminant plume centered between Tanks 9 and 10, extending parallel to the shoreline from the west end of the Tank 9 containment to the east end of the Tank 10 containment.
- Area 3: the central portion of the property that lies between Areas 1 and 2. No significant contaminant levels were identified in Area 3 and no corrective action was required for this area.

Contaminants of concern for the Mukilteo Tank Farm included total petroleum hydrocarbons (TPHs) (including JP-4 and aviation gasoline), both as free product floating on the groundwater table and as soil, groundwater, surface water and sediment contaminants; volatile organic compounds (VOCs, including chloroform, methylene chloride, tetrahydrofuran, and benzene, toluene, ethylbenzene, and xylenes [BTEX]); semi-volatile organic compounds (SVOCs, including carcinogenic polycyclic aromatic hydrocarbons [cPAHs]); polychlorinated biphenyls (PCBs); and heavy metals or inorganic contaminants, including arsenic, cadmium, chromium, copper, lead, mercury, silver, and zinc (Herrera 2003; Herrera 2005; Herrera 2006; Herrera 2007; Ecology Facility/Site Atlas Website 2011; Ecology ISIS Website 2011).

Effective March 7, 1994, Ecology issued Model Enforcement Order No. DE 93TC-N268 to the Defense Fuel Supply Center to address the threat or potential threat posed by the release or threatened release of hazardous substances at the Mukilteo Tank Farm (1994 Enforcement Order). This Enforcement Order cancelled and replaced the 1990 Remedial Acton Order in part because a large amount of additional data had been collected on the property since 1990 and because Ecology had adopted new environmental cleanup and sediment management regulations.

DLA conducted and finalized a remedial investigation and feasibility study for cleanup of the Mukilteo Tank Farm in January 1996. The study established cleanup standards for the site using Method B of the version of the Washington State Model Toxics Control Act (MTCA) that was in effect at that time. The recommended cleanup standards, as well

as the remediation methodology to obtain them, were approved by Ecology. The approved site-specific soil cleanup standards are presented in Table 1 (Ecology and Environment 2010). No soil cleanup standards were developed for gasoline-, diesel-, or lube oil-range petroleum hydrocarbons.

Table 1. Soil Cleanup Standards for the Mukilteo Tank Farm

Contaminant	Site-Specific Cleanup Standard (mg/kg)
Acetone	8,000
Benzene	4
Toluene	328
Ethyl benzene	4,846
Xylenes	3,503
Acenaphthene	64.3[a]
Anthracene	24,000
Benzo(a)anthracene	0.137
Benzo(a)pyrene	0.137
Benzo(b)fluoranthene	0.137
Chrysene	0.137
di-n-butylphthalate	810
Fluoranthene	5.4[a]
Fluorene	3,200[a]
2-Methylnaphthalene	230
Naphthalene	230[a]
Pyrene	2,400[a]
Arsenic	20[b]
Chromium VI	48
Copper	36
Lead	24
Mercury	0.01[c]
Silver	1.0[d]
Zinc	85

Notes:

Site-specific cleanup standards presented in this table were originally defined in the Remedial Investigation/Feasibility Study (GSI 1996), a document not reviewed for this report.

[a] Groundwater protective standards are based on cPAHs. These chemicals are not carcinogenic, so the groundwater protective standards for carcinogenic effects do not apply.

[b] 7 mg/kg is the published natural background concentration for arsenic (pursuant to Ecology 1994, a source not consulted for this report); 20 mg/kg is the calculated area background. The calculated area background is used as the cleanup level.

[c] Selected cleanup standard for mercury is based upon the standard laboratory detection limit for mercury in soil by EPA Method 7471.

[d] Selected cleanup standard of 1.0 mg/kg is based upon the standard laboratory detection limit for silver in soil by EPA Method 6010 and 100 times the laboratory detection limit for silver in water.

Source: Ecology and Environment 2010.

DLA installed remedial treatment systems in Areas 1 and 2. At Area 1, the remediation system consisted of an extensive underground network of fuel product recovery, soil vapor extraction, and air sparge subsystems. (Air sparge subsystems blow air into groundwater to aerate it, promoting biodegradation and volatilization.) The system extended from the truck-loading racks to the Tank Farm Pier and from the Tank 2 containment area to the pump shelter. At Area 2, the system consisted of soil vapor extraction and air sparge subsystems covering the Tanks 8, 9, and 10 containment areas. Air sparge subsystems for both areas were connected through a series of aboveground polyvinyl chloride (PVC) pipelines that converged to blowers located inside remediation treatment system compounds for Areas 1 and 2. Soil vapor was routed to thermal catalytic oxidizers for each area through aboveground PVC pipelines. Floating product recovery pumps were installed in 20 wells located across Area 1. Remedial system startup occurred in May 1997 (Herrera 2003).

Performance monitoring of groundwater and surface water was initiated during remediation to determine the effectiveness of cleanup as it progressed. Remediation systems were shut down in November 2000 in Area 2, the east end of the property, and November 2002 in Area 1, the west end of the property, after performance monitoring indicated that contaminants were not detected or were found at concentrations below the cleanup levels negotiated with Ecology for the property (Herrera 2003; Herrera 2004; Herrera 2006; Herrera 2007). By the time the remediation systems had been shut down, approximately 338,000 pounds of hydrocarbons had been removed from Area 2 and approximately 980,500 pounds of hydrocarbons had been removed from Area 1 (Shaw 2010). Using conversion factors of 6.02 pounds per gallon for aviation gasoline fuels and 6.84 pounds per gallon for JP-4, approximately 49,400-56,100 gallons of hydrocarbons were removed from Area 2 and approximately143,300-162,900 gallons of hydrocarbons were removed from Area 1.

Compliance monitoring conducted following remediation system shutdown included collection of soil, groundwater, surface water, and marine sediment samples for analysis to verify that the site had been cleaned up. The surface water samples were collected from groundwater seeps located within the intertidal zone. Because only those compliance monitoring wells on the north side of Area 1 were exceeding cleanup levels (the ones for inorganic constituents), Ecology agreed to allow re-designation of the three remediation areas to expedite a “cleanup complete” determination for the bulk of the Mukilteo Tank Farm. Area 1 was divided lengthwise (i.e., east to west) into Area 1A to

the north and Area 1B to the south. On April 21, 2005, Ecology issued a Partial Satisfaction of Enforcement Order No. DE 93TC-N268 indicating that the provisions of that Enforcement Order had been satisfied, that no further monitoring was required, and that the monitoring wells could be abandoned for Areas 1B, 2, and 3 (Ecology 2005a). In November 2005, the wells in Area 1A met the site cleanup levels, meaning that monitoring indicated that soil, groundwater, surface water, and marine sediment across the site complied with all provisions of the Ecology-approved Compliance Monitoring Plan (Shaw 2010; Oasis 2006). On May 22, 2006, Ecology issued a letter to the DFSC-FQ, stating that the provisions of Enforcement Order No. DE 93TC-N268 had been satisfied, that no further monitoring was required, and that remaining monitoring wells could be abandoned (Ecology 2006). The April 21, 2005, and May 22, 2006, letters from Ecology are presented in Attachment F.

No environmental covenant or deed restriction has been entered against the property (Ecology ISIS Website 2011). The property was given a "Removal from Hazardous Sites List Completed" site cleanup status in Ecology's 2008 *Sediment Cleanup Status Report*. The property had been listed as a sediment cleanup site within the Everett and Port Gardner area in Ecology's 1996 *Sediment Management Standards Contaminated Sediment Site List* and Ecology's 2000, 2001, 2003, and 2005 *Sediment Cleanup Status Reports*.

Soil contamination has been discovered on the Mukilteo Tank Farm since the shutdown of the remediation systems in 2000 and 2002. Contamination was most significantly encountered during project-related archeological trenching and boring conducted in 2006 and 2007 in Area 1 and in the western half of Area 3.

Four of the soil samples collected during 2006 and 2007 contained contaminants in excess of the site-specific soil cleanup standards. Three of those four samples (H21 with cPAHs and lead; H22 with benzene; and CPT24 with cPAHs, lead, and silver) were collected 10 to 12 feet BGS east of the fuels laboratory near the main oil/water separator and former slop tank (Tank 11). The fourth sample (Tank 3-SS with cPAHs) was a surface sample taken from the granular asphalt bedding material beneath the bottom pad of Tank 3.

Many of the soil samples collected during 2006 and 2007 contained high concentrations of gasoline-, diesel-, or lube oil- range petroleum hydrocarbons, compounds for which no site-specific soil cleanup standards had been established and which were present far in excess of current MTCA Method A soil cleanup levels for unrestricted land uses. Gasoline-range petroleum hydrocarbons, and in some cases

BTEX and cPAHs, were detected far in excess of MTCA Method A cleanup levels in samples collected from the following locations: north of Tank 2; between the former truck-loading racks and the pump filters building; south of the fuels laboratory; near the main oil/water separator; west of Tank 16 (which is south of the pump shelter); south and west of the former maintenance shop (Building 4); north , east, and west of the former storage building (Building 405); east of Tank 12, which is southeast of the former Building 405; and north of Tank 3. These samples were collected 9 to 12 feet BGS, a depth characterized as a smear zone where petroleum product had accumulated in the past, floating on top of the tidally affected groundwater. This contamination may be 6 to 12 inches thick and near the water table.

Diesel- and lube oil-range petroleum hydrocarbons were present far in excess of MTCA Method A cleanup levels in a surface sample taken beneath the bottom pad of Tank 3 (Tank 3-SS). It is thought that the contamination found in this sample exists in the bedding material beneath all of the large AST pads.

Typically, soil with contaminant concentrations exceeding MTCA Method A cleanup levels for unrestricted land uses must be cleaned up or, at a minimum, hauled off site for disposal if excavated. However, according to Brian Sato, the Ecology site manager for the Mukilteo Tank Farm, soil on the Mukilteo Tank Farm that has contaminant concentrations greater than MTCA Method A cleanup levels but less than the site-specific soil cleanup standards is considered clean and may be reused on site. Soil with contaminant concentrations greater than the site-specific soil cleanup standards will need to be cleaned up and may not simply be reused on site. Mr. Sato stated that cleanup would be to the same site-specific soil cleanup standards used before (see Table 1), regardless of who owns the property, unless scientific rationale indicates a higher or lower standard should apply. However, because the site-specific soil cleanup standards do not address petroleum hydrocarbons and because the gasoline-range organics concentrations found during the 2006 and 2007 sampling were so high, Mr. Sato stated that soil contaminated with petroleum hydrocarbons would need to be addressed based on today's standards, ranging from disposing of such soil at an appropriate off-site disposal facility to remediating the contamination to a calculated Method B cleanup level (after demonstrating to Ecology's satisfaction that such soil may remain in place) or taking any other approach allowed by MTCA. (Sato 2011a; Sato 2011c).

The post-1940 uses and the post-1940 hazardous materials use, contamination, and remediation history for the Mukilteo Tank Farm are presented in Table C-2 in Attachment C, with the presentation being broken into discussions of the following seven major Mukilteo Tank Farm structures: 1) the Tank Farm, 2) the Tank Farm Pier, 3) the BNSF Railway siding, 4) the bulk fuel distribution facilities, 5) the U.S. Air Force Fuels Laboratory and vicinity, 6) the NOAA Mukilteo Research Station, and 7) miscellaneous structures including electrical transformers and related oil-filled equipment.

Tables 2 and 3 summarize analytical data from the 2006 and 2007 archeological trenching and boring work. Table 2 presents the analytical results of samples collected from selected trenches and borings associated with gasoline-range petroleum hydrocarbons and BTEX compounds. MTCA Method A cleanup levels and the site-specific soil cleanup standards are also shown. Table 3 presents the analytical results of selected samples for additional constituents of concern, showing MTCA Method A, B, and C cleanup levels and the site-specific soil cleanup standards, to indicate the range of possible cleanup limits afforded by MTCA. However, the Mukilteo Tank Farm's commercial zoning would prevent using the Method A industrial and the Method C cleanup levels (Herrera 2007).

Figure 10 shows the 2006 and 2007 archeological trenching and boring soil sample locations. Figures 11-14 show photos of some of the Mukilteo Tank Farm structures.

Table 2. Summary of Petroleum Hydrocarbon and BTEX Analytical Results for Soil Samples (mg/kg) Collected from Archeological Trenches and Borings in 2006 and 2007

Trench/Boring Designation	Soil Depth (feet)	PID Reading (ppm)	Analyte						
			Lube Oil-Range Organics [a]	Diesel-Range Organics [a]	Gasoline-Range Organics [b]	Benzene [c]	Toluene [c]	Ethylbenzene [c]	Xylenes [c]
MTCA Method A soil cleanup level [d]			*2,000*	*2,000*	*30/100* [e]	*0.03*	*7*	*6*	*9*
Site-specific cleanup level [f]						*4*	*328*	*4,846*	*3,503*
BT5	11	0.0	--	--	--	--	--	--	--
BT6	10	na	--	--	--	--	--	--	--
BT7	12	778	--	--	**960**	ND (0.03)	0.33	3.3	1.4
BT8	10	509	--	--	9.3	ND (0.03)	ND (0.05)	ND (0.05)	ND (0.2)
BT9	7.5	11.5	--	--	--	--	--	--	--
BT11	8	274	--	--	33	ND (0.03)	ND (0.05)	ND (0.05)	ND (0.2)
BT12	10	448	220	1,600	**4,100**	ND **(1.5)**	ND (2.5)	ND (2.5)	ND (10)
BT13	12	691	500	710	**2,600**	**0.59**	2.9	**14**	**12**
BT14	12	176	--	--	19	ND (0.03)	ND (0.05)	ND (0.05)	ND (0.2)
BT15	9	1,075	--	--	**2,000**	ND **(0.3)**	0.53	0.76	**12**
BT16	8	na	--	--	--	--	--	--	--
SB35	11	1.2	--	--	--	--	--	--	--
SB34	12	1,406	--	--	**3,900**	ND **(0.3)**	5.9	**31**	**10**
SB39	12	1,363	--	--	**3,200**	ND **(0.3)**	4.2	**23**	6.9
SB40	13	600	--	--	--	--	--	--	--
SB47	12	1,331	--	--	**8,500**	ND **(0.3)**	**9.7**	**61**	**70**
SB49	14	281	--	--	--	--	--	--	--
SB56	12	120	--	--	--	--	--	--	--
SB60	12	1,345	--	--	**1,000**	ND **(0.3)**	1.8	**11**	4.2
SB71	12	580	--	--	--	--	--	--	--
SB77	10	0.0	--	--	--	--	--	--	--
SB73	9	832	--	--	**140**	ND (0.03)	ND (0.05)	ND (0.05)	ND (0.2)
SB78	10	184	--	--	--	--	--	--	--
SB81	10	0.0	--	--	--	--	--	--	--
SB65	10	0.0	--	--	--	--	--	--	--
SB67	12	257	--	--	--	--	--	--	--
SB72	10	607	--	--	**510**	ND (0.03)	ND (0.05)	0.06	0.6
SB76	13	10.2	--	--	**--**	--	--	--	--

Table 2. Summary of Petroleum Hydrocarbon and BTEX Analytical Results for Soil Samples (mg/kg) Collected from Archeological Trenches and Borings in 2006 and 2007

Trench/Boring Designation	Soil Depth (feet)	PID Reading (ppm)	Analyte						
			Lube Oil-Range Organics [a]	Diesel-Range Organics [a]	Gasoline-Range Organics [b]	Benzene [c]	Toluene [c]	Ethylbenzene [c]	Xylenes [c]
MTCA Method A soil cleanup level [d]			*2,000*	*2,000*	*30/100* [e]	*0.03*	*7*	*6*	*9*
Site-specific cleanup level [f]						*4*	*328*	*4,846*	*3,503*
SB69	12	206	--	--	**--**	--	--	--	--
SB70	10	0.0	--	--	**--**	--	--	--	--
SB57	10	1,309	--	--	**460**	ND (0.03)	0.44	0.11	0.8
SB61	13	11.3	--	--	**--**	--	--	--	--
SB44	8	1,247	--	--	**1,900**	ND (0.03)	0.34	**7.5**	**9.1**
SB53	11	625	--	--	**1,800**	ND (0.03)	1.7	1.2	3.0
Tank 3-SS	Surface	68.7	**14,000**	**13,000**	ND (3)	ND (0.03)	ND (0.05)	ND (0.05)	ND (0.2)
H21	10	na	590	**2,700**	**--**	--	--	--	--
H28	12.5	na	210	880	**--**	--	--	--	--
CPT24	10	na	400	530	**--**	--	--	--	--
H22	12	na	--	--	**4,600**	**12**	**73**	**18**	**48**
H25	8	na	57	1,200	**3,000**	--	--	--	--
H27	13	na	120	40	160	--	--	--	--
VC87	9	na	75	880	**2,400**	--	--	--	--
VC88	8.5	na	ND (54)	230	720	--	--	--	--

Source: Herrera 2007, Table 1.

