UNITED STATES
DEPARTMENT
OF THE NAVY

NAVAL BASE KITSAP
BANGOR
SILVERDALE, WA

COOPERATING AGENCIES:

United States Army
Corps of Engineers

National Oceanic and
Atmospheric Administration,
National Marine
Fisheries Service

LAND-WATER INTERFACE AND SERVICE PIER EXTENSION AT NAVAL BASE KITSAP BANGOR

DRAFT ENVIRONMENTAL IMPACT STATEMENT

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DRAFT ENVIRONMENTAL IMPACT STATEMENT LAND-WATER INTERFACE AND SERVICE PIER EXTENSION AT NAVAL BASE KITSAP BANGOR

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SILVERDALE, WASHINGTON

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ABSTRACT:

This draft environmental impact statement (DEIS) evaluates the environmental effects of constructing and operating a Land-Water Interface (LWI), and constructing and operating a Service Pier Extension (SPE), on Naval Base (NAVBASE) Kitsap Bangor. The DEIS has been prepared by the United States (U.S.) Department of the Navy (Navy) in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969. The LWI and SPE are independent actions, but are being analyzed in the same environmental impact statement (EIS) due to efficiencies, their geographic proximity, and because construction periods for the two projects were initially projected to overlap. NAVBASE Kitsap is the action proponent for both projects.

LWI

The LWI proposed action is to complete the perimeter of the Waterfront Restricted Area (WRA) at NAVBASE Kitsap Bangor by constructing and operating barrier structures connecting the existing on-water Port Security Barrier (PSB) system to the existing on-land Waterfront Security Enclave (WSE). The purpose of the LWI is to comply with Department of Defense (DoD) directives to protect OHIO Class ballistic missile submarines (Section 1.2.1), hereafter referred to as Navy TRIDENT submarines, from increased and evolving threats and to prevent the seizure, damage, or destruction of military assets. The need for the LWI is to enhance security at the WRA and comply with security requirements. Two action alternatives and the No Action Alternative (Alternative 1) are evaluated in the DEIS. The two action alternatives are the Pile-Supported Pier (Alternative 2) and the Port Security Barrier (PSB) Modifications (Alternative 3), which is the Preferred Alternative. Under the No Action Alternative, the

construction and operation of LWI would not occur. Under both action alternatives, there would be two LWI structures, one at the north end and one at the south end of the WRA at NAVBASE Kitsap Bangor. Alternative 2 would construct two piers with a walkway, fence, and towers for lights and equipment. There would be a mesh extending from the bottom of the piers to the seafloor. Alternative 2 would also relocate a portion of the existing floating PSBs at the north and south LWIs. Alternative 3 would not include a fixed structure or an in-water mesh, but instead would entail lengthening and relocating the floating PSB systems to create the entire LWI. Both alternatives would construct two concrete abutments at the shore cliff to which the LWI structures would attach; each abutment would also include an observation post. The in-water and terrestrial construction would occur over approximately 2 years, although there would be only one in-water work season for Alternative 3. In-water work would be subject to timing and seasonal restrictions to avoid and minimize impacts on sensitive species.

SPE

The SPE proposed action is the extension and operation of the existing Service Pier and construction and operation of support facilities to accommodate the transfer of two SEAWOLF Class submarines from NAVBASE Kitsap Bremerton to NAVBASE Kitsap Bangor. The purpose of the SPE is to avoid deployment constraints and improve maintenance of the SEAWOLF Class submarine fleet. The need for the SPE is to improve the operational effectiveness of the SEAWOLF fleet. Two action alternatives and the No Action Alternative (Alternative 1) are evaluated in the EIS. Under the No Action Alternative, the SPE would not be constructed or operated. The action alternatives are the Short Pier (Alternative 2), which is the Preferred Alternative, and the Long Pier (Alternative 3). Under both action alternatives, two SSNs would be transferred from NAVBASE Kitsap Bremerton to NAVBASE Kitsap Bangor. Alternative 2 would extend the existing 500-foot (152-meter) long Service Pier by 540 feet (165 meters); Alternative 3 would extend it by 975 feet (297 meters). After construction of the SPE, the Service Pier would be 1,040 feet (317 meters) or 1,475 feet (450 meters) long under Alternatives 2 and 3, respectively. Both alternatives would include construction of a 2,100-square foot (195-square meter) Pier Services and Compressor Building on the Service Pier and relocation of the existing PSB system to attach to the end of the pier extension. The upland portion of the two action alternatives would be the same. The new 50,000-square foot (4,645-square meter) Waterfront Ship Support Building would be built at the site of an existing parking lot. A new 1,800-square foot (174-quare meter) utility pad with a shoreside emergency generator facility would be constructed. Additional new project elements including a 421-space parking lot, utilities, and road improvements would occupy a total of approximately 7 acres (2.8 hectares).

Environmental Impacts

This DEIS evaluates direct, indirect, and cumulative impacts on the environment. For the LWI, the principal types of impacts during project construction would include pile driving noise (and its effects on fish and wildlife), turbidity, and habitat impacts. However, Alternative 3 would not involve in-water pile driving but would include pile driving in the dry (during low tides) and on-land for the abutments and observation posts (north and south). Impacts of operation and maintenance would include loss and shading of marine habitat including eelgrass, macroalgae, and the benthic community, as well as interference with migration of juvenile salmon, some

species of which are protected under the Endangered Species Act (ESA). Both action alternatives would have the potential to affect fish and bird species protected under the ESA and marine mammals (behavioral harassment only) protected under the ESA and the Marine Mammal Protection Act (MMPA). The above impacts would be greater for Alternative 2 than Alternative 3. Upland construction would be the same for both action alternatives and would result in permanent and temporary vegetation disturbance. Wildlife would be disturbed by construction noise, especially pile driving; measures are proposed to mitigate these impacts. No terrestrial animals or plants protected under the ESA or Migratory Bird Treaty Act (MBTA) would be affected, but bald eagles could be disturbed during construction at the south LWI project site.

For the SPE, the principal types of impacts during project construction would include pile driving noise and its effects on fish, wildlife, and neighboring communities; turbidity; and habitat impacts. Impacts of operation and maintenance would include loss and shading of marine habitat, but minimal interference with migration of juvenile salmon. Both action alternatives would have the potential to affect fish and bird species protected under the ESA and marine mammals (behavioral harassment only) protected under the ESA and the MMPA. In-water impacts would be greater for Alternative 3 than Alternative 2, including greater over-water coverage and more pile driving. Upland impacts would be the same for both alternatives, including permanent and temporary vegetation disturbance. Wildlife would be disturbed by construction noise, especially pile driving; measures are proposed to mitigate these impacts. No wetlands or terrestrial animals or plants protected under the ESA, MBTA, or Bald and Golden Eagle Protection Act would be affected.

Permitting and Consultation

Permitting and consultation will be separate for the two proposed actions but will be based on combined consultation packages. The Navy is working with the National Marine Fisheries Service Headquarters (NMFSHQ) through the MMPA permitting process to ensure compliance regarding behavioral disturbance of marine mammals. In accordance with the ESA, the Navy is in preliminary consultation with the U.S. Fish and Wildlife Service Washington Fish and Wildlife Office and NMFS West Coast Region office regarding impacts on federally listed species and designated critical habitat. In addition, the Navy is in preliminary consultation with NMFS West Coast Region office regarding impacts on Essential Fish Habitat. In accordance with the Coastal Zone Management Act, the Navy will submit Coastal Consistency Determinations to the Washington Department of Ecology (WDOE). The Navy will submit applications to the U.S. Army Corps of Engineers (USACE) for permits under the Clean Water Act (CWA) and the Rivers and Harbors Act and a request for CWA Section 401 Water Quality Certifications from the WDOE. In compliance with the National Historic Preservation Act, the Navy is in consultation with the State Historic Preservation Officer and American Indian tribes. Pursuant to Executive Order 13175 and DoD policy, the Navy is in government-to-government consultation with affected American Indian tribes. The USACE and NMFSHQ are cooperating agencies under NEPA for the proposed actions.

EXECUTIVE SUMMARY

INTRODUCTION

Naval Base (NAVBASE) Kitsap Bangor, located on Hood Canal approximately 20 miles (30 kilometers) west of Seattle, Washington (Figure ES–1), provides berthing and support services to United States (U.S.) Department of the Navy (Navy) OHIO Class ballistic missile submarines, hereafter referred to as TRIDENT submarines, as well as a SEAWOLF Class[1] submarine.

The Navy is proposing two separate actions at the NAVBASE Kitsap Bangor waterfront: the Land-Water Interface (LWI) and the Service Pier Extension (SPE). Under the LWI Proposed Action, the Navy proposes to complete the perimeter of the Waterfront Restricted Area (WRA) at NAVBASE Kitsap Bangor by constructing and operating physical barriers through shallow waters and onto the immediate upland areas at the northern and southern extents of the WRA. These structures would tie into the existing Port Security Barrier (PSB) system and the on-land Waterfront Security Enclave (WSE) system, thereby completing the entire perimeter of the WRA. Under the SPE Proposed Action, the Navy proposes to extend the existing Service Pier and construct associated support facilities, and operate all of these facilities. The SPE would accommodate the proposed relocation of the SEAWOLF Class submarines SSN-21 (SEAWOLF) and SSN-22 (CONNECTICUT) from NAVBASE Kitsap Bremerton to join SSN-23 (JIMMY CARTER) at NAVBASE Kitsap Bangor. The relocation would result in the consolidation of all three SEAWOLF Class submarines at NAVBASE Kitsap Bangor. Maintenance personnel and submarine crews would be transferred to NAVBASE Kitsap Bangor; there would be no changes to facilities at NAVBASE Kitsap Bremerton. Figure ES–2 shows the general location of the Proposed Actions.

This draft environmental impact statement (DEIS) evaluates the environmental effects of constructing and operating the LWI, and constructing and operating the SPE, on NAVBASE Kitsap Bangor. Following publication of the Notice of Intent (NOI) to prepare an EIS in the *Federal Register* and a 45-day public scoping period, the Navy has prepared this DEIS in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969. Following a 45-day public comment period on the DEIS, the Navy will review and respond to comments in writing and, if appropriate, incorporate changes in the final environmental impact statement (FEIS). The resulting FEIS will be circulated for a 30-day wait period. Following the 30-day wait period, the Navy will prepare a Record of Decision that will formally document the selected alternative for each of the two projects and mitigation to be implemented by the Navy, and address substantive new comments received on the FEIS. The Navy has invited and is in government-to-government consultation with the five federally recognized American Indian tribes that have Usual and Accustomed (U&A) areas in the vicinity of the project area: the Skokomish, Port Gamble S'Klallam, Jamestown S'Klallam, Lower Elwha Klallam, and Suquamish Tribes. The U.S. Army Corps of Engineers (USACE) and National Marine Fisheries Service Headquarters (NMFSHQ) are Cooperating Agencies under NEPA for

[1] SEAWOLF is a class of SSN submarine. SSN is the Navy designation for nuclear-powered attack submarines. Other classes of SSNs are LOS ANGELES Class and VIRGINIA Class.