Values reported in milligrams per kilogram (mg/kg) on a dry weight basis, except PID readings reported in parts per million (ppm) in air.

Values shown in **boldface** type exceed MTCA Method A soil cleanup levels.

na not applicable.

ND (0.03) Analyte was not detected above the practical quantitation limit shown in parentheses.

-- Sample was not analyzed for this constituent.

[a] Diesel- and lube oil-range hydrocarbons analyzed by Ecology Method NWTPH-Dx.

[b] Gasoline-range petroleum hydrocarbons analyzed by Ecology Method NWTPH-Gx.

[c] BTEX analyzed by EPA Method 8021B.

[d] MTCA Method A soil cleanup levels (Ecology 2001a).

[e] MTCA Method A soil cleanup level for gasoline-range hydrocarbons based on benzene present/not present.

[f] Original source (not reviewed for this report): Fluer Daniel GRI 1998.

Table 3. Summary of Supplemental Analytical Results for Soil Samples (mg/kg) Collected from Selected Archeological Trenches and Borings in 2006 and 2007

Sample Location Designation	*MTCA Method A cleanup level (unrestricted)* [a]	*MTCA Method B cleanup level (unrestricted)* [b]	*MTCA Method A cleanup level (industrial)* [a]	*MTCA Method C cleanup level (industrial)* [b]	*Site-specific cleanup level* [c]	BT12	BT13	Tank 3-SS	H21	H28	CPT24	H22	H25	H27	VC87	VC88
Soil depth (feet)						10	12	Surface	10	12.5	10	12	8	13	9	8.5
PID reading (ppm)						448	691	68.7	na	na	na	na	na	na	na	na
Analyte																
Volatile Organic Compounds [d]																
Acetone	*na*	*8,000*	*na*	*350,000*	*8,000*	-	-	-	ND (1.6)	ND (0.27)	ND (0.30)	-	ND (0.49)	0.011	ND (1.1)	ND (0.23)
Carbon disulfide	*na*	*8,000*	*na*	*350,000*	*na*	-	-	-	ND (0.33)	ND (0.055)	ND (0.060)	-	ND (0.098)	0.012	ND (0.22)	ND (0.046)
Toluene	*7*	*16,000*	*7*	*700,000*	*4,846*	-	-	-	ND (0.33)	ND (0.055)	0.092	-	ND (0.098)	ND (0.00097)	ND (0.22)	ND (0.046)
Ethylbenzene	*6*	*8,000*	*6*	*350,000*	*328*	-	-	-	**6.9**	ND (0.055)	0.064	-	ND (0.098)	ND (0.00097)	ND (0.22)	ND (0.046)
Total Xylenes	*9*	*160,000*	*9*	*7,000,000*	*3,503*	-	-	-	**13.9**	ND (0.11)	0.222	-	ND (0.20)	ND (0.0019)	ND (0.44)	ND (0.091)
Isopropylbenzene	*na*	*8,000*	*na*	*350,000*	*na*	-	-	-	5.6	ND (0.055)	0.22	-	4.9	ND (0.00097)	ND (0.22)	ND (0.046)
n-Propylbenzene	*na*	*na*	*na*	*na*	*na*	-	-	-	8.8	ND (0.055)	0.17	-	7.8	ND (0.00097)	ND (0.22)	0.078
1,3,5-Trimethylbenzene	*na*	*na*	*na*	*na*	*na*	-	-	-	11	ND (0.055)	ND (0.060)	-	ND (0.098)	ND (0.00097)	ND (0.22)	ND (0.046)
tert-Butylbenzene	*na*	*na*	*na*	*na*	*na*	-	-	-	0.37	ND (0.055)	ND (0.060)	-	0.26	ND (0.00097)	ND (0.22)	ND (0.046)
1,2,4-Trimethylbenzene	*na*	*na*	*na*	*na*	*na*	-	-	-	29	ND (0.055)	0.51	-	ND (0.098)	ND (0.00097)	ND (0.22)	ND (0.046)
sec-Butylbenzene	*na*	*na*	*na*	*na*	*na*	-	-	-	3.4	0.066	0.23	-	2.4	ND (0.00097)	0.41	0.17
p-Isopropyltoluene	*na*	*na*	*na*	*na*	*na*	-	-	-	3.6	ND (0.055)	1.4	-	0.78	ND (0.00097)	ND (0.22)	ND (0.046)
1,2-Dichlorobenzene	*na*	*7,200*	*na*	*315,000*	*na*	-	-	-	ND (0.33)	ND (0.055)	0.17	-	ND (0.098)	ND (0.00097)	ND (0.22)	ND (0.046)
n-Butylbenzene	*na*	*na*	*na*	*na*	*na*	-	-	-	5.5	ND (0.055)	ND (0.060)	-	3.8	ND (0.00097)	0.48	0.14
Naphthalene	*5*	*1,600*	*5*	*70,000*	*230*	-	-	-	**7.5**	ND (0.055)	0.24	-	3.5	0.0011	ND (0.22)	ND (0.046)
Polycyclic Aromatic Hydrocarbons [e]																
Naphthalene	*5*	*1,600*	*5*	*70,000*	*230*	0.65	ND (0.02)	ND (0.04)	1.9	0.059	0.024	-	-	-	-	-
1-Methylnaphthalene	*na*	*na*	*na*	*na*	*na*	8.1	1.1	0.08	4.3	0.027	0.019	-	-	-	-	-
2-Methylnaphthalene	*na*	*na*	*na*	*na*	*230*	10	0.22	0.05	3.9	ND (0.0072)	0.022	-	-	-	-	-
Total naphthalenes	5 [f]	*1,600**	5 [f]	*70,000**	*na*	**18.75**	1.32	0.13	**10.1**	0.086	0.065	-	-	-	-	-
Acenaphthylene	*na*	*na*	*na*	*na*	*na*	0.10	0.03	ND (0.04)	0.062	0.010	0.011	-	-	-	-	-
Acenaphthene	*na*	*4,800*	*na*	*21,000*	*64.3*	0.33	0.20	0.24	0.38	0.10	0.019	-	-	-	-	-
Fluorene	*na*	*3,200*	*na*	*140,000*	*3,200*	0.49	0.21	0.03	0.41	0.080	ND (0.0083)	-	-	-	-	-
Phenanthrene	*na*	*na*	*na*	*na*	*na*	0.54	0.30	ND (0.04)	0.56	0.012	0.030	-	-	-	-	-
Anthracene	*na*	*24,000*	*na*	*1,050,000*	*24,000*	0.08	0.10	ND (0.04)	0.13	0.035	0.024	-	-	-	-	-
Fluoranthene	*na*	*3,200*	*na*	*140,000*	*5.4*	0.33	0.54	ND (0.04)	0.54	0.19	0.35	-	-	-	-	-
Pyrene	*na*	*2,400*	*na*	*105,000*	*2,400*	0.33	0.46	0.92	0.54	0.20	0.59	-	-	-	-	-
Benzo[g,h,i]perylene	*na*	*na*	*na*	*na*	*na*	0.04	0.04	0.09	0.050	0.018	0.040	-	-	-	-	-
Benzo[a]anthracene [g]	*na*	*0.137*	*na*	*18*	*0.137*	0.10	0.13	0.03	**0.20**	0.054	0.094	-	-	-	-	-
Chrysene [g]	*na*	*0.137*	*na*	*18*	*0.137*	0.10	0.013	**0.64**	**0.25**	0.060	0.11	-	-	-	-	-
Benzo[b]fluoranthene [g]	*na*	*0.137*	*na*	*18*	*0.137*	0.05	0.08	**0.71**	**0.19**	0.052	**0.23**	-	-	-	-	-
Benzo[k]fluoranthene [g]	*na*	*0.137*	*na*	*18*	*na*	0.06	0.07	**0.33**	0.046	0.020	0.069	-	-	-	-	-
Benzo(a)pyrene [g]	*na*	*0.137*	*2*	*18*	*na*	0.05	0.07	ND (0.04)	0.11	0.035	0.079	-	-	-	-	-
Indeno[1,2,3-cd]pyrene [g]	*na*	*0.137*	*na*	*18*	*na*	0.03	0.03	0.04	0.061	0.014	0.055	-	-	-	-	-
Dibenz[a,h]anthracene [g]	*na*	*0.137*	*na*	*18*	*na*	ND (0.02)	ND (0.02)	0.02	ND (0.042)	ND (0.0072)	0.012	-	-	-	-	-
Total TEF-modified cPAHs	*0.1* [g]	*0.137*	*2* [s]	*18*	*na*	0.075	0.1023	**0.145**	**0.171**	0.051	0.13	-	-	-	-	-
Polychlorinated biphenyls [h]	*1*	*na*	*10*	*na*	*na*	-	-	ND (0.2)	-	-	-	-	-	-	-	-
RCRA Metals [i]																
Arsenic	*20*	*0.67*	*20*	*87.5*	*20*	–	–	ND (3.8)	14	ND (11)	ND (13)	–	–	–	–	–

Table 3. Summary of Supplemental Analytical Results for Soil Samples (mg/kg) Collected from Selected Archeological Trenches and Borings in 2006 and 2007

Sample Location Designation	*MTCA Method A cleanup level (unrestricted)* [a]	*MTCA Method B cleanup level (unrestricted)* [b]	*MTCA Method A cleanup level (industrial)* [a]	*MTCA Method C cleanup level (industrial)* [b]	*Site-specific cleanup level* [c]	BT12	BT13	Tank 3-SS	H21	H28	CPT24	H22	H25	H27	VC87	VC88
Soil depth (feet)						10	12	Surface	10	12.5	10	12	8	13	9	8.5
PID reading (ppm)						448	691	68.7	na	na	na	na	na	na	na	na
Analyte																
Barium	*na*	*5,600*	*na*	*24,500*	*na*	–	–	13	ND (3.2)	8.0	15	–	–	–	–	–
Cadmium	*2*	*80*	*2*	*3,500*	*na*	–	–	ND (0.5)	ND (0.63)	ND (0.54)	ND (0.63)	–	–	–	–	–
Chromium	*19/2,000'*	*240/120,000'*	*19/2,000'*	*10,500/5,250,000'*	*48* [k]	–	–	11	31	28	25	–	–	–	–	–
Lead	*250*	*na*	*1,000*	*na*	*24*	–	–	ND (3.8)	140	10	32	–	–	–	–	–
Mercury	*2*	*24*	*2*	*1,050*	*0.01*	–	–	ND (0.02)	ND (0.32)	ND (0.27)	ND (0.31)	–	–	–	–	–
Selenium	*na*	*400*	*na*	*17,500*	*na*	–	–	ND (3.8)	ND (13)	ND (11)	ND (13)	–	–	–	–	–
Silver	*na*	*400*	*na*	*17,500*	*1.0*	–	–	ND (2.8)	ND (0.63)	ND (0.54)	5.9	–	–	–	–	–

Source: Herrera 2007, Table 2.

Values reported in mg/kg on a dry weight basis; PID readings reported in ppm in air.

Values shown as **bold** exceeded MTCA cleanup levels for unrestricted land use.

Values shown as **bold** exceeded MTCA cleanup levels for industrial land use.

na not applicable.

ND (0.03) Analyte was not detected above the practical quantitation limit shown in parentheses.

-- Sample was not analyzed for this constituent.

[a] MTCA Method A soil cleanup levels for unrestricted and industrial land uses (Ecology 2001a).

[b] MTCA Method B (unrestricted) and C (industrial) soil cleanup levels for direct contact pathway (Ecology 2001b).

[c] Original source (not reviewed for this report): Fluor Daniel GTI 1998.

[d] VOCs analyzed by EPA Method 8260B.

[e] PAHs analyzed by EPA Method 8270C, with selected ion monitoring (SIM).

[f] MTCA Method A soil cleanup level for naphthalene based on total naphthalenes; including naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene.

[g] Each detected cPAH constituent is adjusted using the toxicity equivalency factor (TEF). When cPAH constituent was not detected, half of the detection limit value was assumed for the TEF calculation. The total cPAH value is the sum of TEF-modified cPAH constituents concentration compared to the MTCA Method A soil cleanup criterion.

[h] PCBs analyzed by EPA Method 8082.

[i] RCRA metals analyzed by EPA Method 6000/7000 Series.

[j] MTCA Method A soil cleanup levels for chromium VI and III, respectively.

[k] Chromium VI soil cleanup level only.

Parametrix 554-1631-088/01(4A) 6/11 (B)

N

0 225

Feet

Source: Herrera Environmental Consultants, Inc. in association with Moffatt & Nichol. May 9, 2007. Mukilteo Multimodal Ferry Terminal Subsurface Environmental Conditions Impacting Design Updated Technical Memorandum. Exhibit 1.

Figure 10
2006 and 2007 Mukilteo Tank Farm Soil Sample Locations

Figure 11. Caulking Material on Rims of Tank Bottoms

Source: Herrera 2006

Figure 12. Former Fueling Equipment

Source: Herrera 2006

Figure 13. Substation Transformer

Source: Herrera 2006

Figure 14. Circuit Breakers and Switches

Source: Herrera 2006

4. PROJECT-RELATED HAZARDOUS MATERIALS IMPACTS

Analysts evaluated direct, indirect, and cumulative hazardous materials impacts potentially related to the project by considering impacts that hazardous materials sites might pose to the project as well as hazardous materials impacts the project might pose to sensitive receptors and to the environment in general.

4.1 Direct Impacts (Construction Impacts)

As is described in detail in the methodology, direct hazardous materials impacts that this project might pose are impacts that would arise during project construction. These impacts primarily consist of

- Subjecting WSF to liability for remediating any hazardous materials site acquired for the project
- Harming project workers, the public, and the environment by exposing them to hazardous materials encountered or used during project construction
- Increasing project costs and delaying project construction in order to properly manage hazardous materials encountered, used, or accidentally spilled during project construction

Using the methodology in Attachment A and the information in the "Current Site Conditions and Contaminants of Concern" portions of Tables C-1 and C-2 in Attachment C, analysts evaluated the direct hazardous materials impacts that each hazardous materials site in the study area would pose during construction to each project alternative. Analysts then assigned one or more of the following impact ratings to each site for each project alternative, depending on whether construction of that alternative would involve acquiring that site; renovating, removing, or excavating structures on that site; or excavating soil or dewatering groundwater on or near that site.

- Acquisition
- Demolition
- Contamination – None
- Contamination – Low
- Contamination – Moderate
- Contamination – High

The impact ratings assigned to each hazardous materials site for each project alternative are shown in Table 4. The direct hazardous materials impacts of each site to each project alternative are described in detail below and after Table 4. The direct hazardous materials impacts that each project alternative might pose to sensitive receptors and to the environment in general are also described below and after Table 4.

4.1.1 No-Build Alternative

Direct Impacts Posed to the No-Build Alternative by Hazardous Materials Sites

As is explained in the direct impacts section of the methodology, the direct impacts that hazardous materials sites pose to the No-Build Alternative are the need to:

- Acquire property for project construction: The No-Build Alternative would require the continued leasing or the acquisition of all or part of Site 6, a site WSF currently uses as a holding area. If WSF decides to purchase the property instead of continuing to lease it, WSF could assume, upon site acquisition, liability for cleaning up contamination that might be related to that property.
- Renovate, remove, or excavate structures and equipment that could contain ACM, LBP, PCBs and mercury: The No-Build Alternative would require the renovation or removal of structures that could have ACM, LBP and paint containing other heavy metals such as chromium, PCBs, and mercury. These materials pose risks to public and worker safety when disturbed. ACM is likely to exist in greater quantities in buildings constructed before 1995. LBP is likely to exist in greater quantities in or on structures painted before 1980. Four sites have or may have structures that would be renovated or removed that have LBP or paint with other heavy metals, ACM, PCBs, or mercury: Site 1 (the Port of Everett's public fishing pier and the ferry docking towers and wingwalls), Site 2 (the ferry passenger and maintenance building, bulkhead, timber trestle and transfer span including hydraulic lifting mechanisms and structures and a bridge seat foundation), Site 5 (the toll booths and terminal supervisor's building), and possibly Site 6 (light standards).

Table 4. Potential Direct Impacts and Impact Ratings of Hazardous Materials Sites[a] by Project Alternative

Potential Direct Hazardous Materials Impacts:

A. Acquire property for project construction
B. Renovate, remove, or excavate structures and equipment that could contain ACM, LBP, PCBs, and mercury
C. Remove ASTs, USTs, and associated contaminated soil
D. Decommission underground oil/water separators, bulk fuel distribution facilities, remediation wells, and all associated piping
E. Remove creosote-treated timber and piles from structures being renovated or removed
F. Disturb, dredge, or excavate sediment and soil that has been in contact with creosote-treated timber or piles
G. Grade or excavate contaminated soil
H. Dewater excavations or pits in the vicinity of contaminated groundwater
I. Construct stormwater facilities in contaminated areas

Impact Rating (with associated potential direct hazardous materials impacts)	Project Alternative			
	No-Build	Existing Site Improvements	Elliot Point 1	Elliot Point 2
Acquisition (A)	Site 6 (A)	Site 1 (A) Site 2 (A) Site 3 (A) Site 6 (A) Site 7 (A) Site 8 (A)	Site 6 (A) Site 8 (A) Site 13[a]: 1, 2, 4, 7 (A)	Site 6 (A) Site 8 (A) Site 13[a]: 1, 2, 3, 4, 7 (A)
Demolition (B, C, D, or E)	Site 1 (B, E) Site 2 (B, E) Site 5 (B) Site 6 (B)	Site 1 (B, E) Site 2 (B, E) Site 3 (B, E) Site 5 (B) Site 6 (B) Site 7 (B) Site 8 (B)	Site 1 (B, E) Site 2 (B, E) Site 5 (B) Site 6 (B, C) Site 8 (B) Site 13[a] (B, C, D, E) Site 14 (B)	Site 1 (B, E) Site 2 (B, E) Site 5 (B) Site 6 (B, C) Site 8 (B) Site 13[a] (B, C, D, E)
Contamination – None (F, G, H, or I – though no potential impacts are assigned to sites receiving this impact rating)	Site 4 Site 9 Site 10 Site 11 Site 12 Site 13[a]	Site 9 Site 12	Site 4 (for everything but I) Site 9 Site 12	Site 4 (for everything but I) Site 9 Site 12
Contamination – Low (F, G, H, or I)		Site 4 (G, H, I) Site 10 (G, H, I) Site 11 (G, H, I) Site 13[a] (G, H, I)	Site 4 (for I only) Site 10 (G, H, I) Site 11 (G, H, I) Site 14 (G, H)	Site 4 (for I only) Site 10 (G, H, I) Site 11 (G, H, I)
Contamination – Moderate (F, G, H, or I)	Site 1 (F) Site 2 (F) Site 6 (G, H) Site 7 (G, H)	Site 1 (F) Site 2 (F) Site 3 (F) Site 6 (G, H, I) Site 7 (G, H, I)	Site 1 (F) Site 2 (F) Site 6 (G, H, I) Site 7 (G, H, I) Site 13[a] (F, G, H, I)	Site 1 (F) Site 2 (F) Site 6 (G, H, I) Site 7 (G, H, I) Site 13[a] (F, G, H, I)
Contamination – High (F, G, H, or I)	--	--	--	--

[a] The major structures on Site 13, the Mukilteo Tank Farm, are defined in this report as 1) the Tank Farm, 2) the Tank Farm Pier, 3) the BNSF Railway siding, 4) the bulk fuel distribution facilities, 5) the U.S. Air Force Fuels Laboratory and vicinity, 6) the NOAA Mukilteo Research Station, and 7) miscellaneous structures including electrical transformers and related oil-filled equipment.

- Remove creosote-treated timber and piles from structures being renovated or removed: The No-Build Alternative would require the renovation or removal of structures that have or could have creosote-treated timber and piles. Creosote-treated timber and piles contaminate the environment and are generally required to be removed as part of the removal of a structure. The structures on Site 1 that could have creosote-treated timber and piles that would be renovated or removed are the Port of Everett's public fishing pier and the ferry docking towers and wingwalls. The structures on Site 2 that could have creosote-treated timber and piles that would be removed are the ferry passenger and maintenance building, bulkhead, timber trestle and transfer span including a bridge seat foundation.
- Disturb, dredge, or excavate sediment and soil that has been in contact with creosote-treated timber or piles: The No-Build Alternative would disturb, dredge, or excavate sediment and soil that has been in contact with creosote-treated timber or piles. Such sediment and soil could be contaminated with creosote and be spread as a result of project work. On Site 1, such sediment could be disturbed or excavated as part of the renovation of the Port of Everett's public fishing pier and the removal and replacement of the ferry docking towers and wingwalls. On Site 2, such sediment could be disturbed or excavated as part of the removal and replacement of the ferry passenger and maintenance building, bulkhead, timber trestle, and the transfer span including a bridge seat foundation.

It is unlikely that any upland grading, excavation, or dewatering would encounter or spread contaminated soil or groundwater though eight potentially contaminated hazardous materials sites exist within, in the vicinity of, or upgradient of the No-Build Alternative footprint: Sites 4, 6, 7, 9, 10, 11, 12, and 13.

Sites 4, 9, 10, 11, 12, and 13 were assigned a "Contamination-None" impact rating. Site 4 has been cleaned up, may have at most only residual contamination, and is essentially down- or cross- gradient of the No-Build Alternative's footprint. Site 9, the railway corridor, could have had hazardous materials released along it but no evidence of releases has been found. Site 10 has been cleaned up. The USTs and all reasonably accessible contaminated soil were removed and subsequent investigations found no soil or groundwater exceeding MTCA Method A cleanup levels. The site received a "No Further Action" determination from Ecology and likely has at most only residual contamination. Also, Site 10 is located near Brewery Creek and therefore is unlikely to have affected the No-Build Alternative's footprint. Site 11, although used as an automotive repair shop with indicia of having one or more

USTs, is not registered with Ecology as an UST site, has no record of any releases, and is located near Brewery Creek and therefore is also unlikely to have affected the No-Build Alternative's footprint. Site 12 is more than an eighth of a mile from the No-Build Alternative's footprint, had an UST that was removed, and has had no reported releases. Site 13, though at one time highly contaminated, has been largely remediated, and is cross-gradient of and not known to still be contaminated in the area closest to the No-Build Alternative's footprint.

Sites 6 and 7 were assigned a "Contamination - Moderate" impact rating. Site 6 is within the project area, could have USTs and petroleum hydrocarbon contamination from that property's use as a gasoline service station in the late 1940s to the mid-1950s, and in 2009 was found to have diesel-range organic contamination across the eastern leg of the property, with contamination exceeding MTCA Method A cleanup levels in one location. However, the nature of the work that would be done for the No-Build Alternative makes it unlikely that contaminated soil or groundwater on the site would be encountered or spread during project construction. Site 7 is essentially down- or cross- gradient of the No-Build Alternative's footprint and in 2009 was found to have low level diesel-range organic contamination just north of its southern boundary with Site 6. This contamination, depending on its extent, could have migrated to the No-Build Alternative footprint, though the nature of the work that would be done for the No-Build Alternative makes it unlikely that contaminated soil or groundwater from Site 7 would be encountered or spread during project construction.

No infiltration impacts would be posed to the No-Build Alternative because no infiltrating stormwater handling facilities would be constructed for this alternative.

Direct Impacts Posed by the No-Build Alternative to Sensitive Receptors and the Environment

The direct hazardous materials impacts that the No-Build Alternative might pose to sensitive receptors and to the environment in general are both beneficial and adverse. Sensitive receptors and the environment could experience short-term exposure to LBP, ACM, PCBs, mercury, creosote-treated timber and piles, and creosote-contaminated sediment during project construction. Hazardous materials used during project construction, such as fuels, lubricants, hydraulic fluid, other vehicle fluids, cement, asphalt tar, paving oils, tack, and paint, could also leak or spill and affect sensitive receptors and the environment. However, the No-Build Alternative poses beneficial hazardous materials impacts to sensitive receptors and the environment by removing

structures containing LBP, ACM, PCBs, and mercury, by removing creosote-treated timber and piles, and by removing creosote-contaminated sediment.

Most of the beneficial and adverse direct hazardous materials impacts that the No-Build Alternative might pose to sensitive receptors would have a greater impact on sensitive receptors typically containing endangered or threatened species than on sensitive receptors typically containing human populations. This is because most of the No-Build Alternative work would occur near or in Possession Sound with any LBP, ACM, PCBs, mercury, and creosote-contaminated materials released by project work having the possibility of entering Possession Sound and being unlikely to reach identified sensitive receptors containing human populations, with the exception of the Art Workshop, which is located at 724 First Street, the same location as Site 8. Similarly, hazardous materials used during project construction are insufficiently volatile and would not be used, leaked, or spilled in great enough concentrations to affect identified sensitive receptors containing human populations except for the Art Workshop, though such materials could leak or spill directly into and adversely affect Possession Sound. Beneficial direct hazardous materials impacts of the No-Build Alternative would also occur near or in Possession Sound and would be unlikely to be felt by sensitive receptors containing human populations except the Art Workshop.

4.1.2 Existing Site Improvements Alternative

Direct Impacts Posed to the Existing Site Improvements Alternative by Hazardous Materials Sites

As is explained in the direct impacts section of the methodology, the direct impacts that hazardous materials sites pose to the Existing Site Improvements Alternative are the need to:

- Acquire property for project construction: The Existing Site Improvements Alternative would require acquisition of all or part of six sites. WSF could assume, upon site acquisition, liability for cleaning up contamination that might be related to these properties. The six sites that WSF would need to acquire all or part of are: Site 1 (for the relocated floating dolphin, the new fixed dolphins, the new wingwalls and towers, the new transfer span, part of the new trestle, and part of the new overhead passenger loading structure), Site 2 (for part of the new bulkhead, part of the new trestle, and part of the new overhead passenger loading structure), Site 3 (for the new bridge seat, the new passenger and maintenance building, and part of the new bulkhead), Site 6 (for permanent ownership of the current holding area and to improve access

and circulation to and from the new ferry terminal), Site 7 (for the new transit center and new WSF employee parking area and to improve access and circulation to and from the new ferry terminal), and Site 8 (for the new terminal supervisor's building and to improve access and circulation to and from the new ferry terminal).

- Renovate, remove, or excavate structures and equipment that could contain ACM, LBP, PCBs and mercury: The Existing Site Improvements Alternative would require the removal of structures that could have ACM, LBP, and paint containing other heavy metals such as chromium, PCBs, and mercury. These materials pose risks to public and worker safety when disturbed. ACM is likely to exist in greater quantities in buildings constructed before 1995. LBP is likely to exist in greater quantities in or on structures painted before 1980. Seven sites have or may have structures that would be removed that have LBP or paint with other heavy metals, ACM, PCBs, or mercury: Site 1 (the Port of Everett's public fishing pier, the floating dolphin, the slip, the fixed dolphins, the towers, and the wingwalls), Site 2 (the ferry passenger and maintenance building, bulkhead, transfer span including hydraulic lifting mechanisms and structures and a bridge seat foundation, and part of the timber trestle), Site 3 (the Ivar's Restaurant building), Site 5 (the terminal supervisor's building and possibly the toll booths), possibly Sites 6 and 7 (light standards), and Site 8 (the glass blowing building).
- Remove creosote-treated timber and piles from structures being renovated or removed: The Existing Site Improvements Alternative would require the removal of structures that have or could have creosote-treated timber and piles. Creosote-treated timber and piles contaminate the environment and are generally required to be removed as part of the removal of a structure. The structures on Site 1 that could have creosote-treated timber and piles that would be removed are the Port of Everett's public fishing pier and the ferry docking floating dolphin, slip, fixed dolphins, towers, and wingwalls. The structures on Site 2 that could have creosote-treated timber and piles that would be removed are the ferry passenger and maintenance building, bulkhead, transfer span including a bridge seat foundation, and part of the timber trestle. The structure on Site 3 that could have creosote-treated timber and piles that would need to be removed is the Ivar's Restaurant building.
- Disturb, dredge, or excavate sediment and soil that has been in contact with creosote-treated timber or piles: The Existing Site Improvements Alternative would disturb, dredge, or excavate sediment and soil that has been in contact with creosote-treated timber or piles. Such sediment and soil could be contaminated with creosote and be spread as a result of

project work. On Site 1, such sediment could be disturbed or excavated as part of the removal of the Port of Everett's public fishing pier; the removal of the ferry docking slip, fixed dolphins, towers, and wingwalls; the relocation of the floating dolphin; and the construction of fixed dolphins, towers, wingwalls, transfer span, and part of the trestle, bulkhead, and overhead passenger loading structure. On Site 2, such sediment could be disturbed or excavated as part of the removal of the ferry passenger and maintenance building, bulkhead, transfer span including a bridge seat foundation, and part of the timber trestle and construction of part of the overhead passenger loading structure, bulkhead, and trestle. On Site 3, such sediment could be disturbed or excavated as part of the removal of the Ivar's Restaurant building and construction of the bridge seat, passenger and maintenance building, and part of the overhead passenger loading structure and bulkhead.

- Grade or excavate contaminated soil: The Existing Site Improvements Alternative would grade or excavate contaminated soil. Such activities would spread contamination.

  Upland grading or excavation performed for the Existing Site Improvements Alternative could encounter or spread contaminated soil related to six of the eight potentially contaminated upland hazardous materials sites that exist within, in the vicinity of, or upgradient of the Existing Site Improvements Alternative footprint. Those eight sites are Sites 4, 6, 7, 9, 10, 11, 12, and 13.

  Sites 9 and 12 were assigned a "Contamination-None" impact rating. Site 9, the BNSF railway corridor, could have had hazardous materials released along it but no evidence of releases has been found. Site 12 is more than an eighth of a mile from the Existing Site Improvements Alternative's footprint, had an UST that was removed, and has had no reported releases.

  Sites 4, 10, 11, and 13 were assigned a "Contamination-Low" impact rating. Although Site 4 has been cleaned up, may have at most only residual contaminant concentrations, and is essentially down- or cross-gradient of the Existing Site Improvements Alternative's footprint, the site's hydrogeology and contaminant type make it possible that any residual contamination could be spread by work that would be performed for the Existing Site Improvements Alternative. Site 10 has been cleaned up and likely has at most only residual contamination; however, it is located near Brewery Creek and therefore could have affected the Existing Site Improvements Alternative's footprint. Site 11 was used as an automotive repair shop, had indicia of having one or more USTs, is not

registered with Ecology as an UST site, and has no record of any releases; however, it is less than an eighth of a mile from the Existing Site Improvements Alternative's footprint and is located near Brewery Creek. Site 13, though at one time highly contaminated, has been largely remediated, and is cross-gradient of and not known to still be contaminated in the area closest to the Existing Site Improvements Alternative's footprint; however, any residual contamination could be spread by work performed for this alternative.

Sites 6 and 7 were assigned a "Contamination - Moderate" impact rating. Site 6 is within the Existing Site Improvements Alternative footprint, could have USTs and petroleum hydrocarbon contamination from use as a gasoline service station in the late 1940s to the mid-1950s, and in 2009 was found to have diesel-range organic contamination across the eastern leg of the property, with contamination exceeding MTCA Method A cleanup levels in one location. Site 7 is also within the Existing Site Improvements Alternative footprint and in 2009 was found to have low level diesel-range organic contamination just north of its southern boundary with Site 6; the extent of its contamination was not determined.

- Dewater excavations or pits in the vicinity of contaminated groundwater: The Existing Site Improvements Alternative would dewater excavations or pits that could be in the vicinity of contaminated groundwater. Contaminated groundwater could be encountered or spread and drawn into the excavations or pits as a result of dewatering activities.

  For the reasons presented under the previous bullet point, "Grade or excavate contaminated soil," upland dewatering performed for the Existing Site Improvements Alternative could encounter or spread contaminated groundwater related to Sites 4, 6, 7, 10, 11, or 13, six of the eight potentially contaminated upland hazardous materials sites that exist within, in the vicinity of, or upgradient of the Existing Site Improvements Alternative footprint.

- Construct stormwater facilities in contaminated areas: The Existing Site Improvements Alternative would increase the depth of the existing infiltrating wet pond located along Park Avenue. This change could pose infiltration impacts to the alternative by spreading the contamination described under the bullet point, "Grade or excavate contaminated soil," above.

Direct Impacts Posed by the Existing Site Improvements Alternative to Sensitive Receptors and the Environment

The types of direct adverse and beneficial hazardous materials impacts that the Existing Site Improvements Alternative might pose to sensitive receptors and the environment in general are the same as those that the No-Build Alternative might pose to sensitive receptors and the environment. However, both the adverse and the beneficial impacts would be greater for the Existing Site Improvements Alternative than for the No-Build Alternative because more structures with LBP, ACM, PCBs, mercury, and creosote-treated timber and piles would be removed, more creosote-contaminated sediment would be disturbed and possibly removed, and more hazardous materials would be used during project construction. However, the direct impacts would almost exclusively affect sensitive receptors typically containing endangered or threatened species. Identified sensitive receptors typically containing human populations would be too far from project construction work areas to be affected by them. The building on Site 8, which contains the Art Workshop that could be affected by the No-Build Alternative, would be acquired and demolished for the Existing Site Improvements Alternative, thereby eliminating the Art Workshop as a sensitive receptor for the alternative.