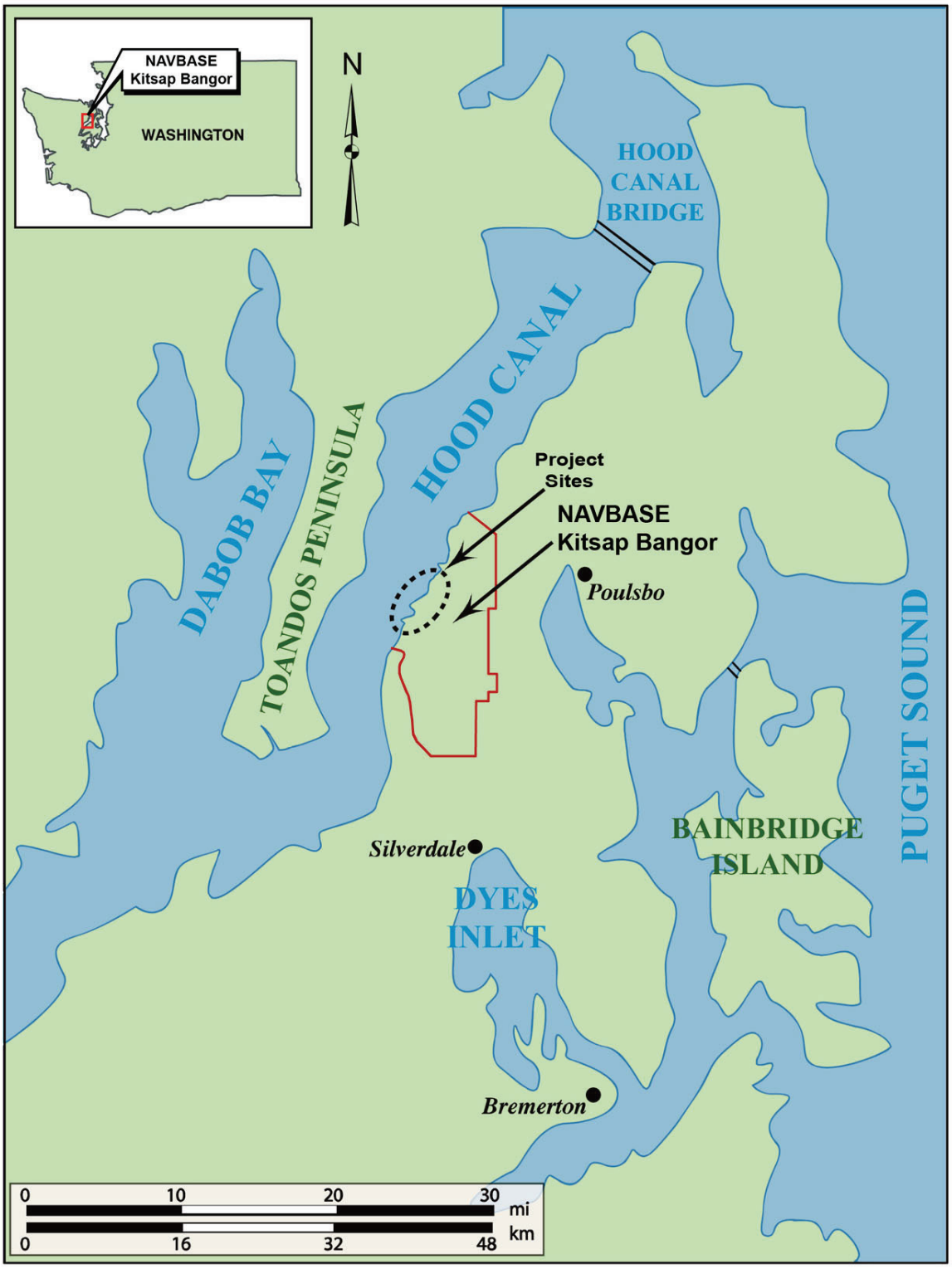

Figure ES–1. Site Location Map for NAVBASE Kitsap Bangor

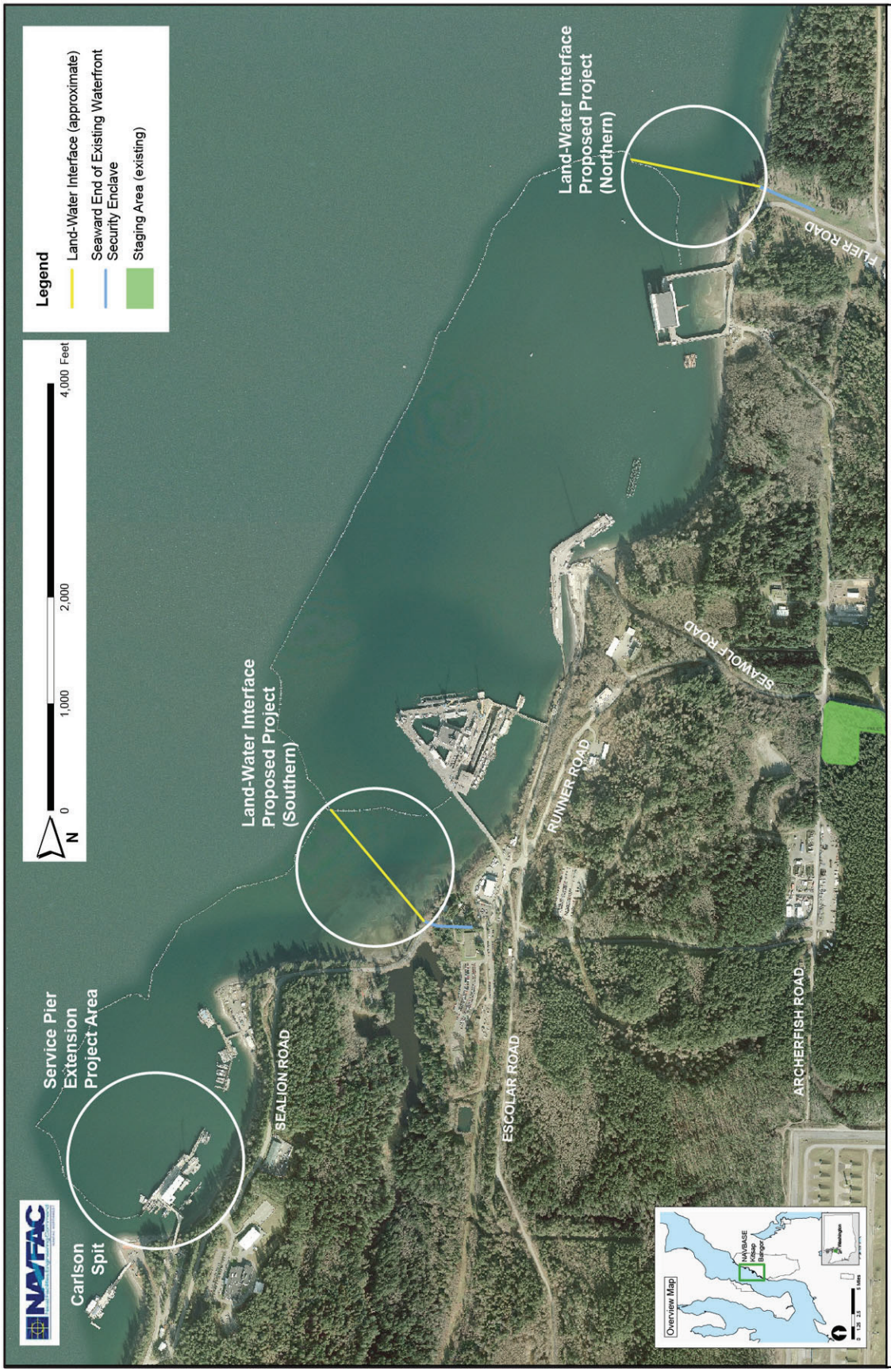

Figure ES–2. Location of the LWI and SPE Projects

the proposed actions. The Navy is in preliminary consultation with, or coordinating with, the following agencies regarding approvals for the proposed actions: USACE, NMFSHQ, NMFS West Coast Region office, U.S. Fish and Wildlife Service (USFWS) Washington Fish and Wildlife Office, U.S. Environmental Protection Agency, Washington State Department of Ecology (WDOE), and State Historic Preservation Officer (SHPO).

PURPOSE AND NEED

The LWI and SPE are independent actions, but are being analyzed in the same environmental impact statement (EIS) due to efficiencies, their geographic proximity, and because construction periods for the two projects were initially projected to overlap. However, these are not connected projects. Each Proposed Action fulfills a separate purpose and need, independent of the other Proposed Action.

LWI Purpose and Need

The purpose of the LWI Proposed Action is to comply with Department of Defense (DoD) directives to protect Navy TRIDENT submarines from increased and evolving threats and to prevent the seizure, damage, or destruction of military assets. The LWI is needed to enhance security within the WRA and comply with security requirements.

SPE Purpose and Need

The purpose of the SPE Proposed Action is to avoid deployment constraints and improve maintenance of the SEAWOLF fleet. The SPE is needed to:

- Avoid restrictions at NAVBASE Kitsap Bremerton on navigating SEAWOLF submarines through Rich Passage under certain tidal conditions.
- Improve long-term operational effectiveness for the three SEAWOLF Class submarines on NAVBASE Kitsap.
- Provide berthing and logistical support for SEAWOLF, LOS ANGELES, and VIRGINIA submarine classes at the Navy's SSN research, development, test & evaluation hub, which is located at NAVBASE Kitsap Bangor.
- Improve submarine crew training and readiness through co-location of the SEAWOLF class with command functions on NAVBASE Kitsap Bangor submarine training center.

LWI ALTERNATIVES

LWI Alternatives Development and Screening Criteria

The environmental impact statement (EIS) must evaluate all reasonable alternatives in accordance with the Council on Environmental Quality regulations (40 Code of Federal Regulations [CFR] Part 1502.14) and Navy regulations (32 CFR Part 775) that implement the NEPA. The development of reasonable alternatives for analysis is dependent on the stated purpose and need for the Proposed Action. Screening criteria were developed to determine if a potential alternative was reasonable, whether it met the purpose and need, and if it should be

carried forward for detailed analysis in the EIS. The screening criteria listed below were used in the identification and evaluation of LWI action alternatives:

- Meets security and TRIDENT program requirements,
- Compatible with existing security features,
- Must be located within the WRA,
- Compatible with a dynamic intertidal environment,
- Supports master planning considerations and does not impact other operational missions on NAVBASE Kitsap, and
- Avoids or minimizes environmental impacts to the maximum extent practicable.

LWI ALTERNATIVE 1: NO ACTION

Under LWI Alternative 1, the No Action Alternative, there would be no construction and operation of LWI structures and existing PSBs would not be relocated. This alternative would not meet security requirements and, therefore, would not meet the purpose and need for the proposed action. No environmental impacts are anticipated from the No Action Alternative, as no construction or physical alteration to the waterfront would occur, and there would be no changes in operations. The No Action Alternative is carried forward for analysis because it is required by NEPA and constitutes baseline conditions for environmental analysis of the proposed action.

LWI ALTERNATIVE 2: PILE-SUPPORTED PIER ALTERNATIVE

Under LWI Alternative 2, construction and operation of LWI structures would include pile-supported piers built from the base of the shoreline bluff out to a connection point with the existing PSB system (Figures ES–2, 2–2, and 2–3) at both the north and south ends of the WRA. The piers would connect to solid concrete abutments that would be built at the shoreline bluff, and an anchoring structure for the PSBs would be installed at the seaward end of each pier. Construction is expected to require one barge with a crane plus one supply barge, a tugboat, and work skiffs. Table 2–1 summarizes the physical features of the two LWI action alternatives. Best management practices (BMPs) and impact reduction measures that would be implemented to avoid or minimize potential environmental impacts associated with the SPE Proposed Action are discussed in Section 2.3.

Pier Structures

The LWI pier structures would be 13 feet (4 meters) wide and 280 feet (85 meters) long at the north location and 730 feet (223 meters) long at the south location. The last (seaward) 23 feet (7 meters) of each pier would be 20 feet (6 meters) wide. The piers would include a walkway for their entire length and 40-foot (12-meter) tall steel monopole towers supporting lights and security equipment; there would be 14 towers on the south pier and 6 towers on the north pier. A fence would be installed along the entire length of each pier. A mesh material would extend from the bottom of the walkway into the water and would be anchored to heavy steel plates placed on the seafloor using a barge-mounted crane assisted by divers. The steel plate anchors would remain in place based on their weight and occupy approximately 1,500 square feet

(140 square meters) at the north LWI and 4,000 square feet (370 square meters) at the south LWI, for a total area of approximately 5,500 square feet (510 square meters).

Pile Installation

The pier deck would consist of metal grating that allows 65 percent of light to pass through. The elevation of the pier deck would be approximately 21.5 feet (6.6 meters) above mean lower low water (MLLW), and the elevation of the bottom of the pier structure would be approximately 17 feet (5.2 meters) above MLLW. There would be a floating dock for small boat access approximately 12 by 35 feet (4 by 11 meters) at the end of each pier, on the inside, or secure side, of the pier. This dock would be anchored with four piles (included in the 136 total number of permanent piles) and would have a metal grating deck. Access to the floating dock from the pier would be by means of a gangway 80 feet long by 3 feet wide (24 by 1 meter). The gangway deck would also consist of metal grating.

The north LWI would require a maximum of 54 hollow steel piles, 24 inches (60 centimeters) in diameter. The south LWI would require a maximum of 82 hollow steel piles, 24 inches in diameter. The estimated total number of permanent piles in the project is therefore 136. Piles primarily would be driven using vibratory methods. An impact hammer would be used to "proof" piles to ensure they provide the required load-bearing capacity. Where geotechnical conditions do not allow piles to be driven to the required depth using vibratory methods, an impact hammer may be used to drive some piles for part or all of their length. Pile driving is expected to take no more than 80 days during the first in-water work season (July 16, 2016, through January 15, 2017).

Piles are expected to be installed primarily using a crane on a floating barge. Pile installation in shallow areas would be tidally dependent, such that the hull of the barge would not be permitted to ground or contact the seafloor at any time during the work. Therefore, the barge would move in and out with the tide as necessary to install the piles and decking. The barge would be positioned by means of spuds and anchors. Because the majority of the piles for the south LWI would be in shallow water above the 5 feet (1.5 meters) below MLLW elevation, the analysis considered that the contractor would build a temporary trestle adjacent to the LWI structure to install the permanent piles and decking in this area. This temporary trestle would be approximately 300 feet (90 meters) long and 20 feet (6 meters) wide; the deck would be of metal grating that allows 65 percent of light to pass through. Approximately 120 temporary 24-inch (60-centimeter) steel piles would be needed. These piles would be driven in the same manner as the permanent piles, within the same 80 days as the permanent piles. The piles would be extracted by vibratory means.

PSBs

Existing PSB systems close to the proposed LWIs would be relocated and attached to the end of the new piers. For the north LWI, approximately 1,000 feet (300 meters) of the existing PSB system would be relocated and 200 feet (60 meters) would be removed. For the south LWI, approximately 650 feet (200 meters) of the existing PSBs would be relocated and 550 feet (170 meters) would be removed. Existing PSBs that are still serviceable would be configured into the new PSB alignment. When PSBs would be removed, they would be disassembled and

recycled as scrap metal. The ends of the remaining PSB systems would be attached to a dolphin near the end of each pier; these dolphins would consist of eight closely spaced 24-inch (60-centimeter) diameter steel piles supporting an 8 by 8-foot (2.5 by 2.5-meter) concrete platform. For each LWI, two existing PSB buoys and associated anchors would be relocated and one would be removed. Each buoy is attached to three anchor legs. Each leg consists of a 120-foot (40-meter) chain attached to a main 10-ton (9-metric ton) concrete anchor (11 feet long, 5.5 feet wide, 5 feet high [3.5 by 1.8 by 1.6 meters]) and two concrete clump anchors, each 3 by 3 feet (1 by 1 meter) and weighing 2 tons (1.8 metric tons) (Figure 2–4).

Shoreline and Upland Construction

The north abutment would be approximately 38 feet (12 meters) high and 75 feet (23 meters) long. It would extend from an approximate elevation of 13 feet (4 meters) above MLLW to the top of the slope at elevation 50 feet (15 meters). The south abutment would be approximately 12 feet high and 85 feet (3.7 by 26 meters) long. This abutment would extend from an elevation of approximately 11 feet (3.4 meters) above MLLW to the top of the slope at elevation 24 feet (7 meters). The upper limit of the intertidal zone is considered to be MHHW, approximately 11 feet above MLLW at NAVBASE Kitsap Bangor.

The abutments would each be supported on 10 24-inch (60-centimeter) piles driven on land by vibratory and impact methods. Each abutment would include a stairway on one end, from the top of the abutment to the LWI deck and base of the bluff, and on the other end an observation post installed adjacent to the abutment at the base of the cliff. At each abutment the stairs would be attached to the abutment wall or supported on piles driven to grade. Each observation post would be approximately 25 by 45 feet (8 by 14 meters), supported on seven 24-inch steel piles, and include a second stairway to the base of the bluff. The abutment stairways would be supported on 6- by 2-foot (2- by 0.6-meter) concrete pads and the observation post stairways would be supported on 2- by 2-foot concrete pads. The piles for the abutment stairways and observation posts would be driven at low tide ("in the dry") using a crane mounted on top of the bluff.

The abutment stair landings and observation post support piles would lie below MHHW; the area below MHHW occupied by these new structures would be approximately 34 square feet (6 square meters) at each LWI. The area excavated below MHHW during abutment construction would be approximately 4,000 square feet (372 square meters) at each north and south abutment. The volume of material excavated below MHHW would be approximately 300 and 500 cubic yards (229 and 382 cubic meters) at the north and south abutments, respectively. Construction of the abutment and observation post at the south LWI would require removal of approximately 25 feet (7.6 meters) of creosoted timber anti-torpedo baulk at the base of the bluff. Similar to work for the stairway and observation post piles (see above), abutment, stair, and observation post work would also be conducted at low tide in the dry. Beach contours would be returned to pre-construction conditions following construction, except for the areas occupied by the new structures. All bluff slopes disturbed by construction of the abutment would be stabilized using riprap placed above MHHW, approximately 200 cubic yards (153 cubic meters) covering 1,125 square feet (105 square meters) at the north abutment and 235 cubic yards (180 cubic meters) covering 1,275 square feet (119 square meters) at the south abutment. The observation posts would be provided with a potable water line and with a wastewater line connecting to the

base sanitary sewer system. These lines would be attached to the walkways/trestles leading to the observation posts.

Construction of the north abutment would clear a total of approximately 8,000 square feet (743 square meters) of upland area and would require excavation of approximately 4,200 cubic yards (3,211 cubic meters) of soil and fill of 4,680 cubic yards (3,578 cubic meters). The south abutment would include a gravel path to Sealion Road and would clear a total of approximately 6,000 square feet (557 square meters) of land. The south abutment would require excavation of approximately 900 cubic yards (688 cubic meters) of soil and fill of 1,000 cubic yards (765 cubic meters).

The staging area for both LWI construction sites would be a 5.4-acre (2.2-hectare) site near the intersection of Archerfish and Seawolf Roads (Figure ES-2). This site has been used for staging other construction projects and is highly disturbed.