4.1.3 Elliot Point 1 Alternative

Direct Impacts Posed to the Elliot Point 1 Alternative by Hazardous Materials Sites

As is explained in the direct impacts section of the methodology, the direct impacts that hazardous materials sites pose to the Elliot Point 1 Alternative are the need to:

- Acquire property for project construction: The Elliot Point 1 Alternative would require acquisition of all or part of three sites. WSF could assume, upon site acquisition, liability for cleaning up contamination that might be related to these properties. The three sites that WSF would need to acquire all or part of are: Site 6 (for realignment and extension of First Street), Site 8 (for realignment and extension of First Street), and Site 13 (for construction of stormwater facilities, realignment and extension of First Street, reconfiguration of parking and access to Mukilteo Station, construction of a WSF employee parking area, a transit center and transit parking, construction of the new ferry terminal facility, daylighting of Japanese Creek, and reconstruction of the parking area for the existing public shoreline area at the Mount Baker Terminal).

- Renovate, remove, or excavate structures and equipment that could contain ACM, LBP, PCBs, and mercury: The Elliot Point 1 Alternative would require the removal of structures that could have ACM, LBP, and paint containing other heavy metals such as chromium, PCBs, and mercury. These materials pose risks to public and worker safety when disturbed. ACM is likely to exist in greater quantities in buildings constructed before 1995. LBP is likely to exist in greater quantities in or on structures painted before 1980. Seven sites have or may have structures that would be removed that have LBP or paint with other heavy metals, ACM, PCBs, or mercury: Site 1 (the floating dolphin, the slip, the fixed dolphins, the towers, and the wingwalls); Site 2 (the transfer span including hydraulic lifting mechanisms and structures and a bridge seat foundation, the timber trestle, the bulkhead, and the ferry passenger and maintenance building); Site 5 (the toll booths and the terminal supervisor's building); possibly Site 6 (light standards); Site 8 (the glass blowing building); Site 13 (various structures and piping including the welded steel bottoms of Tanks 1 through 10; the tank containment walls, floors, and access stairways; bulk fuel distribution pipes and associated facilities with gaskets potentially having ACM and paint potentially containing heavy metals; light standards, structures, and piping on the Tank Farm Pier; possibly the Pump Shelter; and transformers and related oil filled equipment in various locations on the site); and possibly Site 14 (light standards or other structures).
- Remove ASTs and USTs and any associated contaminated soil: The Elliot Point 1 Alternative footprint contains ASTs and possibly USTs. These can corrode and leak over time or can be ruptured and leak if encountered by equipment during project construction. Both scenarios would cause soil to become contaminated with the tank contents, which could be petroleum products or other hazardous materials. Two sites within the alternative's footprint may have or have ASTs or USTs: Site 6 (could have USTs abandoned from that property's use as a gasoline service station in the late 1940s to the mid-1950s; also found to have diesel-range organic contamination at least on eastern leg of property) and Site 13 (AST Tank 16, possibly UST Tank 12, and possibly the firefighting foam chemical AST).
- Decommission underground oil/water separators, bulk fuel distribution facilities, remediation wells, and all associated piping: Underground oil/water separators, bulk fuel distribution facilities, remediation wells, and associated piping likely exist within the Elliot Point 1 Alternative footprint on Site 13. Such structures could contain residual petroleum

products and other hazardous materials that could be spread during project construction and could serve as contaminant conduits.

- Remove creosote-treated timber and piles from structures being renovated or removed: The Elliot Point 1 Alternative would require the removal of structures that have or could have creosote-treated timber and piles. Creosote-treated timber and piles contaminate the environment and are generally required to be removed as part of the removal of a structure. The structures on Site 1 that could have creosote-treated timber and piles that would be removed are the ferry docking floating dolphin, slip, fixed dolphins, towers, and wingwalls. The structures on Site 2 that could have creosote-treated timber and piles that would be removed are the ferry passenger and maintenance building, bulkhead, transfer span including a bridge seat foundation, and timber trestle. The structures on Site 13 that could have creosote-treated timber and piles that would be removed are the Tank Farm Pier, which has 3,900 creosote pressure-treated piles, and possibly the railroad spur that extends from the north side of the area between Tanks 2 and 3 onto the Tank Farm Pier.
- Disturb, dredge, or excavate sediment and soil that has been in contact with creosote-treated timber or piles: The Elliot Point 1 Alternative would disturb, dredge, or excavate sediment and soil that has been in contact with creosote-treated timber or piles. Such sediment and soil could be contaminated with creosote and be spread as a result of project work. On Site 1, such sediment could be disturbed or excavated as part of the removal of the ferry docking slip, fixed dolphins, towers, and wingwalls and the relocation of the floating dolphin. On Site 2, such sediment could be disturbed or excavated as part of the removal of the ferry passenger and maintenance building, bulkhead, timber trestle, and transfer span including a bridge seat foundation. On Site 13, such sediment could be disturbed, dredged, or excavated as part of the removal of the Tank Farm Pier, the dredging of an area approximately 400 feet wide by 26 feet deep (removing approximately 13,600 cubic yards of sediment) in the sediment mound beneath the Tank Farm Pier to create a sufficiently deep channel for ferry boat passage, any additional excavation of the sediment mound beneath the Tank Farm Pier, the possible removal of the railroad spur that extends from the north side of the area between Tanks 2 and 3 onto the Tank Farm Pier, and the construction of the new ferry terminal facility. Because the timber surrounding the railroad track itself appears to have been pressure-treated and therefore possibly preserved with a compound other than creosote, any soil in contact with it would be tested for compounds in addition to creosote components.

Notably, the sediment mound that has accumulated under the Tank Farm Pier extends about 1,300 feet, or the length of the pier, and is generally 25 feet higher than the surrounding sediment (Coast & Harbor 2011). Although no sampling of this sediment has been performed, the sediment is suspected of being contaminated with creosote and possibly with petroleum hydrocarbons from the pier's use as part of the bulk fuel storage and transfer facility. During World War II, the pier was used to load ammunition onto ships and crates of ammunition were reportedly lost over the side of the pier. Because of efforts undertaken in 1986-1987 and 1993-1994 to locate and recover the lost ammunition, it is unlikely though possible that ammunition remains under or in the vicinity of the pier and in the sediment to be dredged or excavated. The sediment mound would be vulnerable to being spread during Tank Farm Pier removal as well as by wave action and ferry propeller scour once the pier is removed.

- Grade or excavate contaminated soil: The Elliot Point 1 Alternative would grade or excavate contaminated soil. Such activities would spread contamination.

  Upland grading or excavation performed for the Elliot Point 1 Alternative could encounter or spread contaminated soil related to six of the nine potentially contaminated upland hazardous materials sites that exist within, in the vicinity of, or upgradient of the Elliot Point 1 Alternative's footprint. Those nine sites are Sites 4, 6, 7, 9, 10, 11, 12, 13, and 14.

  Sites 4, 9, and 12 were assigned a "Contamination-None" impact rating. Site 4 has been cleaned up, may have at most only residual contaminant concentrations, and is downgradient of the Elliot Point 1 Alternative's footprint. Although hazardous materials could have been released on Sites 9 and 12, no evidence of releases was found.

  Sites 10, 11, and 14 were assigned a "Contamination-Low" impact rating. Site 10 has been cleaned up and likely has at most only residual contamination; however, it is located near Brewery Creek and therefore could have affected the Elliot Point 1 Alternative's footprint. Site 11 was used as an automotive repair shop, had indicia of having one or more USTs, is not registered with Ecology as an UST site, and has no record of any releases; however, it is less than an eighth of a mile from the Elliot Point 1 Alternative's footprint and is located near Brewery Creek. Finally, although Site 14 is immediately east of Site 13, it is presumed that any contamination on that site would be contamination that migrated from

Site 13 and that was remediated as part of the Site 13, with only residual contaminant concentrations, if any, remaining on Site 14.

Sites 6, 7, and 13 were assigned a "Contamination-Moderate" impact rating. Site 6 is within the Elliot Point 1 Alternative's footprint, could have USTs and petroleum hydrocarbon contamination from use as a gasoline service station in the late 1940s to the mid-1950s, and in 2009 was found to have diesel-range organic contamination across the eastern leg of the property, with contamination exceeding MTCA Method A cleanup levels in one location. A corner of Site 7 touches the Elliot Point 1 Alternative's footprint. In 2009, the site was found to have low level diesel-range organic contamination just north of its southern boundary with Site 6; the extent of its contamination was not determined. This contamination, depending on its extent, could have migrated to the Elliot Point 1 Alternative's footprint.

Grading or excavation performed on Site 13 for the Elliot Point 1 Alternative could encounter or spread soil with contaminant concentrations greater than Site 13's site-specific cleanup standards. Grading would disturb the granular asphalt bedding material beneath the bottom pad of Tank 3, which has cPAHs in excess of site-specific soil cleanup standards and diesel- and lube oil-range petroleum hydrocarbons in concentrations suggesting free-product. It is thought that this contamination exists in the bedding material beneath all of the large AST pads on Site 13. Excavation could encounter pockets of contamination with cPAHs, lead, silver, benzene, and possibly other contaminants in concentrations greater than the site-specific cleanup standards. Excavation could also encounter soil contaminated with high levels of petroleum hydrocarbons. Such contamination was found 9 to 12 BGS in a band of soil 6 to 12 inches thick just above the water table in Area 1 and in the western portion of Area 3, and may exist in the eastern half of Area 3 and in Area 2. Chromium and lead from sand blasting residues could exist in the Tank 1, 2, 3, 7, and 8 containment areas. Petroleum hydrocarbons and heavy metals from tank cleaning sludge could exist in the Tank 3, 6, and 10 containment areas as well as in the spoils area (also known as the truck turnaround area east of Tank 10. Residual levels of petroleum hydrocarbons may be found across the Mukilteo Tank Farm. Low levels of pesticides have been documented in the surface soils of the containment area for the two former railcar storage tanks, Tanks 13 and 15.

- Dewater excavations or pits in the vicinity of contaminated groundwater: The Elliot Point 1 Alternative would dewater excavations or pits that could be in the vicinity of contaminated groundwater. Contaminated

groundwater could be encountered or spread and drawn into the excavations or pits as a result of dewatering activities.

For the reasons presented under the previous bullet point, "Grade or excavate contaminated soil," upland dewatering performed for the Elliot Point 1 Alternative could encounter or spread contaminated groundwater related to Sites 6, 7, 10, 11, 13, and 14, six of the nine potentially contaminated upland hazardous materials sites that exist within, in the vicinity of, or upgradient of this alternative. In particular, dewatering activities performed on Site 13 could encounter or could draw groundwater containing the same contaminants found in on-site soils, i.e., gasoline-, diesel-, and lube oil-range petroleum hydrocarbons, cPAHs, PAHs, BTEX, chromium, lead, silver, and low levels of pesticides..

- Construct stormwater facilities in contaminated areas: The Elliot Point 1 Alternative would involve installing a stormwater facility on Site 13 in the Tank 1 containment area. If the facility is an infiltrating facility, such as an infiltrating stormwater pond, the infiltrating water could spread contamination affecting the area from upgradient and on-site sources as well as spread contamination on downgradient sites.

Direct Impacts Posed by the Elliot Point 1 Alternative to Sensitive Receptors and the Environment

The Elliot Point 1 Alternative poses the same type of direct adverse and beneficial hazardous materials impacts to sensitive receptors and to the environment that the Existing Site Improvements Alternative poses. Again, both the adverse and the beneficial impacts would be greater for the Elliot Point 1 Alternative than for the Existing Site Improvements Alternative because more structures with LBP, ACM, PCBs, mercury, and creosote-treated timber and piles would be removed, more creosote-contaminated sediment would be disturbed and removed, and more hazardous materials would be used during project construction. In particular, various structures and piping that might have LBP, ACM, PCBs, or mercury would be removed from Site 13. Also, more creosote-treated timber and piles and creosote-contaminated sediment would be disturbed and removed with the removal of the Tank Farm Pier, which has 3,900 creosote pressure-treated piles, the dredging of the sediment mound beneath the pier to create a deeper passage for ferry boat travel, and any additional excavation of the sediment mound.

Additional types of direct adverse and beneficial hazardous materials impacts are posed by the Elliot Point 1 Alternative. Contaminated asphalt bedding beneath the bottom pads of all 10 large bulk fuel tanks might be cleaned up and disposed of off-site. Contaminated soil encountered during construction might be disposed of off-

site. Contaminated dewatered water would be appropriately disposed of. Several ASTs and possibly several USTs might be removed. Oil/water separators, bulk fuel distribution facilities, remediation wells and associated piping might need to be decommissioned and removed. All of these additional impacts would be adverse during construction because of the increased exposure to contaminants by sensitive receptors but beneficial thereafter due to the removal of contaminants that otherwise might be left to migrate or remain undiscovered and harm the environment. Depending on the type and concentration of any contaminants encountered during project construction, vapors from the contaminants could travel and adversely affect sensitive receptors containing human populations, though this is unlikely. The closest sensitive receptor containing human populations, the Art Workshop in the building on Site 8, would not exist during construction of the Elliot Point 1 Alternative because the building would be acquired and demolished for the project. The other sensitive receptors containing human populations are too far from the alternative footprint to be adversely affected by contamination vapors and would not directly benefit from cleanup of the contamination. However, both adverse and beneficial impacts of the removal of contaminants would directly affect sensitive receptors containing endangered or threatened species, i.e., Possession Sound and the lower reach of Japanese Creek.

4.1.4 Elliot Point 2 Alternative

Direct Impacts Posed to the Elliot Point 2 Alternative by Hazardous Materials Sites

The direct impacts that hazardous materials sites pose to the Elliot Point 2 Alternative are the need to:

- Acquire property for project construction: The Elliot Point 2 Alternative would require acquisition of all or part of three sites. WSF could assume, upon site acquisition, liability for cleaning up contamination that might be related to these properties. The three sites that WSF would need to acquire all or part of are: Site 6 (for realignment and extension of First Street) and Site 8 (for realignment and extension of First Street), and Site 13 (for realignment and extension of First Street, construction of stormwater facilities, construction of the new ferry terminal facility, construction of Mukilteo Station parking, and construction of a bus transit facility and bus bays).
- Renovate, remove, or excavate structures and equipment that could contain ACM, LBP, PCBs and mercury: The Elliot Point 2 Alternative

would require the removal of structures that could have ACM, LBP and paint containing other heavy metals such as chromium, PCBs, and mercury. These materials pose risks to public and worker safety when disturbed. ACM is likely to exist in greater quantities in buildings constructed before 1995. LBP is likely to exist in greater quantities in or on structures painted before 1980. Six sites have or may have structures that would be removed that have LBP or paint with other heavy metals, ACM, PCBs, or mercury: Site 1 (the floating dolphin, the slip, the fixed dolphins, the towers, and the wingwalls), Site 2 (the transfer span including hydraulic lifting mechanisms and structures and a bridge seat foundation, the timber trestle, the bulkhead, and the ferry passenger and maintenance building), Site 5 (the toll booths and the terminal supervisor's building), possibly Site 6 (light standards), Site 8 (the glass blowing building), and Site 13 (various structures and piping including the welded steel bottoms of Tanks 1 through 6 with residual caulking that may contain asbestos; the tank containment walls, floors, and access stairways; bulk fuel distribution pipes and associated facilities with gaskets potentially having ACM and paint potentially containing heavy metals; light standards, structures, and piping on the Tank Farm Pier; possibly the foam pump house building (Building T-408); the Pump Shelter; and transformers and related oil filled equipment in various locations on the site).

- Remove ASTs and USTs and associated contaminated soil: The Elliot Point 2 Alternative footprint contains ASTs and possibly USTs. These can corrode and leak over time or can be ruptured and leak if encountered by equipment during project construction. Both scenarios would cause soil to become contaminated with the tank contents, which could be petroleum products or other hazardous materials. Two sites within the alternative's footprint may have or have ASTs or USTs: Site 6 (could have USTs abandoned from that property's use as a gasoline service station in the late 1940s to the mid-1950s; also found to have diesel-range organic contamination at least on eastern leg of property), and Site 13 (AST Tank 16, possibly UST Tank 12, and possibly the firefighting foam chemical AST).
- Decommission underground oil/water separators, bulk fuel distribution facilities, remediation wells and all associated piping: Underground oil/water separators, bulk fuel distribution facilities, remediation wells, and associated piping likely exist within the Elliot Point 2 Alternative footprint on Site 13. Such structures could contain residual petroleum products and other hazardous materials that could be spread during project construction and could serve as contaminant conduits.

- Remove creosote-treated timber and piles from structures being renovated or removed: The Elliot Point 2 Alternative would require the removal of structures that have or could have creosote-treated timber and piles. Creosote-treated timber and piles contaminate the environment and are generally required to be removed as part of the removal of a structure. The structures on Site 1 that could have creosote-treated timber and piles that would be removed are the ferry docking floating dolphin, slip, fixed dolphins, towers, and wingwalls. The structures on Site 2 that could have creosote-treated timber and piles that would be removed are the ferry passenger and maintenance building, bulkhead, transfer span including a bridge seat foundation, and timber trestle. The structures on Site 13 that could have creosote-treated timber and piles that would be removed are the Tank Farm Pier, which has 3,900 creosote pressure-treated piles, and possibly the railroad spur that extends from the north side of the area between Tanks 2 and 3 onto the Tank Farm Pier.