Construction Schedule

Upland construction would take approximately 540 days; equipment would include backhoes, bulldozers, loaders, graders, trucks, and a crane/pile driver. Overall project construction would begin in May 2016 and end in May 2018. All in-water pile driving and abutment construction would take place in one in-water work season, July 16, 2016, to January 15, 2017, and would minimize potential impacts on Endangered Species Act (ESA)-listed fish species. Other in-water activities such as installation of the mesh material and relocation of PSB units and anchors would begin in January 2017 and end by May 2018, and could occur either within or outside the in-water work season. Materials and equipment for the in-water work would be brought in by barge, while materials and equipment for abutment construction would be brought in by truck. The number of construction workers is estimated at 100.

LWI ALTERNATIVE 3: PSB MODIFICATIONS (PREFERRED)

LWI Alternative 3 is the Preferred Alternative. Under this alternative, the construction and operation of the LWI structures would consist of modifying the existing PSB system to extend across the intertidal zone to attach to concrete abutments at the shoreline that would be the same as the abutments described above for the Pile-Supported Pier Alternative (Figure 2–5). Two observation posts, installed at the North and South LWI locations, would be the same as described above for the Pile-Supported Pier Alternative. There would be no underwater mesh, which requires a rigid, fixed structure for attachment. As a security requirement, Alternative 3 would use a greater number of security personnel than Alternative 2. However, the frequency of security vessel operations would not increase.

For the north LWI, approximately 1,200 feet (370 meters) of the existing PSB system would be relocated and 100 feet (30 meters) of new PSB would be added (Figure 2–6). Four existing buoys and associated anchors would be relocated. The mooring system for two of the four relocated buoys would be reduced from three anchor legs to two anchor legs, each with one 2-ton (1.8-metric ton) clump anchor (3 by 3 feet [1 by 1 meter]) and one 10-ton (9-metric ton) anchor (11 feet long, 5.5 feet wide, 5 feet high [3.5 by 1.8 by 1.6 meters]). For the south LWI, approximately 1,200 feet of the existing PSB system would be relocated and 200 feet (60 meters) of new PSB would be added (Figure 2–7). Three existing buoys and associated anchors would

be relocated. One of these would have its anchor legs reduced from three to two, each with one clump anchor and one 10-ton anchor. One new buoy would be installed with two mooring legs (each with one clump anchor and one 10-ton anchor).

Each PSB unit would be 50 feet (15 meters) long and would support an 8-foot high fence on a metal frame (Figure 2–8). Each unit would be supported on three pontoons: a center pontoon 18 feet (5 meters) long, and two end pontoons each 6 feet (2 meters) long. The pontoons would be 42 inches (107 centimeters) in diameter. A metal grating (guard panel) 42 inches high would be suspended below the metal frame, between the pontoons. Because the height of this guard panel would be the same as the diameter of the pontoons, it would extend into the water the same distance as the pontoons (less than 1 foot [30 centimeters]). Openings in the barrier system to allow vessel passage would be created by disconnecting adjacent PSB units at strategic locations and towing the barrier out of the way.

PSBs at Low Tide

On an average low tide, approximately 11 PSB units including 33 pontoons (north and south LWI combined) would "ground out" in the intertidal zone. Over the long term, which would include extreme low tides, approximately 18 PSB units including 54 pontoons would ground out in the intertidal zone. Five of these PSB units would ground out at the north LWI and 13 would ground out at the south LWI. To minimize the resulting disturbance of the intertidal zone, each center pontoon would be fitted with three "feet" and the outer pontoons would be fitted with two feet that would prevent an entire pontoon from contacting the sediment surface (Figure 2–8). These feet would be 12 by 24 inches (30 by 60 centimeters) in size and constructed of high-density polyethylene, a durable, inert plastic often used for water mains and sewer systems. Considering a total of 126 such feet (18 intertidal PSBs with 7 feet each), and that these feet would not always ground out at the same location, it is estimated that approximately 2,520 square feet (234 square meters) of the intertidal zone would be disturbed over the long term (700 square feet [65 square meters] at the north LWI, and 1,820 square feet [169 square meters] at the south LWI). In addition, one buoy at the south LWI would ground out on an average low tide. Over the long term, including extreme low tides, three buoys (one at the north LWI and two at the south LWI) would ground out at low tide. These buoys are 30 inches (76 centimeters) in diameter. Over the long term, grounding out by these buoys would disturb approximately 74 square feet (7 square meters) of seafloor.

Shoreline and Upland Construction

For each abutment, 10 piles would be driven from land using vibratory methods, and impact methods as needed, such as for proofing. Likewise, each observation post would require 7 piles that would be driven from land using vibratory methods and impact methods as needed. Driving of all piles for LWI Alternative 3 would require a maximum of 30 days of pile driving.

With one exception, the abutment and other upland features would be the same as described above for LWI Alternative 2. The exception is that two 30-foot (9-meter) tall, on-land towers would be installed by bolting them to concrete foundations, one at the north LWI and one at the south LWI. These towers would be located within the extension of the WSE; no additional ground would be disturbed for the towers.

Construction Schedule

The overall construction schedule for LWI Alternative 3 would be the same as described above for Alternative 2, except only one in-water work season would be needed.

LWI OPERATIONS

Operation of the LWI would consist primarily of maintenance of the in-water and upland structures, including routine inspections, cleaning, repair, and replacement of facility components (no pile replacement) as required. Operation would also include opening and closing of the PSBs for boat traffic, using small tug boats. The presence of the LWI would result in changes in patterns of security vessel movements, but such movements would be within the WRA and would not increase in frequency. For both alternatives, cleaning and replacement of the PSB guard panels (unbolted and re-bolted out of the water) would occur as needed. Cleaning would be accomplished by power washing. Measures would be employed to prevent discharges of contaminants to the environment (see BMPs, Section 2.3.2). Maintenance would require infrequent visits by vehicles to the upland portions and by small boats to the LWI structures (tying up to the floating docks). Operational lighting at the abutments for both alternatives would not exceed one foot candle to a distance of 50 feet (15 meters) from the abutments; these lights would operate continuously. For Alternative 2, operational lighting levels would not exceed 10 foot candles along the immediate pier structure, 0.5 foot candle out to a distance of 50 feet (15 meters) from the LWI structure, and 0.05 foot candle to a distance of 100 feet (30 meters). These lights would operate only during security responses. For Alternative 3, there would be no lighting on the PSB units, only on the abutment towers.

Comparison of LWI Alternatives

Table 2–1 summarizes the physical features of LWI Alternatives 2 and 3. Table 3.17–1 summarizes the environmental impacts of the LWI alternatives. Under Alternative 1, the No Action Alternative, there would be no change to the environment due to construction and operation of an LWI. Therefore, the No Action Alternative is not discussed in this section.

Alternative 3 is the preferred Alternative, in part because it would have fewer environmental impacts than Alternative 2 and, therefore, it is also the environmentally preferred alternative and the Least Environmentally Damaging Alternative according to the CWA Section 404(b)(1) guidelines. The principal reasons for Alternative 2's greater impacts are that it would have a larger number of piles (and thus greater noise impacts), in-water pile driving, greater habitat impacts, and greater potential to affect migration of juvenile salmonids than Alternative 3. The upland impacts of the two alternatives would be the same. Alternative 2 would have greater adverse impacts on traffic and greater positive impacts on socioeconomics.

Construction of LWI Alternative 2 would include driving 120 in-water support piles for the permanent piers, 16 permanent piles for the dolphins (8 at each), and 120 in-water piles for the temporary construction trestle, which would generate underwater and airborne noise levels for up to 80 days. In comparison, construction of Alternative 3 would require no in-water pile driving, thus avoiding resulting underwater noise impacts to marine biota. For both alternatives, however, marine mammals (pinnipeds), marbled murrelets, and upland wildlife could be exposed to airborne noise from driving of the abutment piles. In addition to pile driving noise,

construction impacts on the marine environment would include minor turbidity from pile driving (LWI Alternative 2 only), PSB mooring anchor removal and placement (both alternatives), and boat movement (both alternatives). For Alternative 2, pile driving noise could result in behavioral disturbance or injury of ESA-listed salmonids (Hood Canal summer-run chum salmon, Puget Sound Chinook salmon, Puget Sound steelhead, and bull trout) or marbled murrelets occurring in the immediate project area, as well as behavioral disturbance of marine mammals. ESA-listed rockfish (bocaccio, yellow-eye rockfish, and canary rockfish) are not expected in the project area. Marine mammals potentially affected by behavioral harassment would include the following non-ESA-listed species: Steller sea lion, harbor seal, California sea lion, harbor porpoise, and transient killer whales. The ESA-listed humpback whale is not expected to be exposed to behavioral harassment due to the rare occurrence of this species in the project area. The ESA-listed Southern Resident killer whale is not present in the project area. Limiting pile driving and abutment work below MHHW to the in-water work season of July 16 to January 15 would minimize potential impacts on ESA-listed salmonids. Pile driving noise for Alternative 3 (airborne noise only) is not expected to result in behavioral disturbance of pinnipeds or marbled murrelets, and would have no measurable impacts on ESA-listed fish.

Construction of the shoreline abutments would be the same for both alternatives and would require temporary excavation of an area of approximately 8,000 square feet (743 square meters) below MHHW. The abutment stair landings and observation post piles would lie below MHHW, with a total area of approximately 68 square feet (6 square meters). Placement of the steel plate anchors and piles for LWI Alternative 2 would result in permanent loss of 1,040 square feet (97 square meters) of eelgrass habitat. Placement of PSB buoy mooring anchors and PSB grounding under LWI Alternative 3 would result in permanent loss of 580 square feet (54 square meters) of eelgrass habitat. Under either alternative, the observation posts would shade benthic habitat (total of 2,000 square feet [186 square meters]), but not marine vegetation or oyster beds. Similarly, the dolphin platforms (Alternative 2 only) would shade benthic habitat (128 square feet [12 square meters]) but not marine vegetation or oysters. The presence of the pier and in-water mesh under Alternative 2 could represent at least a partial barrier to the migration of ESA-listed salmonids along the Bangor waterfront. In contrast, Alternative 3 would have less of a barrier effect on ESA-listed salmonids because it would lack the pier and in-water mesh. The guard panels between PSB pontoons would have negligible impacts on migration of ESA-listed salmonids.

Practices and measures to minimize impacts to ESA-listed species would be implemented as described in the Mitigation Action Plan (Appendix C). Construction and operation of LWI Alternatives 2 and 3 may affect ESA-listed salmonids, rockfish, marbled murrelets and Southern Resident killer whales. Final effect determinations for ESA-listed species and critical habitat will be completed during the consultation process and included in the Final EIS. The Navy is currently in preliminary consultation with the NMFS West Coast Region office and USFWS Washington Fish and Wildlife Office under the ESA, is in preliminary consultation with the NMFS West Coast Region office under the MSA, and is working with NMFSHQ on the MMPA compliance process.

For Alternative 2, periodic cleaning of the mesh by power washing would result in minor water quality impacts, which would be minimized by employing appropriate BMPs. Likewise for both alternatives, periodic cleaning of the PSB guard panels would result in minor water quality

impacts, which would be minimized by employing appropriate BMPs. Pursuant to the CWA, the Navy will seek permits from USACE for fill associated with the abutment stair landings, and a Section 401 water quality certification from WDOE. In accordance with the Coastal Zone Management Act (CZMA), the Navy will submit a Coastal Consistency Determination (CCD) to WDOE.

Impacts of both alternatives on the upland environment would be similar and include approximately 0.32 acre (0.13 hectare) of vegetation clearing, construction traffic, air pollutant emissions, and pile driving and conventional construction noise. With the exception of 0.16 acre (0.064 hectare) of new impervious surface and permanent pervious surfaces such as aggregate pathways, the disturbed area would be revegetated with native species. There would be no impacts on wetlands. Wildlife could be disturbed by construction noise and lighting, but no terrestrial animals or plants protected under the ESA would be affected. Potential impacts to bald eagles may occur as a result of elevated noise levels or visual disturbance during construction, but no incidental takes are anticipated.

Nearby residential areas and recreational users of the waters off NAVBASE Kitsap Bangor may experience elevated noise levels during construction, but no other impacts on land use or recreation are anticipated. Both alternatives would have minimal impacts on aesthetics; impacts would be greater for Alternative 2 than for Alternative 3, because of the larger structure and larger number of piles for Alternative 2. Both alternatives would be consistent with the NAVBASE Kitsap Bangor TRIDENT Support Site Master Plan. Temporary socioeconomic impacts of construction would be positive: for every $100 million spent by the Navy in construction expenditures, an estimated 919 direct jobs would be created, as well as an estimated 426 indirect and induced jobs. Indirect or induced jobs would be concentrated in the following industries: food services and drinking places, real estate establishment, health care, architecture and engineering, wholesale trade, and retail stores. For Alternative 2, the construction cost is estimated to be approximately $54 million, representing the total economic impact of 500 direct jobs and 233 indirect and induced jobs. Total economic output to the region would be in excess of $80 million. For Alternative 3, the construction cost is estimated to be approximately $33 million, representing the total economic impact of 300 direct jobs and 139 indirect and induced jobs. Total economic output to the region would be in excess of $48 million. Long-term socioeconomic impacts would be minimal. Neither alternative would have disproportionately high and adverse human health or environmental effects on minority populations or low-income populations because the affected areas do not disproportionately contain minority or low-income populations. In addition, because the project is located within a military restricted area, there would be no potential for children to be exposed to pollutants, other hazardous materials, or safety hazards as a result of construction and operation of either LWI alternative.

The cultural setting of Delta Pier and the existing Explosives Handling Wharf (EHW-1), which are eligible to be listed in the National Register of Historic Places (NRHP), would likely not be adversely affected. There would be a small potential for disturbance of archaeological resources (prehistoric sites) during construction. However, if any such resources were encountered, the Navy would coordinate with the State Historic Preservation Office (SHPO) and tribes. Access to tribal shellfish harvesting areas would be restricted in the construction area only during construction of the LWI. During operations access would not be restricted but the new structures

would result in permanent loss of 1,880 square feet (175 square meters) of the shellfish harvesting areas under Alternatives 2 and 3 (Table 3.17–1). The Navy has invited and is in government-to-government consultation with the five federally recognized American Indian tribes that have U&A areas in the vicinity of the project area: the Skokomish, Port Gamble S'Klallam, Jamestown S'Klallam, Lower Elwha Klallam, and Suquamish Tribes.

Neither alternative would have population-level effects on salmon stocks harvested by the tribes. Construction would generate truck traffic, but this traffic would be within the capacity of the base road system. However, construction traffic for both alternatives would exacerbate existing peak-hour delays at both gates to NAVBASE Kitsap Bangor and roads immediately outside the gates. Alternative 2 would have a greater impact than Alternative 3 on traffic crossing the Hood Canal Bridge because of the larger number of construction barges. Impacts on air quality would not be significant for either alternative because emissions would be well below regulatory thresholds. Air quality in the vicinity of the LWI and SPE project sites, the upland project area, and the greater area of NAVBASE Kitsap Bangor, all of which are located in Kitsap County, is generally rated as good, which is the highest air quality rating. Kitsap County is presently in attainment for all National Ambient Air Quality Standards (NAAQS) for criteria pollutants.

SPE Alternatives

SPE Alternatives Development and Screening Criteria

The screening criteria listed below were used in the identification and evaluation of SPE action alternatives:

- Supports master planning considerations and does not impact other operational missions on NAVBASE Kitsap,
- Avoids or minimizes environmental impacts to the maximum extent practicable,
- Integrates pier and support facilities into existing facilities and infrastructure to the extent practicable, and
- Provides unrestricted access to the ocean.

SPE ALTERNATIVE 1: NO ACTION

Under the No Action Alternative, no additional pier construction or operation would occur at Service Pier or other piers at NAVBASE Kitsap Bangor, and SSN-21 and SSN-22 would remain homeported at NAVBASE Kitsap Bremerton. This alternative would not meet the purpose and need for the Proposed Action. Operational conflicts between submarines and the homeported aircraft carrier at Pier D at NAVBASE Kitsap Bremerton would continue. Deployment schedules would remain restricted and Commander, Submarine Development Squadron Five (CSDS-5) units at NAVBASE Kitsap Bremerton would continue to be under-utilized. No environmental impacts would result from the No Action Alternative, as no construction or physical alteration to the waterfront would occur, and there would be no changes in operations. The No Action Alternative is carried forward for analysis because it is required by NEPA and constitutes baseline conditions for environmental analysis of the Proposed Action.

SPE ALTERNATIVE 2: SHORT PIER (PREFERRED)

SPE Alternative 2 is the Preferred Alternative. Under this alternative, the Navy would construct and operate an approximately 540-foot (165-meter) long and 68 feet (21 meters) wide, 44,000-square foot (4,090-square meter) surface area extension to the existing Service Pier (Table 2–2) that would be capable of a double-breasted (side-by-side) berthing configuration for submarine maintenance. The new total length of the Service Pier would be 1,040 feet (317 meters). Proposed new facilities would include a pier crane on a 28- by 60-foot (9- by 18-meter) foundation, 2,100-square foot (195-square meter) Pier Services and Compressor Building located on the Service Pier, an upland 50,000-square foot (4,645-square meter) Waterfront Ship Support Building, a 421-car parking lot, an 1,800-square foot (174-square meter) shoreside emergency generator facility, and roadway and utility improvements (transmission line upgrades, and installation of generators, switch gear, and a new substation) (Figure 2–9). All facilities would be designed and constructed to receive a minimum Leadership in Energy and Environmental Design (LEED) certification of Silver. LEED is a third-party certification program and nationally accepted benchmark for the design, construction, and operation of high-performance green buildings developed by the U.S. Green Building Council. BMPs and impact reduction measures that would be implemented to avoid or minimize potential environmental impacts associated with the SPE Proposed Action are discussed in Section 2.3.

The proposed Pier Services and Compressor Building would house the compressor and would be located at the south end of the existing Service Pier (Figure 2–9). The Pier Services and Compressor Building is needed to house sewage lift stations, and "high pressure" and "low pressure" compressors that would provide an off-hull source of air for charging submarine air banks, as well as breathing quality air needed for purging the ship's ballast tanks to allow entry for maintenance. The compressors need to be located as near to the ship as possible to minimize the accumulation of moisture in the air lines.

Pile Installation and Wave Screen

The existing Service Pier is approximately 500 feet long by 85 feet wide (152 by 26 meters). The proposed extension of the Service Pier would be approximately 540 by 68 feet (165 by 21 meters) and would require installation of approximately 230 36-inch (92-centimeter) diameter steel pipe support piles. After construction of the SPE, the pier would be 1,040 feet (317 meters) long. The SSNs would rest against mooring camels which would have 50 24-inch (60-centimeter) diameter steel pipe support piles. Approximately 105 18-inch (45-centimeter) square concrete fender piles would also be installed. Driving of the steel support piles would use a combination of vibratory (primary) and impact methods and would require pile driving on no more than 125 days during the first in-water work season. Driving of the concrete piles would use impact methods only and would require pile driving on no more than 36 days during the second in-water work season. The pier extension would extend to the southwest from the south end of the existing Service Pier and would parallel Carlson Spit in water depths of 30 to 50 feet (9 to 15 meters) below MLLW, such that the berthing areas for the new submarines would be in water depths of approximately 50 to 85 feet (15 to 26 meters) below MLLW. A concrete float 150 feet (46 meters) long and 15 feet (4.6 meters) wide would be attached to the south side of the SPE (Figure 2–10). The existing PSB system would be re-configured to attach to the end of the new pier extension, with approximately 540 feet of existing PSB removed. Removal and

disposal of existing PSBs would be as described for the LWI project. Construction is expected to require one barge with a crane, one supply barge, a tugboat, and work skiffs.

Construction would be preceded by removal of an existing wave screen (including piles) and other existing piles from the Service Pier. A total of 36 existing creosote wood piles (19 18-inch [45-centimeter] and 17 15-inch [38-centimeter] piles) would be removed by cutting at the mudline. A floating boom and other measures would be used to protect water quality during this activity (Section 2.3.2). In addition, a new wave screen would be installed under the SPE (Figure 2–10). This screen would be approximately 200 feet (60 meters) long and 27 feet (8 meters) high (20 feet [6 meters] below to 7 feet [2 meters] above MLLW), made of concrete or steel, and attached to the steel support piles for the SPE.

Upland Construction

The proposed Waterfront Ship Support Building would be located on an existing 36,000-square foot (330-square meter) parking lot on the east side of Wahoo Road which has 107 parking spaces. Based on loss of this lot, transfer of 322 SEAWOLF personnel from Bremerton to Bangor, and related relocation of personnel at Bangor, a new parking lot of 421 spaces would be needed.[2] This parking lot would be located approximately 1,200 feet (370 meters) south of the proposed Waterfront Ship Support Building within a vegetated area. A utility pad for the shoreside emergency generator facility, 1,800 square feet (174 square meters) in size, would be installed adjacent to Sealion Road. Road improvements to accommodate changes in traffic patterns along Wahoo and Sealion Roads, as well as repairs to existing roads damaged from construction activity, would also be included under this alternative. The area permanently occupied by new project elements would be approximately 7 acres (2.8 hectares). Approximately 4 acres (1.6 hectares) would be disturbed temporarily for a construction laydown area and other construction-related disturbance and revegetated with native species following construction. The parking lot, utilities, and laydown area would be located within the area between Sturgeon Street and Sealion Road, as shown on Figure 2–9.

Construction Schedule

Upland construction would take approximately 400 days; equipment would include backhoes, bulldozers, loaders, graders, trucks, and paving equipment. Construction of all proposed facilities is anticipated to take approximately 24 months. Construction would begin in July 2018 and conclude in July 2020. Pile driving would occur within the in-water work windows (July 16 to January 15) to minimize potential impacts on ESA-listed fish species. It is not expected that completion of pile driving would require two full 6-month in-water work seasons. Relocation of existing PSB units and anchors could occur outside the in-water work window. There would be no work in the intertidal zone. The number of construction workers is estimated at 225.

[2] Parking requirements would be: 273 spaces for SSN 21 class parking, 22 for Altgration Installation Team, 120 for Port Operations, and 6 for Nuclear Regional Maintenance Detachment.

SPE ALTERNATIVE 3: LONG PIER

Under this alternative the pier extension would be approximately 975 feet (297 meters) long and 68 feet (21 meters) wide, and would have a surface area of approximately 70,000 square feet (6,500 square meters) (Figure 2–11). The new total length of the Service Pier would be approximately 1,475 feet (450 meters). This design would allow two submarines to be berthed in an in-line configuration rather than breasted (side-by-side). Table 2–2 summarizes the physical features of SPE Alternative 3. The total number of 24-inch (60-centimeter) diameter steel support piles would be approximately 500, including those for small craft and camel mooring; there would be approximately 160 18-inch (45-centimeter) square concrete fender piles. Driving of steel piles would require driving on no more than 155 days and would take place during the first in-water construction season. Driving of concrete piles would require driving on no more than an additional 50 days and would take place during the second in-water work season. The PSB relocation would differ from the relocation under SPE Alternative 2 so as to connect the PSBs to the end of the longer pier extension (approximately 975 feet of existing PSBs would be removed). All other aspects of SPE Alternative 3 would be the same as SPE Alternative 2, including upland features and overall construction schedule. It is expected that completion of in-water work would require two full in-water work seasons. Alternative 3 would meet the purpose and need and screening criteria, but would have greater environmental impacts (Table 2–2) and cost more than Alternative 2.

SPE OPERATIONS

Operation of the SPE that would occur following project completion and submarine relocation would be similar to existing day-to-day operations that currently occur with one submarine (SSN-23) homeported at NAVBASE Kitsap Bangor. SSN-21 and SSN-22 each come with a crew of approximately 140. In addition, shore-based personnel (approximately 182), many of whom currently spend their time at both NAVBASE Kitsap Bangor and NAVBASE Kitsap Bremerton, would be permanently transferred to NAVBASE Kitsap Bangor. In total, the average daily number of employees on site at the Service Pier would increase from 390 to 712 (an increase of 322). There would be a corresponding increase in equipment operations, maintenance activities, transfer of materials on and off the submarines, and vehicular traffic. Facilities such as transit, food service, maintenance, housing, and training are already in place to accommodate two additional submarines and associated personnel at NAVBASE Kitsap Bangor. The proposed changes would allow maintenance activities to be performed on three submarines simultaneously (although only two are anticipated to be in port at any one time). All waste discharges from the submarines would be pumped ashore to the appropriate base waste treatment systems. Drainage water from the SPE would be collected in a trench drain on the pier, treated using an in-line canister system designed to meet the basic treatment requirements of the Washington Department of Ecology (WDOE) Stormwater Management Manual for Western Washington, and then discharged to Hood Canal in accordance with a National Pollutant Discharge Elimination System permit.

The average number of one-way Hood Canal transits of SEAWOLF Class submarines to or from Service Pier would increase from approximately 0.5 per month currently to 2 per month. These submarines are not escorted to and from NAVBASE Kitsap Bangor like the TRIDENT Class submarines, but there would be an increase in small support vessel traffic at Service Pier.

Operational lighting levels would not exceed 10 foot candles on the pier deck, 0.5 foot candle from the pier deck to a distance of 50 feet (15 meters) from the deck, and 0.05 foot candle to a distance of 100 feet (30 meters).

Comparison of SPE Alternatives

Table 2–2 summarizes the physical features of SPE Alternatives 2 and 3. Table 3.17–3 summarizes the environmental impacts of the SPE alternatives. Under Alternative 1, the No Action Alternative, there would be no change to the environment because the relocation of two submarines to NAVBASE Kitsap Bangor, extension of the Service Pier, and construction and operation of related facilities would not occur. Therefore, the No Action Alternative is not discussed in this section.

SPE Alternative 2 the Preferred Alternative, in part because it would have fewer environmental impacts than Alternative 3 and, therefore, it is also the environmentally Preferred Alternative and the Least Environmentally Damaging Alternative according to the CWA Section 404(b)(1) guidelines. The longer pier under Alternative 3 would result in more pile driving (and associated noise) and habitat impacts. Both alternatives would have minimal effects on juvenile salmon migration and tribal fisheries resources, and no effect on tribal shellfish beds. Upland impacts for both alternatives would be the same. Alternative 3 would have greater impacts on traffic on the Hood Canal Bridge and socioeconomics (positive) because of the larger construction project that would be required for the longer pier extension.

The principal difference between SPE Alternatives 2 and 3 is the length of the pier extension: 540 feet (165 meters) under Alternative 2 and 975 feet (297 meters) under Alternative 3. The width of both alternative pier extensions would be 68 feet (21 meters). SPE Alternative 2 would include driving of fewer piles (total of 385) than Alternative 3 (total of 660) and would generate pile driving noise over a shorter period. Alternative 2 would require up to 125 days of steel pile driving during the first in-water work window, and 36 days of concrete fender pile driving during the second, compared to Alternative 3's maximum of 155 days of steel pile driving during the first in-water work window, and 50 days of concrete pile driving during the second.

Pile driving noise could potentially result in behavioral disturbance or injury of ESA-listed salmon (Hood Canal summer-run chum salmon, Puget Sound Chinook salmon, Puget Sound steelhead, and bull trout) and marbled murrelets occurring in the immediate vicinity of the project. ESA-listed rockfish (bocaccio, yellow-eye rockfish, and canary rockfish) are not expected in the project area. Behavioral disturbance of marine mammals is also possible. Marine mammals potentially affected by behavioral harassment would include the Steller sea lion, harbor seal, California sea lion, harbor porpoise, and transient killer whales. These effects would occur over a shorter period for SPE Alternative 2 than for Alternative 3. The ESA-listed humpback whale is not expected to be exposed to behavioral harassment due to its rare occurrence in the project area. The ESA-listed Southern Resident killer whale is not present in the project area. Limiting pile driving to the established in-water work season (July 16 to January 15) would minimize potential for impacts on ESA-listed fish.

The new overwater coverage created would be less under SPE Alternative 2 (44,000 square feet [4,090 square meters]) than Alternative 3 (70,000 square feet [6,500 square meters]), resulting in

less shading of the benthic community. Under both alternatives, new pier structures would lie in water depths greater than 30 feet (9 meters), resulting in no shading of eelgrass or macroalgae habitat and minimal effects on salmon migration.

Practices and measures to minimize impacts to ESA-listed species would be implemented as described in the Mitigation Action Plan (Appendix C). Construction and operation of SPE Alternatives 2 and 3 may affect ESA-listed salmonids and rockfish, marbled murrelets, and Southern Resident killer whales. Final effect determinations for ESA-listed species and critical habitat will be completed during the consultation process and included in the Final EIS. The Navy is currently in preliminary consultation with the NMFS West Coast Region office and USFWS Washington Fish and Wildlife Office under the ESA, is in preliminary consultation with the NMFS West Coast Region office under the MSA, and is working with NMFSHQ on the MMPA compliance process.

Upland features of SPE Alternatives 2 and 3 would be the same, resulting in the same impacts. Construction of new project elements would result in permanent loss of 7 acres (2.8 hectares) of forest vegetation and wildlife habitat (Figures 2–9 and 3.5–3). An additional 4 acres (1.6 hectares) of vegetation would be disturbed temporarily during construction, but revegetated with native species following construction. There would be no impacts on wetlands. Wildlife would be disturbed by pile driving noise for a shorter period under Alternative 2 than under Alternative 3. One tree potentially suitable for nesting by marbled murrelets may be removed under both alternatives. No other terrestrial animals or plants protected under the ESA would be affected. Wildlife could be disturbed by construction noise and lighting, but no terrestrial animals or plants protected under the ESA would be affected. Potential impacts to foraging bald eagles may occur as a result of elevated noise levels or visual disturbance during construction, but no incidental takes are anticipated.

Pursuant to the CWA, the Navy will seek a Section 401 water quality certification from WDOE. In accordance with the CZMA, the Navy will submit a CCD to WDOE. The project would be permitted by USACE under Section 10 of the Rivers and Harbors Act. In accordance with the CZMA, the Navy will submit a CCD to WDOE.