- Disturb, dredge, or excavate sediment and soil that has been in contact with creosote-treated timber or piles: The Elliot Point 2 Alternative would disturb, dredge, or excavate sediment and soil that has been in contact with creosote-treated timber or piles. Such sediment and soil could be contaminated with creosote and be spread as a result of project work. On Site 1, such sediment could be disturbed or excavated as part of the removal of the ferry docking slip, fixed dolphins, towers, and wingwalls and the relocation of the floating dolphin. On Site 2, such sediment could be disturbed or excavated as part of the removal of the ferry passenger and maintenance building, bulkhead, timber trestle, and transfer span including a bridge seat foundation. On Site 13, such sediment could be disturbed, dredged, or excavated as part of the removal of the Tank Farm Pier, the dredging of an area approximately 500 feet wide by 26 feet deep (removing approximately 21,200 cubic yards of sediment) in the sediment mound beneath the Tank Farm Pier to create a sufficiently deep channel for ferry boat passage, any additional excavation of the sediment mound beneath the Tank Farm Pier, the possible removal of the railroad spur that extends from the north side of the area between Tanks 2 and 3 onto the Tank Farm Pier, and the construction of the new ferry terminal facility. Because the timber surrounding the railroad track itself appears to have been pressure-treated and therefore possibly preserved with a compound other than creosote, any soil in contact with it would be tested for compounds in addition to creosote components.

  Notably, as is described under the Elliot Point 1 Alternative, the sediment mound that has accumulated under the Tank Farm Pier is

about 1,300 feet long and generally 25 feet higher than the surrounding sediment (Coast & Harbor 2011). No sampling of this sediment has been performed but it is suspected of being contaminated with creosote and possibly with petroleum hydrocarbons. It is unlikely, though possible, that ammunition remains under or in the vicinity of the pier and in the sediment to be dredged or excavated. The sediment mound would be vulnerable to being spread during Tank Farm Pier removal as well as by wave action and ferry propeller scour once the pier is removed.

- Grade or excavate contaminated soil: The Elliot Point 2 Alternative would grade or excavate contaminated soil. Such activities would spread contamination.

  Upland grading or excavation performed for the Elliot Point 2 Alternative could encounter or spread contaminated soil related to five of the eight potentially contaminated upland hazardous materials sites that exist within, in the vicinity of, or upgradient of the Elliot Point 2 Alternative's footprint. Those eight sites are Sites 4, 6, 7, 9, 10, 11, 12, and 13.

  Sites 4, 9, and 12 were assigned a "Contamination-None" impact rating. Site 4 has been cleaned up, may have at most only residual contaminant concentrations, and is downgradient of the Elliot Point 2 Alternative's footprint. Although hazardous materials could have been released on Sites 9 and 12, no evidence of releases was found.

  Sites 10 and 11 were assigned a "Contamination-Low" impact rating. Site 10 has been cleaned up and likely has at most only residual contamination; however, it is located near Brewery Creek and therefore could have affected the Elliot Point 2 Alternative's footprint. Site 11 was used as an automotive repair shop, had indicia of having one or more USTs, is not registered with Ecology as an UST site, and has no record of any releases; however, it is less than an eighth of a mile from the Elliot Point 2 Alternative's footprint and is located near Brewery Creek.

  Sites 6, 7, and 13 were assigned a "Contamination-Moderate" impact rating. Part of Site 6 is within the Elliot Point 2 Alternative's footprint, could have USTs and petroleum hydrocarbon contamination from use as a gasoline service station in the late 1940s to the mid-1950s, and in 2009 was found to have diesel-range organic contamination across the eastern leg of the property, with contamination exceeding MTCA Method A cleanup levels in one location. A corner of Site 7 touches the Elliot Point 2 Alternative's footprint. In 2009, the site was found to have low level diesel-range organic contamination just north of its southern boundary with Site 6; the extent of its contamination was not determined. This

contamination, depending on its extent, could have migrated to the Elliot Point 2 Alternative's footprint.

Grading or excavation performed on Site 13 for the Elliot Point 2 Alternative could encounter or spread soil with contaminant concentrations greater than Site 13's site-specific cleanup standards. Grading would disturb the granular asphalt bedding material beneath the bottom pad of Tank 3, which has cPAHs in excess of site-specific soil cleanup standards and diesel- and lube oil-range petroleum hydrocarbons in concentrations suggesting free-product. It is thought that this contamination exists in the bedding material beneath all of the large AST pads on Site 13. Excavation could encounter pockets of contamination with cPAHs, lead, silver, benzene, and possibly other contaminants in concentrations greater than the site-specific cleanup standards. Excavation could also encounter soil contaminated with high levels of petroleum hydrocarbons. Such contamination was found 9 to 12 BGS in a band of soil 6 to 12 inches thick just above the water table in Area 1 and in the western portion of Area 3, and may exist in the eastern half of Area 3. Chromium and lead from sand blasting residues could exist in the Tank 1, 2, and 3 containment areas. Petroleum hydrocarbons and heavy metals from tank cleaning sludge could exist in the Tank 3 and 6 containment areas. Residual levels of petroleum hydrocarbons may be found across the Mukilteo Tank Farm. Low levels of pesticides have been documented in the surface soils of the containment area for the two former railcar storage tanks, Tanks 13 and 15.

- Dewater excavations or pits in the vicinity of contaminated groundwater: The Elliot Point 2 Alternative would dewater excavations or pits that could be in the vicinity of contaminated groundwater. Contaminated groundwater could be encountered or spread and drawn into the excavations or pits as a result of dewatering activities.

  For the reasons presented under the previous bullet point, "Grade or excavate contaminated soil", upland dewatering performed for the Elliot Point 2 Alternative could encounter or spread contaminated groundwater related to Sites 6, 7, 10, 11, and 13, five of the eight potentially contaminated upland hazardous materials sites that exist within, in the vicinity of, or upgradient of this alternative.

  In particular, dewatering activities performed on Sites 6 and 13 could encounter or could draw groundwater containing the same contaminants found in on-site soils. For example gasoline-, diesel-, and lube oil-range petroleum hydrocarbons on Site 6 and gasoline-, diesel-, and lube oil-

range petroleum hydrocarbons, cPAHs, PAHs, BTEX, chromium, lead, silver, and low levels of pesticides on Site 13.

- Construct stormwater facilities in contaminated areas: The Elliot Point 2 Alternative would involve installing two stormwater facilities on Site 13: one in the Tank 1 containment area and one in the Tank 6 containment area. If the facilities are infiltrating facilities, such as infiltrating stormwater ponds, the infiltrating water could spread contamination affecting the areas from upgradient and on-site sources as well as spread contamination on downgradient sites.

Direct Impacts Posed by the Elliot Point 2 Alternative to Sensitive Receptors and the Environment

The Elliot Point 2 Alternative poses the same type of direct adverse and beneficial hazardous materials impacts to sensitive receptors and to the environment that the Elliot Point 1 Alternative poses. However, both the adverse and the beneficial impacts posed by the Elliot Point 2 Alternative would be less than those posed by the Elliot Point 1 Alternative (though greater than those posed by the Existing Site Improvements Alternative). Fewer structures and piping that might have LBP, ACM, PCBs, or mercury would be removed from Site 13. Because the Elliot Point 2 Alternative is more compact, smaller quantities of hazardous materials would be used during project construction than those used for the Elliot Point 1 Alternative. Contaminated asphalt bedding beneath the bottom pads of 6, rather than all 10, large bulk fuel tanks might be cleaned up and disposed of off-site. Though the same amount of contaminated soil encountered during construction may be disposed of off-site, the Elliot Point 2 Alternative footprint covers more of the area found to have contamination in 2006 and 2007 than the Elliot Point 1 Alternative footprint does, and the Elliot Point 2 Alternative would have two stormwater treatment facilities rather than one. Finally, fewer oil/water separators, bulk fuel distribution facilities, remediation wells and associated piping might need to be decommissioned and removed. As is true for the Elliot Point 1 Alternative, the direct adverse impacts posed by the Elliot Point 2 Alternative would likely be too far from the sensitive receptors containing human populations to affect or directly benefit them. However, the adverse and beneficial impacts of the Elliot Point Alternative would directly affect sensitive receptors containing endangered or threatened species, i.e., Possession Sound and lower reach of Japanese Creek.

4.2 Indirect Impacts (Operation Impacts)

As is described in the methodology, indirect hazardous materials impacts are impacts posed by the project that arise after construction during project operation. Such impacts can be both adverse and beneficial, consisting, for example, of hazardous materials leaks and spills by the traveling public; use, leaks, and spills during operation and maintenance of the terminal; the reduction of such use, leaks, and spills over current levels; and the reduction of exposure to hazardous materials because of improvements brought about by the project.

4.2.1 No-Build Alternative

No adverse indirect impacts are anticipated for the No-Build Alternative. The traveling public would continue to leak and spill hazardous materials from their vehicles and hazardous materials would continue to be used, leaked, and spilled during terminal operation and maintenance at roughly the same rate as is currently occurring. Beneficial indirect impacts would occur by replacing current structures with ones largely or completely lacking LBP, ACM, PCBs, mercury, and creosote, thereby reducing the hazardous materials exposure of ferry terminal operators, maintenance workers, the traveling public, and wild life, including birds and marine life, over the life of the terminal improvements.

4.2.2 Existing Site Improvements Alternative

No adverse indirect impacts are anticipated for the Existing Site Improvements Alternative. In addition to the beneficial indirect impacts posed by the No-Build Alternative, the Existing Site Improvements Alternative would experience better traffic flow by having improved in-town circulation and by having overhead passenger loading, resulting in improved adherence to ferry schedules. Improved circulation and better adherence to ferry schedules would reduce vehicle wait times and therefore further reduce times for vehicles to leak and spill hazardous materials.

4.2.3 Elliot Point 1 Alternative

Indirect impacts for the Elliot Point 1 Alternative would be the same as for the Existing Site Improvements Alternative except that further improvements in local traffic flow would reduce the number of accidents, thereby further reducing the amount of hazardous materials spills and leaks caused by accidents.

4.2.4 Elliot Point 2 Alternative

Indirect impacts for the Elliot Point 2 Alternative would be the same as for the Existing Site Improvements Alternative.

4.3 Cumulative Impacts

As is described in the methodology, cumulative impacts are impacts on the environment that result from the incremental impacts of the project when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

4.3.1 Resource Identification

Analysts developed this cumulative impacts analysis to determine if there are increased adverse or beneficial impacts on hazardous materials released to the environment from the project in conjunction with the construction or operation of other past, present, and reasonably foreseeable projects and activities regardless of what agency or person undertakes those actions.

4.3.2 Study Area and Time Frame

Analysts defined the study area for this analysis to be the same as the area studied for this hazardous materials discipline report, the study area shown on Figure 7 and described in *Section 3.3*. The timeframe for the study is defined as being from 1903 through 2021, the date major industrial development of the project area began through the date by which reasonably foreseeable projects and activities might be constructed or commence.

4.3.3 Current and Historical Context

Currently, hazardous materials released to the environment play a relatively minor role in the study area. Most sites identified as contaminated hazardous materials sites have been generally cleaned up and have only residual contamination. Few businesses that use hazardous materials exist in the study area. Hazardous materials released to the environment are likely to play an even smaller role in the study area in the future because redevelopment projects of both non-contaminated and former contaminated areas are focusing on residential, transportation, commercial, retail, and recreational uses.

Historically, hazardous materials had been released to the study area environment in significant amounts. The study area originally supported a town, served by a railroad corridor, that grew starting in 1903 with the development of a lumber mill along the study area shoreline. The mill operated until 1930. A 1,300-foot pier was later constructed on the shoreline and the area was used as a terminal for loading ammunition onto ships during World War II. In the early 1950s, the terminal was redeveloped and used as a bulk fuel storage and transfer facility until 1989. The terminal redevelopment brought increased commercial development of the study area. Significant contamination from leaked fuel was discovered on the terminal site beginning in the late 1970s and intensively cleaned up under state order into 2006 when Ecology issued a notification of satisfaction of the order. Much smaller contaminated and potentially contaminated sites, such as service stations and UST sites, existed or exist in the study area and either were cleaned up in the 1990s and 2000s or have the potential of still being contaminated.

4.3.4 Summary of Project-Related Direct and Indirect Impacts

Direct and indirect hazardous materials impacts for the Mukilteo Multimodal Project are listed in Table 5, below, described in detail in *Sections 4.1* and *4.2*, summarized in part in Table 4, and described in part in Tables C-1 and C-2 in Attachment C of this report.

Table 5. Direct and Indirect Hazardous Materials Impacts Posed to and by the Mukilteo Multimodal Project Alternatives

Direct Impact Posed to Project by Hazardous Materials Sites	Alternative			
	No-Build	Existing Site Improvements	Elliot Point 1	Elliot Point 2
Acquire property for project construction	X[a]	X	X	X
Renovate, remove, or excavate structures and equipment that could contain ACM, LBP, PCBs, and mercury	X	X	X	X
Remove ASTs, USTs, and associated contaminated soil			X	X
Decommission underground oil/water separators, bulk fuel distribution facilities, remediation wells, and all associated piping			X	X
Remove creosote-treated timber and piles from structures being renovated or removed	X	X	X	X
Disturb, dredge, or excavate sediment and soil that has been in contact with creosote-treated timber or piles	X	X	X	X
Grade or excavate contaminated soil		X	X	X
Dewater excavations or pits in the vicinity of contaminated groundwater		X	X	X
Construct stormwater facilities in contaminated areas		X	X	X

Table 5. Direct and Indirect Hazardous Materials Impacts Posed to and by the Mukilteo Multimodal Project Alternatives

Direct Impact Posed to Project by Hazardous Materials Sites	Alternative			
	No-Build	Existing Site Improvements	Elliot Point 1	Elliot Point 2
Direct Impact Posed to Environment by Project Construction				
Short-term exposure to ACM, LBP, PCBs, and mercury	X	X	X	X
Short-term exposure to removed creosote-treated timber and piles	X	X	X	X
Short-term exposure to creosote-contaminated sediment and soil	X	X	X	X
Leak and spill hazardous materials used during project construction	X	X	X	X
Permanently eliminate exposure to ACM, LBP, PCBs, and mercury	X	X	X	X
Permanently eliminate exposure to creosote-treated timber and piles that are removed	X	X	X	X
Permanently eliminate exposure to creosote-contaminated sediment that is removed	X	X	X	X
Short-term exposure to contaminated soil and possibly contaminated groundwater, including petroleum products and their vapors	X	X	X	X
Permanently clean up some soil and possibly groundwater contamination, including petroleum products and their vapors	X	X	X	X
Indirect Impact				
Leak and spill hazardous materials by traveling public	X	X	X	X
Use, leak, and spill hazardous materials during Mukilteo ferry terminal operation and maintenance	X	X	X	X
Reduce exposure of ferry terminal operators, maintenance workers, traveling public, and wildlife to ACM, LBP, PCBs, mercury, and creosote	X	X	X	X
Reduce time for traveling public to leak and spill hazardous materials		X		X
Reduce accidents by traveling public in which hazardous materials leak and spill			X	

[a] WSF may decide to acquire the property it is currently leasing if the No-Build Alternative is selected.

4.3.5 Direct and Indirect Impacts of Other Projects in the Vicinity

The following actions are planned or have been recently completed in the Mukilteo Multimodal Project area. While WSF is coordinating with the sponsors of these other projects, they involve separate actions that could be taken even if the Mukilteo Multimodal Project is not developed.

Mukilteo Tank Farm Transfer, U.S. Air Force

The Air Force is proposing to convey 18.85 acres of the Mukilteo Tank Farm, (formerly known as the Defense Fuel Support Point Mukilteo) to the Port of Everett, as directed by federal law. The U.S. Air Force also proposes to transfer jurisdiction over the remaining 1.1 acres of the site to the Department of Commerce for continuing operation of the NOAA Mukilteo Research Station. All of the Mukilteo Tank Farm's 19.95 acres of land would be either conveyed or transferred from the U.S. Air Force. The property to be conveyed includes the lands, structures and other facilities, including the pier, buildings, structures, roadways, and other features. In July 2010, the U.S. Air Force released a Draft Environmental Assessment for the proposed transaction, and received public comments. The U.S. Air Force is currently preparing the Final Environmental Assessment and will then make an environmental determination prior to conveying the property.

The conveyance would transfer the property without other demolition or development actions, and any other party seeking to develop the property would be subject to environmental review and permitting requirements under applicable federal, state, and local regulations. Because this site had releases of hazardous materials that required remediation, the U.S. Air Force is proposing to provide a warranty to the transferee stating that all remedial action necessary to protect human health and the environment with respect to any contaminated materials remaining on the property have been taken. The Draft Environmental Assessment stated that any additional remedial action found to be necessary after the date of the transfer would be conducted by the United States.

Because this conveyance would transfer the Mukilteo Tank Farm to the Port of Everett and the NOAA Mukilteo Research Station without other demolition or development actions having first been taken, the conveyance itself would not change the direct and indirect hazardous materials impacts currently posed by the Mukilteo Tank Farm. Structures and equipment would remain as they are and continue to release ACM, LBP, PCBs, mercury, and creosote to the environment; ASTs and USTs may start or continue to leak; and contamination remaining on the property would continue to spread and degrade.

Mukilteo Tank Farm Master Plan, Port of Everett

The Port of Everett is currently preparing a Master Plan for the Mukilteo Tank Farm, working in collaboration with WSF, the City of Everett, the City of Mukilteo, NOAA, Sound Transit and others. Concepts for a draft Master Plan have been

developed for discussion; however, the timeline for implementation of the Master Plan has not been determined because it depends upon the completion of the U.S. Air Force's Environmental Assessment to transfer the Mukilteo Tank Farm to the Port of Everett. The plan is focusing on the portions of the Mukilteo Tank Farm that would not be occupied by WSF or NOAA. These areas could be developed by the Port of Everett, or they could be developed by others who could lease the property from the Port. Increased development in the Mukilteo downtown and waterfront is already considered as general background growth through 2040 for the study area. For instance, growth is already assumed in the forecasts used for traffic and related population and employment growth. Depending on configuration of the Mukilteo Multimodal Project, the remaining western portion of the Mukilteo Tank Farm could be redeveloped with commercial and residential space, and the eastern portion could be redeveloped as open space.

The Tank Farm Pier would be removed by WSF under either Elliot Point alternative. Removal of the Tank Farm Pier is not part of the project for either the No-Build or the Existing Site Improvements Alternative. There are no specific plans for the removal of the pier if the WSF project does not remove it. If the Tank Farm Pier is removed in the future, removal would likely not occur until after the proposed Mukilteo Multimodal Project is completed.

Because the Mukilteo Tank Farm Master Plan is currently being prepared and because implementation of the Master Plan's development concepts would depend on the preferred alternative selected for the Mukilteo Multimodal Project, direct and indirect hazardous materials impacts posed by the plan are speculative. Nonetheless, because the plan calls for developing the portion of the Mukilteo Tank Farm not occupied by the Mukilteo Multimodal Project, its development concepts will cover the entire portion of the Mukilteo Tank Farm not occupied by NOAA. Thus, direct impacts of the plan would involve removing above ground structures and equipment containing ACM, LBP, PCBs, and mercury and removing ASTs. Direct impacts might also involve removing the granular asphalt bedding material beneath Tank 3 containing contaminants exceeding site-specific cleanup levels and believed to also exist under Tanks 1, 2, and 4 through 10.

Finally, direct impacts might involve removing remaining USTs and underground oil/water separators, facilities, wells, and piping, especially at the western end of the property, which could be redeveloped with commercial and residential space. Direct impacts would include short-term exposure to ACM, LBP, PCBs, mercury, contamination, and leaks and spills of hazardous materials used during redevelopment.

Indirect impacts would include continued migration of at least some of the contamination remaining on the property. If the No-Build Alternative or the Existing Improvements Alternative is selected as the Mukilteo Multimodal Project preferred alternative, indirect impacts would also include the continued release of creosote from the Tank Farm Pier and continued migration of additional contamination remaining on the property.

Sounder Mukilteo Station, Sound Transit

Sound Transit's Sounder commuter rail line from Seattle to Everett serves the Mukilteo Station, which is located southeast of the existing ferry terminal, where First Street currently terminates. The station has had a phased development approach, and the first phase completed in 2006 included a platform on the north side of the tracks for passengers, along with a dedicated surface parking lot located on the Mukilteo Tank Farm west of the station. A second phase is to include a south platform, a pedestrian bridge, and additional parking spaces, which Sound Transit currently plans to develop in a structure. Funding for this second phase is now in place. Sound Transit is coordinating its planning and design process for the second phase with the Mukilteo Multimodal Project because several of the project's alternatives would alter the current station's layout as well as the potential location of a surface parking structure.

Construction of the second phase of the station would pose direct and indirect hazardous materials impacts. Direct impacts would include removing above ground structures and equipment containing ACM, LBP, PCBs, and mercury and removing ASTs in the portion of the second-phase footprint located north of the tracks. Direct impacts might also involve removing the granular asphalt bedding material beneath tank bottoms, additional contamination, remaining USTs, and underground oil/water separators, facilities, wells, and piping within the footprint. Finally, direct impacts would include short-term exposure to ACM, LBP, PCBs, mercury, contamination, and leaks and spills of hazardous materials used during project construction. Indirect impacts could include increased traffic with hazardous materials leaks and spills.

Some similar direct impacts appear to have been posed by the first phase of the station completed in 2006. It appears that above ground structures containing ACM, LBP, PCBs, and mercury, i.e., the storage building (Building 405), the maintenance shop (Building 4), the IT Corporation Building, railcar AST Tanks 13 and 15, and transformers or other electrical equipment, existing in December 2002, were gone by May 2011, and might have been removed to facilitate station construction. If so, direct impacts would have included short-term exposure to ACM, LBP, PCBs, and mercury

during structure demolition as well as to leaks and spills of hazardous materials used during project construction. It is unknown if any USTs or underground oil/water separators, facilities, wells, and piping were removed. It is also unknown if any contamination was removed, especially because the sampling that found contamination in excess of site-specific cleanup standards was performed after construction of the first phase of the station.

NOAA Mukilteo Research Station Expansion

NOAA owns and operates a laboratory immediately northwest of the Tank Farm and plans to expand this facility, on the 1.1 acres it currently uses, subject to a property transfer from the U.S. Air Force to the U.S. Department of Commerce. NOAA is coordinating its planning with WSF, the Port of Everett, the City of Mukilteo and others, but has not yet formalized its plans.

NOAA's plans are too general to determine even potential direct and indirect impacts of expanding the facility. Information such as whether the lab would move to a different location, whether the main lab building would be rebuilt or expanded, and whether and where any additional buildings would be located is needed to project the impacts of facility expansion.

Mount Baker Terminal, Port of Everett

The Port of Everett recently constructed a rail/barge transfer facility (the Mount Baker Terminal) along the waterfront to allow oversize containers to be delivered to the Everett Boeing plant at Paine Field. This facility is located on the shoreline immediately east of the Mukilteo Tank Farm, on property owned by WSF, and it lies within the City of Everett. Construction of the Mount Baker Terminal was completed in 2006. The facility included the construction of a pier and a rail spur to allow trains to directly offload large parts and materials that are shipped in for assembly at Boeing's plant at Paine Field. It also included a public shoreline access area, which includes parking, benches and a paved walkway, although this area has not yet been opened to the public because there is no public roadway for accessing the site. (For operations and employee access, the Port uses a gated road that runs through the Mukilteo Tank Farm.) The Elliot Point 1 Alternative would provide a new roadway serving the facility, but the other alternatives would not.

The Mount Baker Terminal was constructed in the vicinity of a trestle pier used for loading ammunition on ships during World War II and demolished by the mid-1960s. Depending on the extent of that demolition, construction of the facility might have

posed the direct impacts of removing creosote-treated timber and piles, disturbing or excavating sediment that was in contact with creosote-treated piles, creating short-term exposure to such removed timbers and any excavated sediment, and possibly permanently eliminating exposure to such removed piles and excavated sediment. Although the facility is east of the easternmost boundary of the Mukilteo Tank Farm, facility construction also might have posed the direct impacts of excavating, creating short-term exposure to, and possibly permanently eliminating some contaminated soil and petroleum products from the area. Finally, facility construction would have posed the direct impact of exposure to leaks and spills of hazardous materials used during project construction. Facility operation poses the indirect impact of the use, leaks, and spills of hazardous materials during facility operation and maintenance.

Restoration of Japanese Creek

The City of Mukilteo's Shoreline Plan calls for removing a culvert that carries Japanese Creek to an outfall into Possession Sound. The culvert crosses under BNSF tracks and the Mukilteo Tank Farm. This would allow Japanese Creek to be free-flowing as it meets the shoreline. Elliot Point 1 includes this action as part of the alternative, but the other alternatives would not affect the areas above the culvert. If this area is not developed by the Mukilteo Multimodal Project, Japanese Creek could be daylighted as part of development plans by the Port or others. However, no specific proposal or timeline has been identified for daylighting the creek.

The lack of a proposal or timeline makes the evaluation of direct and indirect hazardous materials associated with daylighting the creek speculative. However, because the culvert is located between Tanks 7 and 8, it is likely that daylighting the creek would pose the direct impacts of cleaning up any granular asphalt bedding material beneath the bottom pad of Tanks 7 and 8; grading or excavating and possibly cleaning up additional soil contamination; creating short-term exposure to contaminated soil; decommissioning what is thought to be the underground oil/water separators and associated piping for Tanks 7 and 8; decommissioning any bulk fuel distribution facilities, remediation wells, and associated piping in the vicinity of the creek; and leaks and spills of hazardous materials used during project construction.

4.3.6 Hazardous Materials Cumulative Impacts

No-Build Alternative

The No-Build Alternative poses both beneficial and adverse direct and indirect hazardous materials impacts, including the potential impact of acquiring Site 6, a

property that was used as a gas station and is known to be contaminated with diesel-range organics. However, by removing structures containing LBP, ACM, PCBs, mercury, creosote-treated timber and piles, and creosote-contaminated sediment, and addressing any requirements with respect to contamination, the No-Build Alternative poses predominantly beneficial impacts. Considering these impacts with the adverse impacts of the Mukilteo Tank Farm Transfer; the generally beneficial impacts of the Mukilteo Tank Farm Master Plan, Mukilteo Station, and Restoration of Japanese Creek; and the unknown impacts of the NOAA Mukilteo Research Station Expansion and Mount Baker Terminal indicates that cumulative impacts are generally beneficial for the No-Build Alternative. However, because the Tank Farm Pier would not be removed for the No-Build Alternative or for any of the other described projects, and because less contamination might be removed from the Mukilteo Tank Farm by the other projects than would be removed if the Mukilteo Multimodal Project were built on the Mukilteo Tank Farm, the cumulative impacts would be less beneficial because they would include the adverse impact of the continued release of creosote from the Tank Farm Pier and the continued spreading and degradation of some of the contamination remaining on the Mukilteo Tank Farm.

Existing Site Improvements Alternative

The Existing Site Improvements Alternative poses the beneficial and adverse direct and indirect hazardous materials impacts that the No-Build Alternative poses. It also poses greater potentially adverse and beneficial direct impacts of acquiring property because the Existing Site Improvements Alternative would acquire more property than the No-Build Alternative would. Taken together, impacts posed by the Existing Site Improvements Alternative are predominantly beneficial. Considering these impacts with the adverse impacts of the Mukilteo Tank Farm Transfer; the generally beneficial impacts of the Mukilteo Tank Farm Master Plan, Mukilteo Station, and Restoration of Japanese Creek; and the unknown impacts of the NOAA Mukilteo Research Station Expansion and Mount Baker Terminal indicates that cumulative impacts are generally beneficial for the Existing Site Improvements Alternative. Again, though, because the Tank Farm Pier would not be removed for the Existing Site Improvements or for any of the other described projects, and because less contamination might be removed from the Mukilteo Tank Farm by the other projects than would be removed if the Mukilteo Multimodal Project were built on the Mukilteo Tank Farm, the cumulative impacts would be less beneficial because they would include the adverse impact of the continued release of creosote from the Tank Farm Pier and the continued spreading and degradation of some of the contamination remaining on the Mukilteo Tank Farm.

Elliot Point 1 Alternative

The Elliot Point 1 Alternative poses predominantly beneficial direct and indirect hazardous materials impacts by removing structures containing LBP, ACM, PCBs, and mercury and by removing creosote-treated timber and piles including the Tank Farm Pier piles, creosote-contaminated sediment including at least some of the sediment that has accumulated under the Tank Farm Pier, and upland ASTs and contaminants. It also poses the adverse direct impact of acquiring a significant portion of the Mukilteo Tank Farm, which is known to have levels of contamination exceeding site-specific cleanup levels. This is mitigated somewhat because the U.S. Air Force has indicated it will provide a warranty stating that remedial action found to be necessary after the date of transfer will be conducted by the United States. As a result, taken together, the impacts posed by this alternative are predominantly beneficial. Again, considering these impacts with the adverse impacts of the Mukilteo Tank Farm Transfer; the generally beneficial impacts of the Mukilteo Tank Farm Master Plan, Mukilteo Station, and Restoration of Japanese Creek; and the unknown impacts of the NOAA Mukilteo Research Station Expansion and Mount Baker Terminal indicates that cumulative impacts are beneficial for the Elliot Point 1 Alternative. Further, because the Tank Farm Pier would be removed for this alternative and because more contamination might be removed from the Mukilteo Tank Farm by this alternative than by the other projects, the cumulative impacts would more beneficial for this alternative than for the No-Build Alternative or the Existing Site Improvements Alternative.

Elliot Point 2 Alternative

The Elliot Point 2 Alternative poses the predominantly beneficial direct and indirect hazardous materials impacts that the Elliot Point 1 Alternative poses and would require acquisition of a smaller portion of the Mukilteo Tank Farm than the Elliot Point 1 Alternative would require. Again, considering these impacts with the adverse impacts of the Mukilteo Tank Farm Transfer; the generally beneficial impacts of the Mukilteo Tank Farm Master Plan, Mukilteo Station, and Restoration of Japanese Creek; and the unknown impacts of the NOAA Mukilteo Research Station Expansion and Mount Baker Terminal indicates that cumulative impacts are beneficial for the Elliot Point 2 Alternative. These beneficial impacts would not be as great as those for the Elliot Point 1 Alternative because the Elliot Point 2 Alternative would not remove as much upland contamination as the Elliot Point 1 Alternative would remove. Again, though, because the Tank Farm Pier would be removed for

this alternative and because more contamination might be removed from the Mukilteo Tank Farm by this alternative than by the other projects, the cumulative impacts would more beneficial for this alternative than for the No-Build Alternative or the Existing Site Improvements Alternative.

4.3.7 Cumulative Impacts Mitigation Measures

Mitigation measures for the Mukilteo Multimodal Project alternatives are discussed in the next section, *Section 5*. Because adverse impacts are posed by the Mukilteo Tank Farm, it is recommended that the U.S. Air Force: 1) appropriately survey, abate, and then demolish structures and equipment on the property that could contain ACM, LBP, PCBs, and mercury; 2) remove the Tank Farm Pier and assess and address the sediment mound for contamination; 3) decommission and remove all remaining ASTs and USTs; and 4) remove the granular asphalt bedding material beneath the bottom pad of Tank 3 found to contain contaminants above the site-specific cleanup levels and remove all similar material beneath Tanks 1, 2, and 4 through 10.

5. MITIGATION MEASURES

None of the project alternatives poses significant adverse hazardous materials impacts that cannot be mitigated. The direct hazardous materials impacts that each project alternative might pose, as discussed in *Section 4* above, can be avoided, addressed, or reduced by implementing the mitigation measures recommended in Table 6. Estimated costs of the recommended mitigation measures, where available, are included in the table. The most important elements of the mitigation measures recommended for each project alternative are summarized after Table 6.