Nearby residential areas and recreational users of the waters off NAVBASE Kitsap Bangor may experience elevated noise levels during construction, but no other impacts on land use or recreation are anticipated. SPE Alternative 2 would result in a shorter duration of construction, and would have somewhat less potential lighting impacts on residential areas, than SPE Alternative 3. Aesthetic impacts would be slightly greater under SPE Alternative 3, but minimal under both alternatives. Both alternatives would be consistent with the NAVBASE Kitsap Bangor TRIDENT Support Site Master Plan. Temporary socioeconomic impacts would be positive and greater for SPE Alternative 3. The construction cost for SPE Alternative 2 is estimated to be approximately $89 million, representing the total economic impact of 818 direct jobs and 380 indirect and induced jobs. Total economic output to the region would be in excess of $131 million. The construction cost for SPE Alternative 3 is estimated to be approximately $116 million, representing the total economic impact of 1,066 direct jobs and 494 indirect and induced jobs. Total economic output to the region would be in excess of $170 million. Neither alternative would have disproportionate adverse effects on minority or disadvantaged populations. There would be a small potential for disturbance of archaeological resources

(prehistoric sites) during construction; if any such resources were encountered, the Navy would coordinate with the SHPO and tribes. Neither alternative would affect tribal fishing access or have a population-level effect on salmon stocks harvested by the tribes. The Navy has invited and is in government-to-government consultation with the five federally recognized American Indian tribes that have U&A areas in the vicinity of the project area: the Skokomish, Port Gamble S'Klallam, Jamestown S'Klallam, Lower Elwha Klallam, and Suquamish Tribes.

Construction and operational traffic would exacerbate existing peak-hour delays at both gates to NAVBASE Kitsap Bangor and on roads immediately outside the gates. Construction traffic impacts would persist longer for Alternative 3 than Alternative 2; operational traffic impacts would be the same for both alternatives. On-base construction traffic impacts would be minimal; new operational traffic could impact traffic flow on some base roads. During construction, both alternatives would increase the frequency of openings of the Hood Canal Bridge, an adverse impact on travelers on SR-104; this impact would last longer for Alternative 3 than for Alternative 2. Impacts on air quality would be minimal because emissions would be well below regulatory thresholds. Air quality in the vicinity of the LWI and SPE project sites, the upland project area, and the greater area of NAVBASE Kitsap Bangor, all of which are located in Kitsap County, is generally rated as good, which is the highest air quality rating. Kitsap County is presently in attainment for all NAAQS for criteria pollutants.

COMBINED IMPACTS OF LWI AND SPE

Although the LWI and SPE projects are independent, if both were implemented it is important to understand their combined impacts on environmental resources (the cumulative impacts of the proposed actions in conjunction with other past, present, and reasonably foreseeable actions are discussed in the next section). Under the current schedules, construction of the two projects would occur sequentially and would not overlap. This would extend the projects' impacts over a 4-year period compared to a 2-year period for each project. If schedule changes result in construction of the two projects overlapping, the combined impacts of the LWI and SPE projects would reflect these overlapping schedules. For example, during concurrent pile driving for the two projects, total sound levels would increase by up to 3 decibel (dB) in the limited area roughly equidistant between the south LWI project site and the SPE project site. This could affect fish and wildlife in this area, whereas residential areas north and south of the base, and recreational areas outside the base, would not receive cumulative noise levels from these two projects. Migratory species would experience construction impacts on water quality in two locations rather than just one. Limiting in-water construction to the in-water work windows would minimize the impacts of these construction impacts on juvenile salmon species protected under the ESA. Construction of the two projects would result in combined economic benefits. Combined construction traffic from the two projects would be considerable but would be within the capacity of the base road system. Combined construction vessel traffic would result in longer delays of traffic on SR-104 due to openings of the Hood Canal Bridge. In the long term, operations of the two projects would have combined impacts on marine habitats and species, including migrating juvenile salmon. Regarding the combined impacts on terrestrial habitat, most of the impacts would come from the SPE project.

CUMULATIVE IMPACTS

Past, present, and reasonably foreseeable future actions have had and will have adverse impacts on marine habitats and species in Hood Canal. Construction and operation of the LWI and SPE would contribute to regional cumulative impacts in conjunction with past, present, and future actions on marine resources such as shallow-water habitat, including loss of eelgrass, macroalgae, and habitat for juvenile salmon and other fish and invertebrate species. However, through the implementation of proposed compensatory aquatic mitigation actions in the Mitigation Action Plan (Appendix C), the project's contribution to cumulative impacts in conjunction with past, present, and future actions would not be significant.

The other construction impacts of the Proposed Actions, such as air and water quality effects, would be minor and highly localized and, thus, would not contribute significantly to cumulative impacts in conjunction with past, present, and future actions in the region.

Impacts on upland habitats and species from LWI and SPE would be moderate, and all but 7.2 acres (2.9 hectares) would be revegetated; approximately 4.2 acres (1.7 hectares) would be revegetated. The 7.2 acres would contribute to cumulative impacts to upland habitats in the region. During construction, marine vessel traffic from LWI and SPE would increase the frequency of openings of the Hood Canal Bridge by roughly half, resulting in an adverse impact on travelers on SR-104. The construction and operational impacts of the proposed actions on other resources would be minimal and have little potential to contribute to cumulative impacts in conjunction with past, present, and future actions in the region. The multiple projects would have cumulative economic benefits.

It is also possible that construction of the LWI and/or SPE would overlap in time with construction of other waterfront structures on NAVBASE Kitsap Bangor. In this case, pile driving for the multiple projects could result in cumulative noise impacts, as discussed above for the LWI and SPE projects themselves. If more than one construction project occurred at the same time, the predominant noise impact would be expansion of the geographic area affected by maximum sound levels. In limited areas where the noise spheres of influence would overlap, the total sound levels would increase by up to 3 dB. As a result, more individuals of marine species (fish, marine mammals, and marine birds) would be affected, but it is unlikely that population-level effects due to cumulative sound levels would be greater than those of the LWI and SPE projects alone. Noise impacts on nearby residential and recreational areas also would increase slightly due to the separated locations of the multiple construction projects. It is not expected that there would be major marine construction projects outside of NAVBASE Kitsap Bangor that would overlap with the other Navy projects and cause cumulative noise impacts. Concurrent construction of multiple projects would exacerbate traffic impacts on base roads and delays at the gates entering the base, with increased impacts to traffic on adjacent regional roadways.

BEST MANAGEMENT PRACTICES, CURRENT PRACTICES, MITIGATION MEASURES, AND REGULATORY COMPLIANCE

The following are the principal measures proposed for both projects to avoid, minimize, or compensate for the environmental impacts of the Proposed Actions:

Best Management Practices and Current Practices

- To reduce the likelihood of any petroleum products, chemicals, or other toxic or deleterious materials from entering the water, fuel hoses, oil or fuel transfer valves, and fittings would be checked regularly for drips or leaks and would be maintained and stored properly to prevent spills from construction and pile driving equipment into state waters.
- To limit soil erosion and potential pollutants contained in stormwater runoff, a Storm Water Pollution Prevention Plan would be prepared and implemented in conformance with the *Stormwater Management Manual for Western Washington* (WDOE 2012).
- Oil booms would be deployed around in-water construction sites as required by a CWA Section 401 Water Quality Certification for the projects, to minimize water quality impacts during construction.
- Debris would be prevented from entering the water during all demolition or new construction work. During in-water construction activities, floating booms would be deployed and maintained to collect and contain floatable materials that are accidentally released. Any accidental release of equipment or materials would be immediately retrieved and removed from the water. Following completion of in-water construction activities, an underwater survey would be conducted to remove any remaining construction materials that may have been missed previously. Retrieved debris would be disposed of at an appropriate commercial landfill.
- Removed creosote-treated wood piles and associated sediments (if any) would be contained on a barge or, if a barge is not utilized, stored in a containment area near the construction site. All creosote-treated material and associated sediments would be disposed of in a landfill that meets the liner and leachate standards of the Washington Administrative Code.
- Creosote-treated wood piles would be removed by cutting below the mudline and filling the resulting hole with clean sediment.
- To minimize impacts on marine habitat, limitations would be placed on construction vessel operations, anchoring, and mooring line deployment. A mooring and anchoring plan would be developed and implemented to avoid dragging anchors and lines in special status areas. Spudding/anchoring in existing eelgrass habitat would be avoided whenever possible. Vessel operators would be provided with maps of the construction area with eelgrass beds clearly marked.
- Barges and other construction vessels would not be allowed to run aground. Additionally, vessel operators would be instructed to avoid excess engine thrust in water depths shallower than 30 feet (9 meters) to the extent possible.
- To minimize impacts on ESA-listed fish species, in-water construction would be conducted within the in-water work window (July 16 through January 15). The exception is that mesh

installation (LWI Alternative 2), relocation of PSBs, and placement of anchors could occur outside the work window.

- For LWI Alternative 2, the in-water mesh would be cleaned regularly by power washing to minimize impacts on migrating fish. For both alternatives, the grates (guard panels) between the pontoons would be cleaned regularly.
- Applicable measures described above for Construction (Section 2.3.2.1) to protect water quality and habitats would be implemented during operational procedures.
- Low impact development and integrated management practices would be developed and implemented.

Mitigation Measures

- Pile driving of steel piles would be done using vibratory rather than impact methods whenever feasible, which would reduce noise levels by approximately 20 decibels root mean square (dB RMS) at 33 feet (10 meters) from the source.
- Bubble curtains would be used around steel piles being driven by impact methods to attenuate in-water sound pressure of the pile driving activity. The Navy would also consider other equally or more effective noise attenuation methods that may become available. Noise attenuation would not be used for driving concrete piles (SPE only), because of the much lower level of noise generated by driving of concrete piles compared to steel piles, and the resulting much lower potential for impacts to biota.
- During impact pile driving, a soft-start approach would be used to induce marine mammals to leave the immediate area. This soft-start approach requires contractors to initiate noise from hammers at reduced energy, followed by a waiting period. Due to mechanical limitations, soft starts for vibratory driving will be conducted only with drivers equipped with variable moment features. Typically, this feature is not available on larger, high-power drivers. The Navy will use the driver model most appropriate for the geologic conditions at the project location, and will perform soft starts if the hammer is equipped to conduct them safely.
- Construction activities would not be conducted during the hours of 10:00 p.m. and 7:00 a.m. Between July 16 and September 23, impact pile driving would only occur between 2 hours after sunrise and 2 hours before sunset to protect foraging marbled murrelets during the breeding season. Between September 24 and January 15, in-water construction activities would occur during daylight hours (sunrise to sunset). The Navy would notify the public about upcoming construction activities and noise at the beginning of each construction season.
- Construction in the upper intertidal zone (LWI abutments and observation posts) will be conducted at low tide ("in the dry") to minimize impacts to marine water quality and underwater noise.
- To avoid impacts on marine mammals protected by ESA and MMPA and marine birds protected by ESA, monitoring of shut down and buffer zones around in-water pile driving locations would be implemented. Detailed marine mammal and marbled murrelet monitoring plans would be developed and implemented in consultation with NMFS and the USFWS.

- A revegetation plan would be developed with the objective of restoring native vegetation to the areas temporarily cleared for the construction laydown area and construction of new roads. A monitoring and maintenance program (such as once a month) would be implemented until the native plants are sufficiently established to minimize invasion by noxious weeds.
- The Navy would develop a local Notice to Mariners to establish uniform procedures to facilitate the safe transit of vessels operating in the project vicinity. Barge trips and associated bridge openings would be scheduled to avoid peak commuting hours. The Notice to Mariners would also serve to notify divers, including tribal divers, of potential underwater noise impacts.
- The Navy would, as part of the Proposed Actions, undertake marine habitat mitigation in accordance with the Mitigation Action Plan (Appendix C). This habitat mitigation action, including mitigation of eelgrass impacts, would compensate for impacts of the Proposed Actions on marine habitats. The Navy would purchase habitat credits from the Hood Canal In-Lieu Fee Program, which would implement appropriate mitigation in the Hood Canal watershed.

Regulatory Compliance

The Navy must comply with a variety of federal environmental laws, regulations, and Executive Orders (EOs). These include the following:

- Bald and Golden Eagle Protection Act
- Clean Air Act
- Clean Water Act
- Coastal Zone Management Act
- Endangered Species Act
- Magnuson-Stevens Fishery Conservation and Management Act
- Marine Mammal Protection Act
- Migratory Bird Treaty Act
- National Historic Preservation Act
- Rivers and Harbors Act
- EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*
- EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*
- EO 13175, *Consultation and Coordination with Indian Tribal Governments*
- EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*
- EO 13653, *Preparing the United States for the Impacts of Climate Change*

Chapter 3 discusses the applicability of and compliance with these laws and regulations, as well as the laws and regulations of the state of Washington, that apply to the Proposed Actions. Regulatory compliance is summarized in Chapter 5.

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LIST OF ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
µg/kg	micrograms per kilogram
µg/m^3	micrograms per cubic meter
AAQS	ambient air quality standards
ACHP	Advisory Council on Historic Preservation
AIRFA	American Indian Religious Freedom Act
APE	Area of Potential Effect
AQI	air quality index
BMP	best management practice
BOD	biochemical oxygen demand
CAA	Clean Air Act
CCD	Coastal Consistency Determination
CDP	Census Designated Place
CDF	cumulative distribution functions
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COMNAVREGNWINST	Commander Navy Region Northwest Instruction
CP	current practices
CSDS-5	Commander, Submarine Development Squadron Five
CSL	Cleanup Screening Level
cu m	cubic meter
cu yd	cubic yard
CVN	aircraft carrier
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
DAHP	Department of Archaeology and Historic Preservation
dB re 1µPa	decibels referenced at 1 micropascal
dB	decibel
dBA	A-weighted decibel
DDESB	Department of Defense Explosives Safety Board
DEIS	draft environmental impact statement
DO	dissolved oxygen
DoD	Department of Defense
DPS	distinct population segment
dw	dry weight
EA	Environmental Assessment

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

EFH	Essential Fish Habitat
EHW-1	Explosives Handling Wharf
EHW-2	Explosives Handling Wharf-2
EIS	environmental impact statement
EISA	Energy Independence and Security Act
ELWS	extreme low water of spring tides
EO	Executive Order
EQ	Extraordinary Quality
ESA	Endangered Species Act
ESU	evolutionarily significant unit
FEIS	final environmental impact statement
FEMA	Federal Emergency Management Agency
FMC	Fishery Management Council
FMP	Fishery Management Plan
FR	*Federal Register*
FRD	Formerly Restricted Data
ft	foot/feet
FY	fiscal year
g	gravitational acceleration
GHG	greenhouse gas
GIS	Geographic Information System
gpd	gallons per day
gpm	gallons per minute
GWP	global warming potential
HAP	hazardous air pollutants
HAPC	Habitat Areas of Particular Concern
HCCC	Hood Canal Coordinating Council
HCDOP	Hood Canal Dissolved Oxygen Program
HDPE	high density polyethylene
HLUC	Historic Land Use Complexes
HPAH	high molecular weight polycyclic aromatic hydrocarbon
Hz	hertz
IHA	Incidental Harassment Authorization
IMP	integrated management practices
IMPLAN	Impact Analysis for Planning
INRMP	Integrated Natural Resources Management Plan
JARPA	Joint Aquatic Resources Permit Application
KB	Keyport/Bangor
kHz	kilohertz
km	kilometer
kph	kilometers per hour
kVA	kilovolt-ampere
kW	kilowatt