Table 6. Recommended Hazardous Materials Mitigation Measures by Project Alternative

Direct Impact	No-Build Alt.	Existing Site Improvements Alt.	Elliot Point 1 Alt.	Elliot Point 2 Alt.	Mitigation Measures (including cost estimates, if available)
Acquire property for project construction	X	X	X	X	If possible, acquire, lease, or obtain an easement to use only those portions of properties necessary for constructing and operating the selected project alternative and avoid acquiring, leasing, or obtaining easements to use additional portions of properties. For example, if either the Elliot Point 1 or Elliot Point 2 Alternatives is the selected project alternative, acquire, lease, or obtain an easement to use only that portion of the Mukilteo Tank Farm (Site 13) that is necessary to construct and operate the selected project alternative. Well before acquiring property for the selected alternative, work with the WSDOT Hazardous Materials and Solid Waste Program to determine if contamination might be related to the property and therefore if, in acquiring the property, WSF could assume liability for cleaning up that contamination. Depending on what is known about a property, performance of a Phase I Environmental Site Assessment (ESA) and possibly a follow-up Phase II ESA might be recommended for the property. The cost of a Phase I ESA varies with the size and complexity of the property being evaluated. Generally, Phase I ESAs cost $5,000 to $8,000. Phase II ESAs, which involve collecting and analyzing soil and groundwater samples from the property, typically cost at least $12,000. If contaminated property must be acquired for the selected project alternative, consider either a) deducting from the property valuation the cost to remediate all contamination found on the property or b) obtaining an indemnification from the property seller to pay for remediating all contamination found on the property. If WSF will lease or obtain an easement to use, rather an acquire, part or all of a property for the selected project alternative, consider including in the lease or easement agreement language making clear WSF's obligations with respect to existing contamination and any contamination WSF causes or makes worse. If WSF will acquire, lease, or obtain an easement to use any part of Site 13, consider including in the acquisition, lease, or easement agreement a) a description of who will address and pay for petroleum hydrocarbon contamination remediation; and

Table 6. Recommended Hazardous Materials Mitigation Measures by Project Alternative

Direct Impact	No-Build Alt.	Existing Site Improvements Alt.	Elliot Point 1 Alt.	Elliot Point 2 Alt.	Mitigation Measures (including cost estimates, if available)
Acquire property for project construction, continued					b) the following statement (see Ecology and Environment 2010): *Pursuant to CERCLA Section 120(h)(3), when remedial actions have been completed, as is the case here, the U.S. Air Force shall provide a warranty to the transferee stating that all remedial action necessary to protect human health and the environment with respect to any such substance remaining on the property has been taken before the date of transfer. Any additional remedial action found to be necessary after the date of such transfer shall be conducted by the United States. This warranty shall not apply in any case in which the person or entity to whom the real property is transferred is a potentially responsible party. This warranty, amending the quitclaim deed, will be recorded by the U.S. Air Force.*
Renovate, remove, or excavate structures and equipment that could contain ACM, LBP, PCBs, and mercury	X	X	X	X	Before renovating, removing, or excavating any structure or piece of equipment, conduct a survey of the structure or equipment in accordance with all applicable laws and regulations for the presence of ACM, LBP and paint containing other heavy metals such as chromium, PCBs, and mercury. • ACM must be surveyed by an Asbestos Hazard Emergency Response Act (AHERA)-certified building inspector. The survey would verify the presence of ACM and provide ACM locations and estimated quantities. • LBP must be tested by individuals licensed by the Lead-Based Paint Program located within the Washington State Department of Community, Trade and Economic Development (CTED). • PCBs and mercury, classified as universal waste (e.g., transformers and light fixture ballasts containing PCBs and mercury-containing equipment such fluorescent lamps and thermostat switches), must be surveyed in accordance with WAC 173-303-573. Before renovating, removing, or excavating each structure or piece of equipment in which ACM, LBP and paint containing other heavy metals, PCBs, or mercury have been found, abate or remove, manage, and dispose of ACM, LBP and paint containing other heavy metals, PCBs, and mercury, as identified in the surveys, using licensed abatement and removal contractors following applicable regulations. Metal painted with lead-based paint can be recycled as scrap metal pursuant to WAC 173-303-071(3)(ff); otherwise, it must be evaluated to determine whether it requires management and disposal as a dangerous waste per WAC Chapter 173-303. Costs of removing ACM, LBP and paint containing other heavy metals, PCBs and mercury vary with the type and amount of material to be removed. Removal of the ACM caulking from the steel bottoms of Tanks 1 through 10 could cost $2,000 to $4,000. Removal of oil from transformers and related oil filled equipment (e.g., switches and circuit breakers) could cost $1,000 to $2,000 for oil with less than 50 ppm PCBs and up to $4,000 for transformers with greater than 50 ppm PCBs. Removal of ACM, PCBs, and mercury and addressing of LBP and paint with other heavy metals in smaller structures, like the pump shelter canopy, could cost $2,000 to $7,000. Removal of ACM and PCBs and addressing LBP and paint with other heavy metals in larger

Table 6. Recommended Hazardous Materials Mitigation Measures by Project Alternative

Direct Impact	No-Build Alt.	Existing Site Improvements Alt.	Elliot Point 1 Alt.	Elliot Point 2 Alt.	Mitigation Measures (including cost estimates, if available)
					structures like the former storage building (Building 405 or T-405) could cost $18,000 to $22,000 (Herrera 2006).
Remove ASTs, USTs, and associated contaminated soil			X	X	For Site 6, which may have USTs remaining from that property's use as a gasoline service station in the late 1940s to the mid-1950s, review historical WSDOT right-of-way plans and consider performing a magnetometer and ground penetrating radar survey to identify the location(s) of any remaining UST(s). For Site 13, confer with the U.S. Air Force to determine if Tank 12, a 12,000-gallon diesel UST located immediately southeast of former Building 405, still exists or was removed. For Site 13, verify the existence of Tank 16, a 2,000-gallon empty fuel system icing inhibitor (FSII) AST located south of the pump shelter and a rectilinear firefighting foam chemical AST adjacent to the former foam pump house. Empty, clean, remove, manage, transport, dispose of, sample beneath ASTs and USTs according to tank decommissioning and site assessment regulations, and document proper disposal of and sampling beneath ASTs and USTs. All USTs shall be removed by a certified UST decommissioning supervisor and soil samples shall be collected by a registered site assessor to determine if a release has occurred from the UST. Remove any contaminated soil associated with the removed ASTs and USTs. On Site 6, the soil may be reused on site if its contaminant concentrations are less than MTCA Method A Soil Cleanup Levels for Unrestricted Land Uses. On Site 13, the soil may be reused on site if its contaminant concentrations are less than the site-specific cleanup standards and possibly, for petroleum hydrocarbons, less than a calculated Method B cleanup level. It is recommended that the WSDOT Hazardous Materials and Solid Waste Program be consulted before contaminated soil is reused on site. If an UST is unexpectedly encountered, contact a WSDOT Hazardous Materials Specialist for direction or oversight to ensure compliance with and performance of the appropriate follow-up work pursuant to state regulations. Tank decommissioning costs vary depending on whether or not the tanks are empty, whether the tanks are ASTs or USTs, and tank size. The cost of removing and performing the associated sampling of an UST can range from $5,000 for a 400-gallon heating oil UST to over $40,000 for a 10,000-gallon gasoline UST. The cost for disposing of contaminated soil depends on the volume of contaminated soil that is generated and the type and concentration of contaminants in the soil. It is not expected that soil excavated from the project area will designate as dangerous waste. Disposal of soil containing petroleum hydrocarbons or cPAHs exceeding MTCA Method A Soil Cleanup Levels but not designating as dangerous waste typically costs $38.50 to $47 per ton. These prices do not include the cost of excavating the soil or transporting it to the receiving port for the disposal facility.

Table 6. Recommended Hazardous Materials Mitigation Measures by Project Alternative

Direct Impact	No-Build Alt.	Existing Site Improvements Alt.	Elliot Point 1 Alt.	Elliot Point 2 Alt.	Mitigation Measures (including cost estimates, if available)
Decommission underground oil/water separators, bulk fuel distribution facilities, remediation wells, and all associated piping			X	X	Decommission the underground oil/water separator systems and associated piping remaining on the Mukilteo Tank Farm on Site 13, as needed for the selected project alternative. Decommission the underground bulk fuel distribution facilities and associated piping on Site 13, as needed for the selected project alternative. Abandon any wells and decommission the associated underground piping remaining from the remediation treatment systems installed at Areas 1 and 2 of Site 13, as needed for the selected project alternative. This could include numerous soil vapor extraction, air sparge, and groundwater monitoring wells, and an extensive underground network of horizontal soil vapor extraction and air sparge piping in Area 1. All wells would need to be abandoned by a licensed well driller in accordance with state regulations. Remove, manage, and dispose of residual petroleum products and, as necessary, petroleum-contaminated soil encountered in and along these systems, facilities, wells, and piping during structure and piping decommissioning. On Site 13, the soil may be reused on site if its contaminant concentrations are less than the site-specific cleanup standards and possibly, for petroleum hydrocarbons, less than a calculated Method B cleanup level. It is recommended that the WSDOT Hazardous Materials and Solid Waste Program be consulted before contaminated soil is reused on site. As is discussed above, disposal of soil containing petroleum hydrocarbons or cPAHs exceeding MTCA Method A Soil Cleanup Levels but not designating as dangerous waste typically costs $38.50 to $47 per ton. These prices do not include the cost of excavating the soil or transporting it to the receiving port for the disposal facility.
Remove creosote-treated timber and piles from structures being renovated or removed	X	X	X	X	Consult with the U.S. Air Force regarding the potential existence of ammunition beneath and in the vicinity of the pier because of pier's use for loading ammunition onto ships bound for the Pacific theater during World War II. Obtain appropriate regulatory permits for properly removing, managing, and disposing of at an appropriately permitted landfill the creosote-treated timber and piles associated with the structures being demolished for the selected project alternative. These structures could include Port of Everett public fishing pier, the existing ferry terminal facility structures, structures and buildings supported by piles, the railroad spur on Site 13 that extends from the north side of the area between Tanks 2 and 3 onto the Tank Farm Pier, and the Tank Farm Pier itself. Prepare and implement a **Treated Timber Removal and Disposal Plan** addressing how creosote-treated timber and piles would be removed, managed, and disposed of at an appropriately permitted landfill in accordance with state laws and regulations. The plan shall comply with the regulatory permits obtained for properly removing creosote-treated timber and piles associated with the structures being demolished for the selected project alternative. The plan shall identify • For the Tank Farm Pier, how unexploded ordnance shall be identified and responded to

Table 6. Recommended Hazardous Materials Mitigation Measures by Project Alternative

Direct Impact	No-Build Alt.	Existing Site Improvements Alt.	Elliot Point 1 Alt.	Elliot Point 2 Alt.	Mitigation Measures (including cost estimates, if available)
Remove creosote-treated timber and piles from structures being renovated or removed, <u>continued</u>					• The techniques and best management practices (BMPs) that shall be used for pile removal, using, where possible, those techniques that would allow for complete removal of piles instead of cutting piles below the mudline because complete removal of piles would eliminate future release of creosote from the piles to the sediment and water column and would avoid the possible need of recutting the piles in the future to stay below the mudline. • The techniques and BMPs that shall be used to control the suspension and dispersion of sediment surrounding the timber and piles being removed in order to minimize the release and dispersion of creosote-contaminated sediments • The techniques and BMPs that shall be used to contain, manage, and transport timber, piles, and runoff and adhered sediment from the same. • How the timber, piles, and runoff and adhered sediment from the same shall be properly disposed of at an appropriately permitted landfill. • When documentation of proper disposal shall be provided for the timber, piles, and runoff and adhered sediment from the same. Costs for removing the existing ferry dock, slip, and transfer span, and for removing part of the creosote piles and potentially contaminated sediment have been estimated at $50,000 to $75,000 (Herrera 2006).

Disturb, dredge, or excavate sediment and soil that has been in contact with creosote-treated timber or piles	X	X	X	X	Undertake a sediment evaluation process for sediment that would be disturbed, dredged, or excavated during the demolition and construction phases of the selected project alternative, especially focusing on sediment that has been in contact with creosote-treated timber or piles because it is suspected of being contaminated with creosote. This process shall include:
					• Developing and implementing a **<u>Sampling Analysis Plan</u>** for sediment and soil in contact with timber and piles that shall be removed for the selected project alternative. Depending on the alternative selected, the timber and piles would be from the Port of Everett public fishing pier, the existing ferry terminal facility structures, structures and buildings supported by piles, the railroad spur on Site 13 that extends from the north side of the area between Tanks 2 and 3 onto the Tank Farm Pier, and the Tank Farm Pier. If the Elliot Point 1 Alternative or the Elliot Point 2 Alternative is the selected alternative, the sediment to be sampled shall include:
					  o The soil around the timber encasing the railroad spur on Site 13. That timber appears to have been pressure-treated and so may have been preserved with a compound other than creosote, indicating that soil in contact with that timber should be tested for compounds in addition to creosote components.
					  o The 1,300-foot-long and up to 25-foot-high sediment mound that has accumulated beneath the Tank Farm Pier. That sediment is suspected of being contaminated with creosote from contact with the pier's 3,900 creosote pressure-treated piles. It may also be contaminated with petroleum hydrocarbons from the pier's use as part of a bulk fuel storage and transfer facility from 1953 to 1989. Finally, it is unlikely though possible that ammunition remains in the sediment beneath and in the vicinity of the pier because of pier's use for loading ammunition onto ships bound for the Pacific theater during World War II. Because of this possibility, a consultation with the U.S. Air Force in this regard is recommended.

Table 6. Recommended Hazardous Materials Mitigation Measures by Project Alternative

Direct Impact	No-Build Alt.	Existing Site Improvements Alt.	Elliot Point 1 Alt.	Elliot Point 2 Alt.	Mitigation Measures (including cost estimates, if available)
Disturb, dredge, or excavate sediment and soil that has been in contact with creosote-treated timber or piles, <u>continued</u>					o Any sediment outside of the sediment mound that would be dredged to create a sufficiently deep channel for ferry boat operation. • Determining if the area in which sediment disturbance, dredging, or excavation would occur is in a sediment cleanup site. • Obtaining proper permits and approvals for sediment disturbance work for project demolition and construction phases. • Obtaining proper permit approvals and complying with regulations for sediment dredging and excavation through the state's Dredged Material Management Program (DMMP) and, if the sediment is contaminated, Ecology or EPA. • Determining disposal requirements and options for dredged and excavated sediment, including open-water disposal, in-water disposal, and upland disposal. Use the results of the sediment evaluation process to select disposal option(s) for dredged and excavated sediment. Use the results of the sediment evaluation process to prepare and implement a **<u>Sediment Excavation, Sampling, and Disposal Plan</u>** addressing how sediment that is disturbed, dredged, and excavated and how soil in contact with treated timber that is excavated would be removed, managed, sampled, transported, and disposed of in accordance with the permits and approvals for sediment disturbance work and the permit approvals and regulations for sediment dredging and excavation. The plan shall identify: • For the sediment mound, how unexploded ordnance shall be identified and responded to • The techniques and BMPs that shall be used for sediment and soil dredging and excavation • The techniques and BMPs that shall be used to control the suspension and dispersion of sediment when disturbed, dredged, or excavated in order to o Minimize the release and dispersion of creosote-contaminated sediments, including minimizing the downcurrent accumulation of contaminated sediment released by disturbing, dredging, or excavating o Minimize the length of time any newly exposed creosote-contaminated sediment is exposed to the waters of Possession Sound. • The field screening methods and confirmation sampling of the dredged and excavated sediment and excavated soil. • The techniques and BMPs that shall be used to contain, manage, and transport dredged and excavated sediment and soil • How dredged and excavated sediment and soil shall be properly disposed of • When documentation of proper disposal shall be provided for the sediment and soil • How any notification requirements shall be satisfied • When documentation of satisfaction of any notification requirements shall be provided

Table 6. Recommended Hazardous Materials Mitigation Measures by Project Alternative

Direct Impact	No-Build Alt.	Existing Site Improvements Alt.	Elliot Point 1 Alt.	Elliot Point 2 Alt.	Mitigation Measures (including cost estimates, if available)
Disturb, dredge, or excavate sediment and soil that has been in contact with creosote-treated timber or piles, <u>continued</u>					Costs for removing the existing ferry dock, slip, and transfer span, and for removing part of the creosote piles and potentially contaminated sediment have been estimated at $50,000 to $75,000 (Herrera 2006). Costs for disposing of excavated sediment could range from $0.45 per cubic yard with a $2,000.00 minimum to $38.50 to $47 per ton. The $0.45 per cubic yard fee is available only if the DMMP's extensive application and approval process is satisfied for using a Puget Sound open-water disposal site. The $38.50 to $47 per ton assumes, as is discussed above, that any contamination in the sediment is petroleum hydrocarbons or cPAHs that exceed MTCA Method A Soil Cleanup Levels but do not cause the sediment to designate as dangerous waste. The $38.50 to $47 per ton cost also assumes that non-dewatered sediment may be accepted or that the sediment is first dewatered. None of these prices include the cost of excavating the sediment, dewatering the sediment, if necessary, or transporting the sediment it to the disposal site or receiving port for the disposal facility.
Grade or excavate contaminated soil		X	X	X	**<u>If the Elliot Point 1 Alternative or the Elliot Point 2 Alternative is selected as the preferred alternative</u>:** • Conduct soil sampling in those areas that were not sampled in 2006 or 2007 where project-related excavation depths would extend to within a foot of the water table or where ferry terminal buildings would be built. • Determine how any excavated soil contaminated with petroleum hydrocarbons would be addressed. For example, consider calculating a Method B cleanup level for petroleum hydrocarbons for use in determining when petroleum hydrocarbon contaminated soil excavated during project construction should be disposed of offsite at a permitted disposal facility. **<u>For any selected alternative:</u>** • If any ferry terminal structures would be built over contaminated soil, determine if contaminant "vapor pathways" must be controlled. If so, either remove contaminated soil or implement engineered controls such vapor barriers. If not, consider alternative designs, such as different footing designs, to lessen the depths of excavations. • Prepare and implement a **<u>Soil Excavation, Sampling, and Disposal Plan</u>** addressing the field screening methods that would be used to segregate graded and excavated soil and how such soil would be stockpiled, contained, managed, sampled, analyzed, transported, and disposed of pursuant to selected or applicable cleanup levels, all in accordance with state laws and regulations. It is not expected that any graded or excavated soil will classify as dangerous waste. The plan shall: o Require the use of 40-hour trained personnel in the vicinity of the proposed work and include a site-specific health and safety component regarding contaminated material exposure and personal protective equipment.