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

LAA	likely to adversely affect
LEED	Leadership in Energy and Environmental Design
Leq	equivalent sound level
LOA	Letter of Authorization
LOS	level of service
Lmax	maximum noise levels
LPAH	low molecular weight polycyclic aromatic hydrocarbon
LWI	Land-Water Interface
m	meter
MBTA	Migratory Bird Treaty Act
mg/kg	milligrams per kilogram
mg-N/kg	ammonia
mg/L	milligrams per liter
mgd	million gallons per day
MHHW	mean higher high water
MHWS	mean high water of spring tides
mi	mile
mL	milliliters
MLI	minority and low-income
MLLW	mean lower low water
mm	millimeter
MM	mitigation measures
MMO	marine mammal observer
MMPA	Marine Mammal Protection Act
MOA	Memorandum of Agreement
mph	miles per hour
MPN	most probable number
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSF	Magnetic Silencing Facility
MSGP	Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity
MSL	mean sea level
MTCA	Model Toxics Control Act
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAM	not adversely modify
NAVBASE	Naval Base
NAVFAC	Naval Facilities Engineering Command Northwest
Navy	U.S. Department of the Navy
NBK Bangor	Naval Base Kitsap Bangor
NCP	National Oil and Hazardous Substances Contingency Plan
ND	not detected
NE	no effect
NEPA	National Environmental Policy Act

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

NHPA	National Historic Preservation Act
NLAA	not likely to adversely affect
NMFS	National Marine Fisheries Service
NMFSHQ	National Marine Fisheries Service Headquarters
NMSDD	Navy Marine Species Density Database
NO_2	nitrogen dioxide
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOC	Notice of Construction
NOI	Notice of Intent
NOSSA	Naval Ordnance Safety and Security Activity
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRHP	National Register of Historic Places
NSWCCD	Navy Surface Warfare Center Carderock Division
NTU	Nephelometric Turbidity Units
O_3	ozone
OA	Operational Area
OPNAVINST	Chief of Naval Operations Instruction
OSHA	Occupational Safety and Health Administration
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PBDE	polybrominated diphenyl ether
PCB	polychlorinated biphenyl
PCE	Primary Constituent Element
PFC	properly functioning condition
PFMC	Pacific Fishery Management Council
PGA	peak ground acceleration
PM	respirable particulate matter
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PNPTT	Point No Point Treaty Tribes
PNPTC	Point No Point Treaty Council
ppm	parts per million
ppt	parts per thousand
PSAMP	Puget Sound Ambient Monitoring Program
PSAT	Puget Sound Action Team
PSB	Port Security Barrier
PSCAA	Puget Sound Clean Air Agency
PSD	prevention of significant deterioration
PSTRT	Puget Sound Technical Recovery Team
PSU	practical salinity unit
PTRCIT	Property of Traditional Religious and Cultural Importance to an Indian Tribe

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

PTS	permanent threshold shift
Qal	alluvium, colluviums, and fill material
Qva	advanced outwash
Qvgl	Vashon glacio-lacustrine
Qvt	Vashon till
RCW	Revised Code of Washington
RMS	root mean square
ROD	Record of Decision
ROI	Region of Influence
SAIC	Science Applications International Corporation
SARA	Superfund Amendments and Reauthorization Act
SECNAVINST	Secretary of the Navy Instruction
SEL	Sound Exposure Level
SEPA	State Environmental Policy Act
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SL	source level
SLR	sea level rise
SMA	Shoreline Management Act
SMP	Shoreline Management Plan
SMS	Sediment Management Standards
SO_2	sulfur dioxide
SOx	sulfur oxides
SPCC	Spill Prevention, Control, and Countermeasure
SPE	Service Pier Extension
SPL	sound pressure level
sq ft	square feet
sq km	square kilometers
sq m	square meters
sq mi	square miles
SQS	sediment quality standards
SR	State Route
SSBN	OHIO Class Ballistic Missile submarines
SSN	SEAWOLF Class submarine (This document does not address other classes of attack submarines)
SSP	Strategic Systems Program
SUBASE	Naval Submarine Base
SWPPP	Stormwater Pollution Prevention Plan
TCP	Traditional Cultural Property
TL	transmission loss
TMDL	total maximum daily load
TOC	total organic carbon
TPP	Test Pile Program
TPS	Transit Protection System
TRIDENT	TRIDENT Fleet Ballistic Missile

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

T-ROC	Thorndyke Resources Operation Complex
TSS	total suspended solids
TTS	temporary threshold shift
U&A	Usual and Accustomed
U.S.	United States
UCNI	Department of Defense Unclassified Controlled Nuclear Information
USACE	U.S. Army Corps of Engineers
USC	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGBC	U.S. Green Building Council
USGS	U.S. Geological Survey
VOC	volatile organic compound
W	Watts
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WDOE	Washington Department of Ecology
WDOH	Washington Department of Health
WISAARD	Washington Information System for Architectural and Archaeological Records Data
WRA	Waterfront Restricted Area
WSDOT	Washington State Department of Transportation
WSE	Waterfront Security Enclave
ZOI	zone of influence

CHAPTER 1

INTRODUCTION

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1.0 INTRODUCTION

Naval Base (NAVBASE) Kitsap Bangor, located on Hood Canal approximately 20 miles (30 kilometers) west of Seattle, Washington (Figure 1–1), provides berthing and support services to United States (U.S.) Department of the Navy (Navy) OHIO Class ballistic missile submarines, hereafter referred to as TRIDENT submarines, as well as a SEAWOLF Class submarine.[1]

The Navy is proposing two separate actions along the NAVBASE Kitsap Bangor waterfront: the Land-Water Interface (LWI) and the Service Pier Extension (SPE) projects. Under the LWI Proposed Action, the Navy proposes to secure the perimeter of the Waterfront Restricted Area (WRA) on NAVBASE Kitsap Bangor by constructing physical barriers through shallow waters and onto the immediate upland areas at the northern and southern extent of the WRA. These structures would tie into the existing Port Security Barrier (PSB) system and the on-land Waterfront Security Enclave (WSE) system, thereby securing the entire perimeter around the WRA. Under the SPE Proposed Action, the Navy proposes to extend the existing Service Pier and construct associated support facilities. The SPE would accommodate the proposed relocation of the SEAWOLF Class submarines SSN-21 (SEAWOLF) and SSN-22 (CONNECTICUT) from NAVBASE Kitsap Bremerton to join SSN-23 (JIMMY CARTER) on NAVBASE Kitsap Bangor. The relocation would result in the consolidation of all three SEAWOLF Class submarines on NAVBASE Kitsap Bangor. Maintenance personnel and submarine crews would be transferred to NAVBASE Kitsap Bangor; there would be no changes to facilities on NAVBASE Kitsap Bremerton. Figure 1–1 shows the general location of the Proposed Actions. Detailed descriptions of the Proposed Actions are provided in Sections 2.1 and 2.2.

NAVBASE Kitsap is the action proponent. The LWI project is for the use of the Navy's Strategic Systems Programs, which directs research, development, manufacturing, testing, evaluation, and operational support of the TRIDENT program. The SPE and supporting facilities are for the use of Commander, Submarine Development Squadron Five (CSDS-5). CSDS-5 is the Immediate Superior in Command for all SEAWOLF Class submarines and four Navy research and development detachments on NAVBASE Kitsap Bangor.

The National Environmental Policy Act (NEPA) requires federal agencies to provide environmental impact information to decision makers and the public before decisions are made and actions are taken (Public Law 91-190, 42 United States Code [USC] 4321-4347, as amended by Public Law 94-52, 94-83, 97-238 §4(b), 40 Code of Federal Regulations [CFR] 1502.14, 1505.1(e)). The Navy has determined that an environmental impact statement (EIS) is the appropriate level of NEPA analysis for each of the proposed actions. Although the two actions are independent, due to the geographic proximity, timing of construction, and potential to impact the same resources, the Navy has chosen to analyze both proposed actions in one EIS. The Department of the Navy is the lead agency for NEPA compliance for the Proposed Action as defined in NEPA regulations 40 CFR 1501.5, Navy regulations 32 CFR Part 775, and Chief of Naval Operations Instruction (OPNAVINST) 5090.1D CH-1, §5-3.10. This EIS is being prepared to meet NEPA and OPNAVINST requirements. The U.S. Army Corps of Engineers (USACE) and National Marine Fisheries Service (NMFS) are serving as Cooperating Agencies

[1] SEAWOLF is a class of SSN submarine; other classes of SSNs are LOS ANGELES Class and VIRGINIA Class.

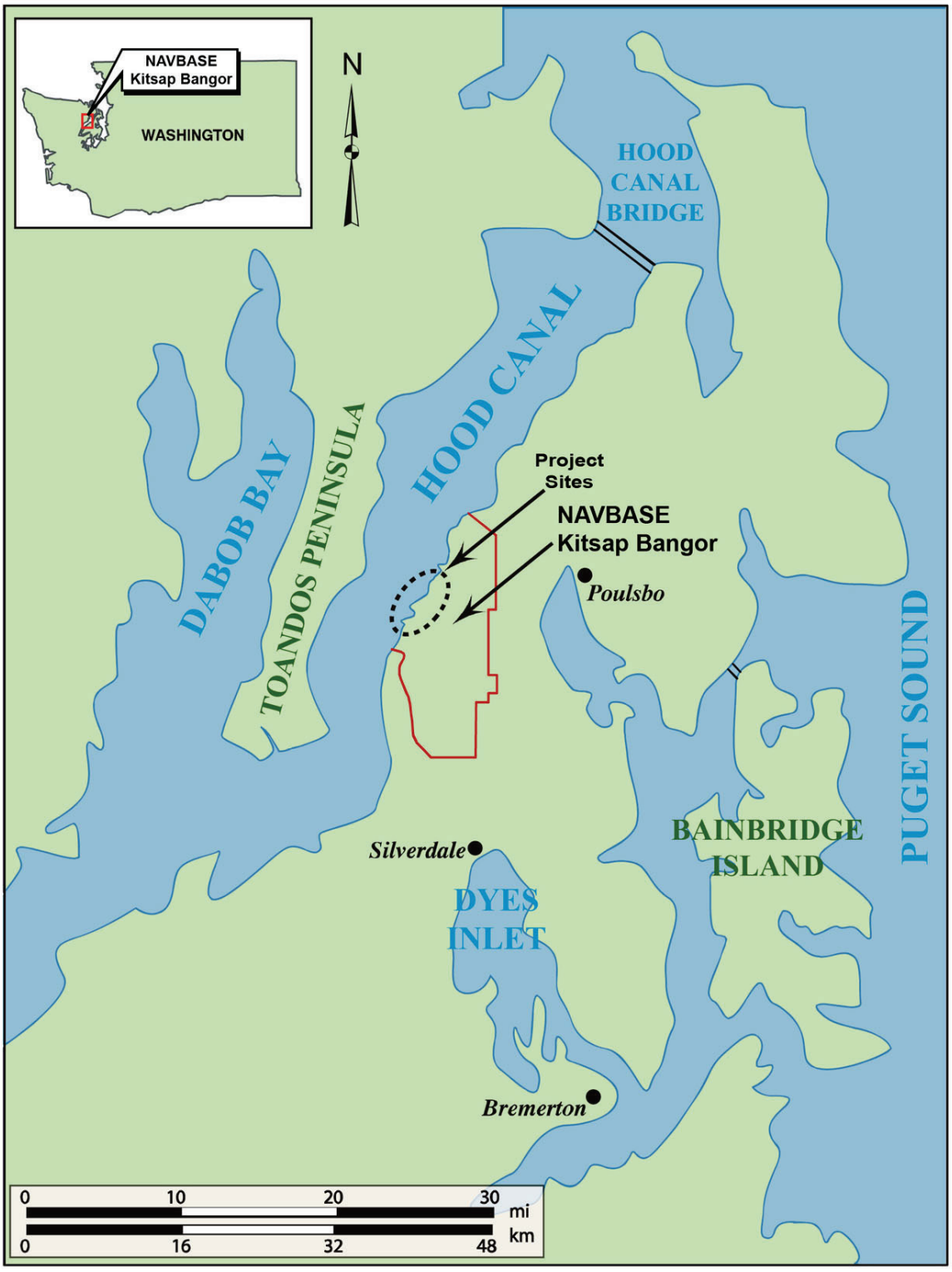

Figure 1–1. Site Location Map for NAVBASE Kitsap Bangor

under NEPA for the proposed actions. The dates of the acceptance letters were March 26, 2013, for NMFS and July 26, 2013 for the USACE.

1.1. PROJECT LOCATION

The WRA is a designated area that encompasses, among other things, TRIDENT support facilities. The in-water perimeter of the WRA is already physically secured by a floating barrier system known as a PSB. The on-land perimeter of the Bangor WRA is physically secured by a fencing system, known as the WSE. The LWI would be located across shallow waters and the adjacent upland areas, creating a physical barrier on the perimeter of the WRA along the Bangor waterfront and tying into the existing WRA PSB and WSE. The existing Service Pier is outside the WRA (approximately 0.7 mile [1.1 kilometer]) but is located within the extended PSB system (Figure 1–2).

There are two areas in which vessel traffic is restricted along the Bangor waterfront: Naval Restricted Areas 1 and 2 (Title 33 of the CFR, Part 334.1220 [33 CFR 334.1220]) (Figure 1–2). Naval Restricted Area 1 covers the area to the north and south along Hood Canal encompassing the Bangor waterfront, including the proposed LWI and Service Pier project sites. The regulations associated with Naval Restricted Area 1 state that no person or vessel shall enter this area without permission from the Commander, NAVBASE Kitsap Bangor or his/her authorized representative. The WRA is located within Restricted Area 1.

Naval Restricted Area 2 encompasses the waters of Hood Canal within a circle of 3,000 feet (914 meters) diameter centered at the north end of NAVBASE Kitsap Bangor and partially overlapping Naval Restricted Area 1. The regulations associated with Naval Restricted Area 2 state that navigation will be permitted within that portion of this circular area not lying within Naval Restricted Area 1 at all times except when magnetic silencing operations are in progress.

"Bedlands" are those aquatic lands that are submerged at all times and that include navigable salt/fresh waters of the state. The bedlands adjacent to NAVBASE Kitsap Bangor are under the ownership of the Washington Department of Natural Resources (WDNR). Nevertheless, the United States retains a navigational servitude in all navigable waters regardless of the ownership of submerged lands. Thus, the United States may take actions concerning navigation over any navigable channel such as Hood Canal, to include effects on the submerged lands beneath the water column. At the Bangor waterfront, restrictions on access to waters immediately adjacent to the base are a valid exercise of the navigational servitude, as would be the construction of any facility relating to navigation, such as the LWI structures and PSB modifications.

There are multiple manmade structures along the Bangor waterfront (Figure 1–2). Nevertheless, much of the Bangor shoreline is in relatively natural condition, with only 6 percent classified as "modified" by the Kitsap County Nearshore Habitat Assessment (Judd 2009). The substrate ranges from sand and gravel to cobble and rock in intertidal and shallow subtidal areas, with silty or muddy substrate predominating in deeper zones.

Beds of macroalgae and eelgrass are present along much of the shoreline to depths of approximately 20 feet (6 meters) below mean lower low water (MLLW), although some species

Figure 1–2. NAVBASE Kitsap Bangor Restricted Areas

of macroalgae occur sparsely as deep as 60 feet (18 meters) below MLLW. A shoreline cliff ranging from a few feet to over 20 feet in height separates the marine from the terrestrial environment. The upland area of the base is primarily forested (68 percent of the base), while 27 percent is developed. There are numerous wetlands, as well as surface water drainages discharging to Hood Canal.

NAVBASE Kitsap Bangor is surrounded by private communities along its north, south, and east borders, as well as on the opposite (west) side of Hood Canal. The closest off-base communities are approximately 1.5 miles (2.4 kilometers) north of the LWI project area and 0.6 mile (1.0 kilometer) south of the SPE project area. The entirety of NAVBASE Kitsap Bangor, including the land areas and adjacent water areas in Hood Canal, is restricted from general public use.

The project area is also within the Usual and Accustomed (U&A) fishing area of several American Indian tribes, including the Skokomish, Port Gamble S'Klallam, Jamestown S'Klallam, Lower Elwha Klallam, and Suquamish Tribes. In the cooperative agreement of 1997, signed between the Navy and the Point No Point Treaty Council (Skokomish, Port Gamble S'Klallam, Jamestown S'Klallam, and the Lower Elwha Klallam Tribes), the Navy permitted tribal access to the intertidal beach south of Delta Pier for the "enhancement, perpetuation, and harvest of shellfish" (Navy 1997).

1.2. PURPOSE AND NEED

The LWI and SPE are independent actions, but are being analyzed in the same environmental impact statement (EIS) due to efficiencies, their geographic proximity, and because construction periods for the two projects were initially projected to overlap. However, these are not connected projects. Each Proposed Action fulfills a separate purpose and need, independent of the other Proposed Action.

1.2.1. LWI Purpose and Need

The purpose of the LWI Proposed Action is to comply with Department of Defense (DoD) directives to protect Navy TRIDENT submarines from increased and evolving threats and to prevent the seizure, damage, or destruction of military assets. The LWI project is needed to enhance security within the WRA and comply with security requirements contained in the following documents:

- *Nuclear Weapon Security Manual: The DoD Nuclear Weapon Security Program*, DoD 5210.41M, Secret/Rel to USA and NATO;
- *United States Nuclear Weapons Command and Control, Safety, and Security*/NSPD-28, Secret; and
- *Naval Nuclear Weapons Security Policy*, SECNAVINST S8126.1, Secret.

Enclosure of the WRA would be completed by installing LWI structures and modifying the PSB system at the waterfront. The LWI project would include construction of abutments at the shoreline cliff at the north and south ends of the WRA. The new LWI structures would attach to the abutments, as would the on-land WSE, thus completing enclosure of the WRA.

Protection of strategic military assets is a vital national security concern. Aggressive security improvements within the Navy pre-date the USS COLE incident and the terrorist attacks of September 11, 2001, and continue today. The Navy continues to improve security along the Bangor waterfront to protect its submarines and critical support facilities. The proposed LWI structures and PSB modifications have been designed and located to meet DoD and Navy security requirements and minimize, to the extent practicable, environmental impacts.

1.2.2. SPE Purpose and Need

The purpose of the SPE Proposed Action is to eliminate deployment constraints and improve maintenance of the SEAWOLF fleet. The SPE project is needed to:

- Avoid restrictions at NAVBASE Kitsap Bremerton on navigating SEAWOLF Class submarines through Rich Passage under certain tidal conditions;
- Improve long-term operational effectiveness for the three SEAWOLF Class submarines on NAVBASE Kitsap;
- Provide berthing and logistical support for SEAWOLF, LOS ANGELES, and VIRGINIA submarine classes at the Navy's SSN research, development, test and evaluation hub, which is located on NAVBASE Kitsap Bangor; and
- Improve submarine crew training and readiness through co-location of the SEAWOLF Class submarines with command functions on NAVBASE Kitsap Bangor submarine training center.

Co-locating all three SEAWOLF Class submarines at a single location would combine project teams, conserve unique submarine maintenance resources, simplify logistics, streamline production practices, and improve the efficiency of pier-side maintenance of the submarines.

The SPE and supporting facilities would address a number of infrastructure deficiencies on NAVBASE Kitsap (both NAVBASE Kitsap Bangor and NAVBASE Kitsap Bremerton) to ensure its capability to homeport the SEAWOLF fleet. These deficiencies, described below, include inadequate support services facilities, parking, and berthing space at the existing NAVBASE Kitsap Bangor Service Pier. An earlier assessment of homeporting SEAWOLF Class submarines on NAVBASE Kitsap (Navy 2004a) recommended homeporting two SEAWOLFs on NAVBASE Kitsap Bremerton and one SEAWOLF (USS JIMMY CARTER) on NAVBASE Kitsap Bangor in the short term, but recommended homeporting all three SEAWOLFs on NAVBASE Kitsap Bangor in the long term.

1.2.2.1. CURRENT INFRASTRUCTURE DEFICIENCIES ON NAVBASE KITSAP BANGOR

Inadequate Support Services Facilities. The existing Service Pier received upgrades in August 2005 that included widening of the pier and construction of a waterfront support facility (Navy 2003). Existing space is not adequate to consolidate parts testing, maintenance activities, and storage of equipment. Currently, temporary trailers, a barge, and several makeshift structures located on the Service Pier house the production and engineering support services. Additionally, shore power and emergency shore power facilities require upgrading to meet current DoD Unified Facilities Criteria UFC-4-150-02 (DoD 2003).

Inadequate Parking. Parking available to maintenance workers, CSDS-5 crew, and mission essential personnel is located upland from the Service Pier and is spread across four different locations as well as along Sealion Road (Figure 2–1). Overflow parking, when the closer parking lots fill, requires the use of a shuttle service to transport personnel to and from the Service Pier. Because the new Waterfront Ship Support Building would be built on the site of an existing parking lot, and the relocation of the two SEAWOLF Class submarines to NAVBASE Kitsap Bangor would add a need for 421 parking spaces[2], additional parking capacity would be required.

Inadequate Berthing Space. In addition to the existing Service Pier, the waterfront area includes Marginal Wharf and the Delta Pier. Visiting SSN capability at Marginal Wharf is severely restricted by increased security measures since 2001 and by its close proximity to the Explosives Handling Wharf (EHW), which prohibits maintenance on the visiting ship during EHW operations. Delta Pier is fully utilized and has no extra berthing capacity. Completion of Explosives Handling Wharf-2 (EHW-2) in 2016 will further encumber Marginal Wharf and prohibit its use for visiting SSNs at all times. The Service Pier is the only other SSN-capable pier on NAVBASE Kitsap Bangor and it cannot concurrently accommodate the USS JIMMY CARTER and visiting SSNs.

1.2.2.2. CURRENT DEFICIENCIES ON NAVBASE KITSAP BREMERTON

Operational Constraints. The location of NAVBASE Kitsap Bremerton poses operational constraints to the SEAWOLF fleet deployment schedule. Submarines depart NAVBASE Kitsap Bremerton via Rich Passage where transiting time is dictated by tides and currents. SEAWOLF Class submarines are not designed for surface movement and have difficulty with navigation below five knots. In addition, SEAWOLF Class submarines are not visible after dark, which creates a safety hazard. As a result, safe navigation through Rich Passage requires daylight hours and slack high tides.

These restrictions adversely affect deployment of the SEAWOLF fleet and create operational and maintenance constraints. On 144 days per year, the window to transit Rich Passage is less than 90 minutes; on 12 days per year, there is no acceptable transit window. In 2012, 4 of 9 submarine transits were delayed from 12 to 48 hours, resulting in the loss of 5 operational days.

In the event that maintenance is required and returning to NAVBASE Kitsap Bremerton is impossible due to a tidal constraint through Rich Passage, emergency maintenance is performed at Naval Magazine Indian Island. While emergency maintenance can be performed at Naval Magazine Indian Island, this facility is not equipped or staffed to conduct regular submarine maintenance.

Inadequate Waterfront Facilities. Pier D on NAVBASE Kitsap Bremerton currently supports berthing of SSN-21 and SSN-22. The pier's primary use is an aircraft carrier Homeporting Pier and it is not configured for submarine pier-side maintenance and emergent ordnance handling

[2] Parking requirements would be: 273 spaces for SSN 21 class parking, 22 for Altgration installation team, 120 for Port Operations, and 6 for Nuclear Regional Maintenance Detachment.

activities. The configuration of Pier D infrastructure is inefficient for supporting routine submarine maintenance for the following reasons:

- Weapons are stored at magazines off base, thereby requiring the transportation of ordnance through urban areas. This issue does not affect submarines berthed on NAVBASE Kitsap Bangor, which load and unload ordnance at Naval Magazine Indian Island.
- It requires the partial disassembly of weapons at Pier D prior to loading.
- It lacks dedicated waterfront support maintenance facilities for homeport-level maintenance.
- It requires configuration of shore power for each evolution (3.5 hours of preparation time to connect each time a submarine is berthed at the pier).
- Personnel are required to travel from Pier D to NAVBASE Kitsap Bangor for training and maintenance, as well as command functions.

These factors result in reduced productivity, reduced efficiency, and fewer deployments across the life of the class.

1.3. EIS SCOPE

Table 1–1 presents a summary of the comments received during the scoping process (Section 1.5). These comments were taken into account in defining the scope of this draft environmental impact statement (DEIS); not all comments were determined to be within the scope of NEPA. Commenters included private citizens, tribes, regulatory agencies, and elected officials.

Table 1–1. Summary of Comments Received During Scoping

Category	Comment Summary
Purpose and Need	• Effect of recent Strategic Arms Reduction Treaty and resulting reduction in nuclear weapons on purpose of and need for the projects • General support for or opposition to the Proposed Actions • Unnecessary spending of taxpayer money
Alternatives	• Preference for short pier configuration for the Service Pier Extension to minimize impacts • Alternatives to proposed shoreline abutments for the LWI project
General	• Informative meeting materials and project staff • Naval Base Kitsap Bangor is a good neighbor • Concerns about the increased threat of attack due to the presence of the SEAWOLF submarines
Hydrology	• Impacts on littoral drift (sediment transport)
Natural Resources	• Impacts Proposed Actions would have on wildlife, sensitive seabirds, and marine habitats and resources • Effect of proposed LWI mesh structure on salmon migration • Request to minimize impacts on fish in the Hood Canal

Table 1–1. Summary of Components Received During Scoping (continued)

Category	Comment Summary
Land Use/Noise	• Impact of Proposed Actions on vehicular traffic • Impact of Proposed Actions on recreation in Jefferson County • Impact on nearby residential areas due to noise, light and glare, and visual changes
Cultural Resources	• Impacts on tribal treaty rights • Impacts on tribal resources, such as fish and shellfish
Transportation	• Impacts on marine traffic • Impacts on vehicular traffic
Cumulative Impacts	• Need to consider the impacts of the LWI and SPE in conjunction with other projects in the region

This EIS presents alternatives that meet the purpose and need of the Proposed Actions, describes existing baseline conditions, and evaluates the environmental impacts on the resources listed below.

- Marine Water Resources
- Marine Vegetation and Invertebrates
- Fish
- Marine Mammals
- Marine Birds
- Terrestrial Biological Resources
- Geology, Soils, and Water Resources
- Land Use and Recreation
- Airborne Acoustic Environment
- Aesthetics and Visual Quality
- Socioeconomics
- Environmental Justice and Protection of Children
- Cultural Resources
- American Indian Traditional Resources
- Traffic
- Air Quality

Two action alternatives and a No Action Alternative are analyzed for each project. These resources were identified based on their potential to be affected by the Proposed Actions and on their potential for public interest. The EIS evaluates the potential impacts on these resources separately for the two projects, but also evaluates their combined impacts. The cumulative impacts of the Proposed Actions in combination with past, present, and future Navy and non-Navy actions are also analyzed. Issues related to public health and safety are addressed under

Airborne Acoustic Environment, Land Use and Recreation, and American Indian Traditional Resources.

1.4. REGULATORY CONSIDERATIONS

This section identifies the principal federal laws and implementing regulations that are applicable to the Proposed Actions. The Navy must comply with a variety of federal environmental laws, regulations, and Executive Orders (EOs). These include the following:

- Bald and Golden Eagle Protection Act
- Clean Air Act
- Clean Water Act
- Coastal Zone Management Act
- Endangered Species Act
- Magnuson-Stevens Fishery Conservation and Management Act
- Marine Mammal Protection Act
- Migratory Bird Treaty Act
- National Historic Preservation Act
- Rivers and Harbors Act
- EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*
- EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*
- EO 13175, *Consultation and Coordination with Indian Tribal Governments*
- EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*
- EO 13653, *Preparing the United States for the Impacts of Climate Change*

Chapter 3 discusses the applicability of and compliance with these laws and regulations, as well as the laws and regulations of the state of Washington, that apply to the Proposed Actions. Regulatory compliance is summarized in Chapter 5.

1.5. ENVIRONMENTAL REVIEW PROCESS

NEPA requires that environmental information be made available to the public, agencies, and other stakeholders before decisions are made. The Navy's public involvement process for the Proposed Action is designed to inform stakeholders of the Navy's Proposed Actions early in the NEPA process, to provide stakeholders with the opportunity to comment on the Navy's Proposed Actions, and to keep stakeholders informed throughout the NEPA process. The Navy's public involvement plan includes the following:

- **Publish Notice of Intent (NOI).** An NOI was published in the *Federal Register* (FR) on February 1, 2013, to announce the Navy's intent to prepare an EIS and to announce public

scoping meetings (May 20–21, 2013, in Chimacum and Poulsbo, WA). Additional public notices were published in local newspapers (e.g., *Kitsap Sun, Seattle Times*).