Table 6. Recommended Hazardous Materials Mitigation Measures by Project Alternative

Direct Impact	No-Build Alt.	Existing Site Improvements Alt.	Elliot Point 1 Alt.	Elliot Point 2 Alt.	Mitigation Measures (including cost estimates, if available)
Grade or excavate contaminated soil, <u>continued</u>					o Include site-specific measures to minimize exposure to contaminants through both airborne and direct contact routes. Increased construction-zone setbacks, additional barriers to public access, and prompt removal of contaminated materials may be required to limit contact by the public near project boundaries and minimize the spread of contamination into the surrounding environment. o Plan for appropriate space to stockpile graded and excavated soil that shows evidence of being contaminated or that is to be disposed of off-site. o Note that soil originating near the water table (the soils that are 9 to 12 feet BGS) may be very moist to wet, will be heavier than average sandy soil due to increased moisture content, and will require more careful storage (e.g., thick plastic liners above and below the soil stockpile) to prevent water from draining or running off from the soil. o Require sampling of all excavated soil that shows evidence of being contaminated. o Require sampling of all excavated soil that is to be disposed of off site o Specify the date when analytical results shall be provided. o Specify the date when documentation of proper off-site disposal shall be provided for the soil that is to be disposed of off-site. **<u>If the Elliot Point 1 Alternative or the Elliot Point 2 Alternative is selected as the preferred alternative, the Soil Excavation, Sampling, and Disposal Plan shall also</u>:** o Require careful scraping up of, and if necessary excavating, the granular asphalt bedding material beneath the bottom pad of each welded steel tank bottom that is removed for project construction. Scraping and excavating shall continue until confirmation samples collected from the ground beneath the bedding material have contaminant concentrations less than or equal to site-specific cleanup levels and any calculated Method B cleanup level for petroleum hydrocarbons that WSF chooses to use. The scraped and excavated soil shall be sampled and analyzed. Disposal of this soil shall be according to the disposal specifications below. o Require disposal according to the following specifications: ▪ If any contaminant concentration is greater than a site-specific cleanup level (see Table 1), dispose of the soil off site at a permitted disposal facility. ▪ If a petroleum hydrocarbon contaminant concentration is greater than any calculated Method B cleanup level WSF chooses to use, dispose of the soil off site at a permitted disposal facility. ▪ If all contaminant concentrations are equal to or less than all site-specific cleanup levels and, possibly, any calculated Method B cleanup level WSF chooses to use, reuse the soil on site or dispose of it off site at an appropriate, permitted disposal facility. It is recommended that the WSDOT Hazardous Materials and Solid Waste Program be consulted before contaminated soil is reused on site.

Table 6. Recommended Hazardous Materials Mitigation Measures by Project Alternative

Direct Impact	No-Build Alt.	Existing Site Improvements Alt.	Elliot Point 1 Alt.	Elliot Point 2 Alt.	Mitigation Measures (including cost estimates, if available)
Grade or excavate contaminated soil, continued					As is discussed above, disposal of soil containing petroleum hydrocarbons or cPAHs exceeding MTCA Method A Soil Cleanup Levels but not designating as dangerous waste typically costs $38.50 to $47 per ton. These prices do not include the cost of excavating the soil or transporting it to the receiving port for the disposal facility.
Dewater excavations or pits in the vicinity of contaminated groundwater		X	X	X	Conduct groundwater sampling in and around those areas where project-related dewatering would occur. Prepare and implement a **Groundwater Management Plan** addressing groundwater that would be dewatered during project construction. The plan shall outline how apparently clean, potentially contaminated, and contaminated groundwater shall be field screened, segregated, stored, sampled, analyzed, managed, reported, and treated or transported and disposed of, all in accordance with state and local laws and regulations. It is not expected that any dewatered groundwater will classify as dangerous waste. • Require the use of 40-hour trained personnel in the vicinity of the proposed work and include a site-specific health and safety component regarding contaminated material exposure and personal protective equipment. • The sampling shall be designed to support onsite and off-site treatment and discharge of dewatered fluids since discharge to the sanitary sewer is apparently prohibited in Mukilteo. Generally, if groundwater contaminants do not exceed MTCA Method A cleanup levels and the water conforms to criteria defined in WAC 173-201A, Water Quality Standards for Surface Waters in Washington State, the groundwater may be discharged directly or indirectly to the ground surface or surface water • Plan for appropriate space to store dewatered water until it is discharged or transported off site for discharge. • Specify when analytical results shall be provided. • Specify when documentation of proper off disposal shall be provided for the dewatered water. •
Construct stormwater facilities in contaminated areas		X	X	X	If possible, avoid constructing infiltrating stormwater facilities on Site 6 or Site 13 over or upgradient of areas where contamination has been observed or measured. If the use of infiltrating stormwater facilities on Site 6 or Site 13 cannot be avoided and such facilities cannot be placed over or upgradient of areas where no contamination has been observed or measured: • Clean up the soil beneath and downgradient of the facilities to prevent the spread of contamination into Possession Sound. • For Site 13, place facilities over and upgradient of areas with contamination below site-specific cleanup standards and consult with Ecology because such areas are technically considered clean and infiltrating water might be acceptable. Line non-infiltrating stormwater facilities on Site 6 or Site 13 to ensure no water infiltrates and spreads any existing contamination beneath and downgradient of the facilities.

Table 6. Recommended Hazardous Materials Mitigation Measures by Project Alternative

Direct Impact	No-Build Alt.	Existing Site Improvements Alt.	Elliot Point 1 Alt.	Elliot Point 2 Alt.	Mitigation Measures (including cost estimates, if available)
Prevent construction-related hazardous materials spills and stormwater runoff	X	X	X	X	To minimize the likelihood of construction-related hazardous materials spills, maximize the ability to control and respond to such spills, and ensure proper control of surface water runoff during construction, prepare and implement a site-specific **Spill Prevention, Control and Countermeasures Plan (SPCC Plan)** meeting the requirements of WSDOT Standard Specification 1-07.15(1) and prepare and implement a **Temporary Erosion and Sediment Control Plan (TESC Plan)** meeting the requirements of WSDOT Standard Specification 8-01.3(1)(A). The SPCC Plan for this project shall identify and include measures to protect from releases and spills the sensitive receptors identified in this report. It also shall describe any pre-existing contamination and contaminant sources that are described In the Contract Provisions and Plans and identify the equipment and work practices that shall be used to prevent the release of contamination. Where appropriate, the plans prepared pursuant to the above mitigation measures may be referenced in lieu of identifying such equipment and work practices.
Provide special provision in project's Contract Provisions and Plans	X	X	X	X	Prepare and add to the Project Contract Provisions and Plans a special provision to inform the contractor of known and potential contaminants in the project area, to inform the contractor of hazardous materials reports related to the project area that are available for the contractor's review, and to direct the contractor regarding addressing the contamination, including all mitigation measures described above that are to be implemented by the contractor, and the maintenance of erosion and dust controls.

5.1 No-Build Alternative

The mitigation measures recommended for the No-Build Alternative address all four of the direct impacts posed to that alternative by hazardous materials sites. They also address the adverse direct impacts posed by the No-Build Alternative to sensitive receptors and the environment, i.e., construction-related hazardous materials leaks and spills. Finally, they provide for the inclusion of a special provision in the project contract that would describe the mitigation work the project contractor is to perform. These mitigation measures are described under the following direct impacts in Table 6, above:

- Acquire property for project construction (if all or part of Site 6 will be acquired).
- Renovate, remove, or excavate structures and equipment that could contain ACM, LBP, PCBs, and mercury.
- Remove creosote-treated timber and piles from structures being renovated or removed.

- Disturb, dredge, or excavate sediment and soil that has been in contact with creosote-treated timber or piles.
- Prevent construction-related hazardous materials spills and stormwater runoff.
- Provide special provision in project's Contract Provisions and Plans.

For purposes of the No-Build Alternative, the most important elements of these mitigation measures are the element regarding acquisition of property; the surveying and abating of ACM, LBP, PCBs, and mercury; the preparation and implementation of a Treated Timber Removal and Disposal Plan; and the undertaking of a sediment evaluation and removal process involving the development and implementation of a Sampling Analysis Plan and the preparation and implementation of a Sediment Excavation, Sampling, and Disposal Plan.

The element regarding acquisition of property recommends acquiring only the portion of the property needed to complete the project and working with the WSDOT Hazardous Materials and Solid Waste Program to determine if sufficient contamination might be related to a property to be acquired to warrant additional hazardous materials investigation or a change in property valuation.

The surveying and abating of ACM, LBP, PCBs, and mercury would occur in the ferry terminal facility structures that would be replaced.

The Treated Timber Removal and Disposal Plan would address the removal, management, and disposal at an appropriately permitted landfill of creosote-treated timber and piles from the renovation of the Port of Everett public fishing pier and from the removal of ferry terminal facility structures. The plan would include appropriate best management practices (BMPs) to minimize harm to the environment from project construction.

The sediment evaluation and removal process, including the Sampling Analysis Plan and the Sediment Excavation, Sampling, and Disposal Plan, would address the disturbance, excavation, and disposal, if any, of sediment from the renovation of the Port of Everett public fishing and the demolition and reconstruction ferry terminal facility structures. Appropriate BMPs would be included in the Sediment Excavation, Sampling, and Disposal Plan to minimize harm to the environment from project construction.

5.2 Existing Site Improvements Alternative

The mitigation measures recommended for the Existing Site Improvements Alternative address all seven of the direct impacts posed to that alternative by hazardous materials sites. They also address the adverse direct impacts posed by the Existing Site Improvements Alternative to sensitive receptors and the environment, i.e., construction-related hazardous materials leaks and spills, and provide for the inclusion of a special provision in the project contract describing the mitigation work the project contractor is to perform. These mitigation measures are described under the following direct impacts in Table 6, above:

- Acquire property for project construction.
- Renovate, remove, or excavate structures and equipment that could contain ACM, LBP, PCBs, and mercury.
- Remove creosote-treated timber and piles from structures being renovated or removed.
- Disturb, dredge, or excavate sediment and soil that has been in contact with creosote-treated timber or piles.
- Grade or excavate contaminated soil.
- Dewater excavations or pits in the vicinity of contaminated groundwater.
- Construct stormwater facilities in contaminated areas.
- Prevent construction-related hazardous materials spills and stormwater runoff.
- Provide special provision in project's Contract Provisions and Plans.

The most important elements of the mitigation measures for the Existing Site Improvements Alternative are the same as those for the No-Build Alternative.

5.3 Elliot Point 1 and Elliot Point 2 Alternatives

The same mitigation measures are recommended for the Elliot Point 1 Alternative and the Elliot Point 2 Alternative. These mitigation measures address all nine of the direct impacts posed to those alternatives by hazardous materials sites. As for the No-Build Alternative and the Existing Site Improvements Alternative, the mitigation measures recommended for the Elliot Point 1 Alternative and the Elliot Point 2 Alternative also address the adverse direct impacts posed to sensitive receptors and the environment, i.e., construction-related hazardous materials leaks and spills, and provide for the inclusion of a special provision in the project contract describing the

mitigation work the project contractor is to perform. These mitigation measures are described under the following direct impacts in Table 6:

- Acquire property for project construction.
- Renovate, remove, or excavate structures and equipment that could contain ACM, LBP, PCBs, and mercury.
- Remove ASTs, USTs, and associated contaminated soil.
- Decommission underground oil/water separators, bulk fuel distribution facilities, remediation wells, and all associated piping.
- Remove creosote-treated timber and piles from structures being renovated or removed.
- Disturb, dredge, or excavate sediment and soil that has been in contact with creosote-treated timber or piles.
- Grade or excavate contaminated soil.
- Dewater excavations or pits in the vicinity of contaminated groundwater.
- Construct stormwater facilities in contaminated areas.
- Prevent construction-related hazardous materials spills and stormwater runoff.
- Provide special provision in project's Contract Provisions and Plans.

For purposes of both the Elliot Point 1 Alternative and the Elliot Point 2 Alternative, the most important elements of these mitigation measures are determining the terms of the acquisition of the Mukilteo Tank Farm (Site 13); the preparation and implementation of a Treated Timber Removal and Disposal Plan; the undertaking of a sediment evaluation and removal process involving the development and implementation of a Sampling Analysis Plan and the preparation and implementation of a Sediment Excavation, Sampling, and Disposal Plan; and preparing and implementing a Soil Excavation, Sampling, and Disposal Plan. The other elements, though numerous and in some cases extensive, are fairly straightforward and standard.

Determining the terms under which WSF would acquire the use of the Mukilteo Tank Farm, whether through purchase, lease, or easement, is important because the U.S. Air Force stated in its *Draft Environmental Assessment of the Mukilteo Tank Farm Property Transfer, Mukilteo, Snohomish County, Washington*, dated July 1, 2010, that:

> [p]ursuant to CERCLA Section 120(h)(3), when remedial actions have been completed, as is the case here, the Air Force shall provide a warranty to the transferee stating that all remedial action necessary to protect human health and

> the environment with respect to any such substance remaining on the property has been taken before the date of transfer. Any additional remedial action found to be necessary after the date of such transfer shall be conducted by the United States. This warranty shall not apply in any case in which the person or entity to whom the real property is transferred is a potentially responsible party. This warranty, amending the quitclaim deed, will be recorded by the Air Force.

Incorporating this warranty as a term in a property use or acquisition document could help make the United States responsible for cleaning up areas on the Mukilteo Tank Farm where contamination is found to exceed the site-specific cleanup levels. Four such areas, including the granular asphalt bedding material beneath the welded steel bottom of Tank 3, are already known to exist. Other areas, such as the bedding beneath the welded steel bottoms of Tanks 1, 2, and 4 through 10, are suspected to exist; still more might be found during project construction.

The preparation and implementation of a Treated Timber Removal and Disposal Plan is important because it would address the removal, management, and disposal at an appropriately permitted landfill of creosote-treated timber and piles generated during the demolition of the Tank Farm Pier. Because the pier was used for loading ammunition onto ships during World War II, the element recommends that WSF consult with the U.S. Air Force regarding the potential existence of ammunition beneath and in the vicinity of the pier. The element also requires the inclusion of BMPs for removing the timber and piles; controlling the suspension and dispersion of sediment surrounding the timber and piles; and containing the timber, piles, and any runoff and adhered sediment from the timber and piles.

The undertaking of a sediment evaluation and removal process involving the development and implementation of a Sampling Analysis Plan and the preparation and implementation of a Sediment Excavation, Sampling, and Disposal Plan would address the dredging as well as any additional excavation of the sediment mound under the Tank Farm Pier. The Sampling Analysis Plan would take into account that the sediment mound is suspected of being contaminated with creosote because of its contact with creosote-treated piles, may be contaminated with petroleum hydrocarbons from the pier's use as part of a bulk fuel storage and transfer facility, and could conceal ammunition dating from the pier's use for loading ammunition onto ships during World War II. The sediment evaluation process would involve obtaining proper permits and approvals for sediment disturbance work, obtaining permit approvals for sediment dredging and excavation through the Dredged Material Management Program and possibly Ecology, and using the results of the sampling and permitting

process to determine and select disposal options for dredged and excavated sediment. The Sediment Excavation, Sampling, and Disposal Plan would address how sediment that is disturbed, dredged, and excavated from the sediment mound would be removed, managed, sampled, transported, and disposed. The element requires the inclusion of BMPs for containing dredged and excavated sediment, for controlling the suspension and dispersion of sediment during dredging and excavation, and for minimizing the length of time any newly exposed contaminated sediment is exposed to the waters of Possession Sound.

A Soil Excavation, Sampling, and Disposal Plan is important because it would require sampling of soil from the Mukilteo Tank Farm that would be disposed of off-site and that shows any evidence of being contaminated, addressing the methods that would be used to segregate such soils. It would incorporate any calculated Method B cleanup level for petroleum hydrocarbons, contaminants not assigned a site-specific cleanup level during the cleanup of the Mukilteo Tank Farm but present on site in high concentrations. The plan would identify the contaminants for which the soil must be analyzed. The plan would then set forth when soil must be disposed of off-site and when it may be reused on site. It also would specify areas requiring cleanup, such as the granular asphalt bedding material beneath the bottom pad of Tank 3, which has contaminants exceeding site-specific cleanup levels, and possibly the same material beneath the other tank bottoms removed for project construction.

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