- **Conduct Scoping.** Scoping provides an early and open process for determining the scope of issues and for identifying the significant issues related to a Proposed Action. The 45-day public scoping period for this EIS occurred from February 1 to March 17, 2013. Throughout the scoping period, the Navy sought to engage and involve the public, tribes, and agencies in the decision-making process. Their input and comments were solicited through press releases; newspaper advertisements; and letters to the public, local governments, federal and state agencies, and American Indian tribes. Two scoping meetings were held in Chimacum and Poulsbo, Washington, on February 20 and 21, 2013, respectively. Both written and oral comments were sought during scoping. Comments were also accepted by mail and through the project website (https://www.nbkeis.com/lwi/). Comments received during the scoping period were considered in preparing the DEIS.
- **Establish and Sustain Regulatory Communication and Coordination.** The Navy will meet with key regulatory agencies. Federal agencies include the NMFS, U.S. Fish and Wildlife Service, and USACE. State agencies include the Washington Department of Ecology, WDNR, and the Washington Department of Archaeology and Historic Preservation. The USACE and NMFSHQ have agreed to be Cooperating Agencies on the EIS.
- **Conduct Government-to-Government Consultation.** The Navy has initiated Government-to-Government consultation with American Indian tribes that use traditional resources in the vicinity of the project area, including the Skokomish, Port Gamble S'Klallam, Jamestown S'Klallam, Lower Elwha Klallam, and Suquamish Tribes.
- **Prepare a DEIS.** This DEIS describes the purpose and need of the proposed LWI and SPE projects, explains the actions and alternatives being proposed, presents the existing conditions in the region potentially affected, and provides an analysis of the environmental consequences, including cumulative impacts, of the Proposed Actions and each alternative, including a No Action Alternative. To ensure the widest dissemination possible, the DEIS will be distributed to agencies, American Indian tribes, local libraries, members of the public who have requested copies, and all stakeholders on the mailing list. The DEIS will also be posted to the project website (www.nbkeis/lwi/).
- **Allow for Public/Agency Review.** The DEIS will be made available for public, government agency, American Indian tribes, and other stakeholder review and comment for 45 calendar days upon FR publication of the U.S. Environmental Protection Agency's Notice of Availability (NOA) for the DEIS. The public comment period is currently planned for winter 2014–2015. The public hearings will be held in Poulsbo and Chimacum, Washington, and hearings will allow the public, agencies, American Indian tribes, and other stakeholders an opportunity to provide both oral and written comments on the DEIS. Comments received during the DEIS public comment period will be considered in preparing the final environmental impact statement (FEIS). All comments submitted at the public hearings, received by mail, and by the LWI/SPE website will be given equal consideration in preparation of the FEIS.
- **Prepare an FEIS.** An FEIS will be prepared to reflect all substantive comments received during the public comment period and public hearings from the public, Federal and state

agencies, American Indian tribes, and other stakeholders. The FEIS will consider the Navy's responses to comments; information from project development/design and analysis; and additional information received from reviewers. The FEIS will provide the decision maker with a comprehensive review of the potential environmental consequences of each alternative for each of the two Proposed Actions and will identify a preferred alternative for each Proposed Action. A responsiveness summary will be prepared consisting of the Navy's response to each substantive DEIS public comment. Where appropriate, FEIS sections will be changed to respond to public comments. The summary, as well as transcripts of the DEIS public hearings, will be included as appendices to the FEIS. An NOA will be published in the FR in the winter of 2015–2016, to announce availability of the FEIS and to commence the 30-calendar-day wait period.

- **Allow for Additional Public Involvement.** The Navy will distribute the FEIS to all stakeholders on the mailing list, including those that made substantive comments on the DEIS or requested a copy. New substantive comments received during the 30-day wait period will be addressed in the Record of Decision (ROD).
- **Issue a Record of Decision.** The final step in the NEPA process is signing of a ROD for both Proposed Actions. For each action, the ROD will state the Navy's decision, identify alternatives considered, address any additional substantive comments received that were not addressed in the FEIS, and discuss other considerations influencing the decision. Each ROD will also describe efforts planned to avoid or minimize the environmental impacts resulting from the Navy's decision.

1.6. PROJECTED SCHEDULE

An overview of the projected EIS schedule is provided in Table 1–2. (Note: This is subject to change.)

Table 1–2. Detailed Projected Schedule with Key Dates Identified

Milestone	Date
Notice of Intent Published in *Federal Register*	February 1, 2013
Scoping Period (45 days)	February 1 – March 17, 2013
Scoping Meeting Dates	Poulsbo, WA: February 21, 2013 Chimacum, WA: February 20, 2013
NOA DEIS published in *Federal Register*	Winter 2014–2015
DEIS Public Comment Period (45 days)	45-day period following release of the DEIS
Public Hearings	Poulsbo, WA: Winter 2015 Chimacum, WA: Winter 2015
NOA FEIS published in *Federal Register*	Spring 2016
Records of Decision (ROD) signed	Spring 2016

CHAPTER 2

PROPOSED ACTIONS AND ALTERNATIVES

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2.0 PROPOSED ACTIONS AND ALTERNATIVES

This section describes the Proposed Actions and alternatives considered for implementing each Proposed Action. For each of the Land-Water Interface (LWI) and Service Pier Extension (SPE) proposed actions, the United States (U.S.) Department of the Navy (Navy) identified a range of alternatives to meet the action's purpose and need. After applying screening criteria, two action alternatives for each project are carried forward for detailed analysis in this environmental impact statement (EIS), along with the No Action Alternative for each project. These two projects are independent, and the decisions on whether to implement each of the projects will be independent. The two Proposed Actions, including alternatives considered, are described separately in the following sections.

2.1. LWI PROPOSED ACTION

Under the LWI Proposed Action, the Navy proposes to secure the perimeter of the Waterfront Restricted Area (WRA) at NAVBASE Kitsap Bangor by constructing and operating physical barriers through shallow waters and onto the immediate upland areas at the northern and southern extent of the WRA (Figure 2–1). These structures would tie into the existing Port Security Barrier (PSB) system and the on-land Waterfront Security Enclave (WSE) system, thereby securing the entire perimeter of the WRA. Construction would occur over a 2-year period, May 2016 through May 2018. Operations would consist of maintenance and periodic cleaning of the structures and the periodic opening and closing of sections for boat egress/ingress. The design life of the LWI Proposed Action is 50 years.

2.1.1. LWI Alternatives

2.1.1.1. ALTERNATIVES DEVELOPMENT AND SCREENING CRITERIA

The EIS must evaluate all reasonable alternatives in accordance with the Council on Environmental Quality regulations (40 Code of Federal Regulations [CFR] Part 1502.14) and Navy regulations (32 CFR Part 775) that implement the National Environmental Policy Act (NEPA). The development of reasonable alternatives for analysis is dependent on the stated purpose and need for the Proposed Action. Screening criteria were developed to determine if alternatives meeting the purpose and need were reasonable and should be carried forward for detailed analysis in the EIS. The screening criteria listed below were used in the identification and evaluation of LWI action alternatives:

- Meets security and TRIDENT Fleet Ballistic Missile (TRIDENT) program requirements,
- Compatible with existing security features,
- Must be located within the WRA,
- Compatible with a dynamic intertidal environment,
- Supports master planning considerations and does not impact other operational missions on NAVBASE Kitsap, and
- Avoids or minimizes environmental impacts to the maximum extent practicable.

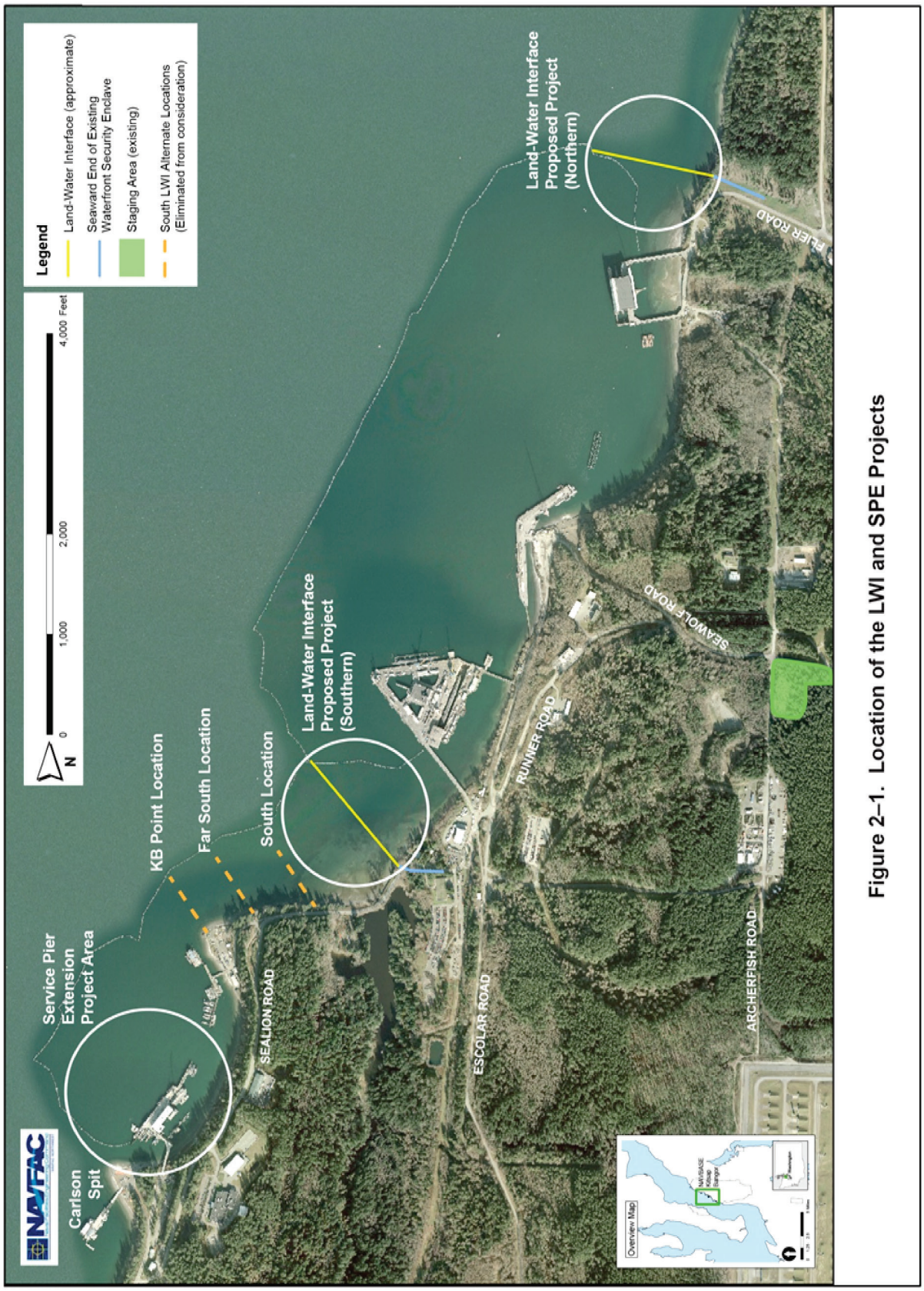


Figure 2–1. Location of the LWI and SPE Projects

2.1.1.2. ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

Using the above screening criteria, the following LWI alternatives were considered but eliminated from further analysis in the EIS.

- *Constructing the structures at another location within the Bangor WRA.* The LWI must be constructed in the WRA to meet the purpose and need and the screening criteria, including the ability to connect the existing floating PSB system to the WSE. Alternative locations within the WRA were considered for the south and north LWIs. The Bangor waterfront has constrained development space for alternative LWI locations, as described below.
  - *South LWI Location.* The Navy considered alternative locations north and south of the proposed location of the south LWI. Alternative locations north of the proposed south LWI site would not meet security requirements. Three alternative locations for the south LWI structure were considered: South Location (south of Devil's Hole), Far South Location (near Keyport/Bangor [KB] Dock), and KB Point (Figure 2–1). These three south location alternatives were not carried forward for further analysis because their potential environmental impacts are greater than those of the alternatives carried forward for detailed analysis, particularly with respect to adverse effects on tribal shellfishing and tribal beach access. These three locations would also require re-routing of the WSE, an action not compatible with existing security features.
  - *North LWI Location.* Locations south of the proposed north LWI site would not meet security requirements. Locations north of the proposed site would have a greater impact (more excavation and larger abutment required) on bluffs that provide input of substrate material to the intertidal zone (greater environmental impact). In addition, locations north of the proposed site would require re-routing of the WSE, an action which is not compatible with existing security features.
- *Alternatives to structure design.* Alternatives with different designs for the LWI structures, such as a pile-supported pier structure with a solid pier deck, a pile-supported pier structure that required a dredge construction method, and an earthen berm, were considered. The pile-supported pier structure with a solid pier deck would have used a concrete deck. The pile- supported pier structure requiring dredging would have used a stiffer in-water mesh that would have consisted of metal grating resting on a concrete foundation buried into the seafloor. These alternative designs were eliminated from further consideration because they would have resulted in greater environmental impacts, particularly to marine habitats and species, compared to the alternatives carried forward. Dredging and foundation construction for the stiff metal grating would have resulted in much more disruption of marine habitat than the proposed flexible mesh alternative. The earthen berm would have displaced 2.6 acres (1 hectare) of seafloor compared to the pile-supported pier structures which would result in minimal seafloor displacement. Concerns for sediment transport and juvenile fish migration served to eliminate the berm from further consideration. An alternative consisting of PSB modifications with an in-water mesh was not carried forward because the mesh would have required a rigid, fixed structure for attachment.

2.1.1.3. LWI ALTERNATIVES EVALUATED IN EIS

Two action alternatives were identified as meeting the purpose and need and the screening criteria. These alternatives consist of a pile-supported pier with associated PSB modifications, and PSB modifications alone. These action alternatives and the No Action Alternative are described below.

2.1.1.3.1. LWI ALTERNATIVE 1: NO ACTION

Under LWI Alternative 1, the No Action Alternative, the LWI structures would not be constructed and existing PSBs would not be relocated. This alternative would not meet security requirements and, therefore, would not meet the purpose and need for the Proposed Action. No environmental impacts would result from the No Action Alternative, as no construction or physical alteration to the waterfront would occur, and there would be no changes in operations. The No Action Alternative is carried forward for analysis because it is required by NEPA and constitutes baseline conditions for environmental analysis of the Proposed Action.

2.1.1.3.2. LWI ALTERNATIVE 2: PILE-SUPPORTED PIER

Under LWI Alternative 2, construction and operation of LWI structures would include pile-supported piers built from the base of the shoreline bluff out to a connection point with the existing PSB system (Figures 2–1, 2–2, and 2–3) at both the north and south ends of the WRA. The piers would connect to solid concrete abutments that would be built at the shoreline bluff, and an anchoring structure for the PSBs would be installed at the seaward end of each pier. Construction is expected to require one barge with a crane, one supply barge, a tugboat, and work skiffs. Table 2–1 (presented at the end of Section 2.1.1.3.3) summarizes LWI Alternative 2.[1] Best management practices (BMPs) and impact reduction measures that would be implemented to avoid or minimize potential environmental impacts associated with the LWI Proposed Action are discussed in Section 2.3.

Pier Structures

The LWI pier structures would be 13 feet (4 meters) wide and 280 feet (85 meters) long at the north location and 730 feet (223 meters) long at the south location. The last (seaward) 23 feet (7 meters) of each pier would be 20 feet (6 meters) wide. The piers would include a walkway for their entire length and 40-foot (12-meter) tall steel monopole towers supporting lights and security equipment; there would be 14 towers on the south pier and 6 towers on the north pier. A fence would be installed along the entire length of each pier. A mesh material would extend from the bottom of the walkway into the water and would be anchored to heavy steel plates placed on the seafloor. The steel plate anchors would occupy approximately 1,500 square feet (140 square meters) at the north LWI and 4,000 square feet (370 square meters) at the south LWI, for a total area of approximately 5,500 square feet (510 square meters). (Dimensions and numbers are based on preliminary design and are approximate and subject to change.)

[1] Under LWI Alternative 1, the No Action Alternative, there would be no change to the environment due to construction and operation of an LWI. Therefore, the No Action Alternative is not included in Table 2–1.

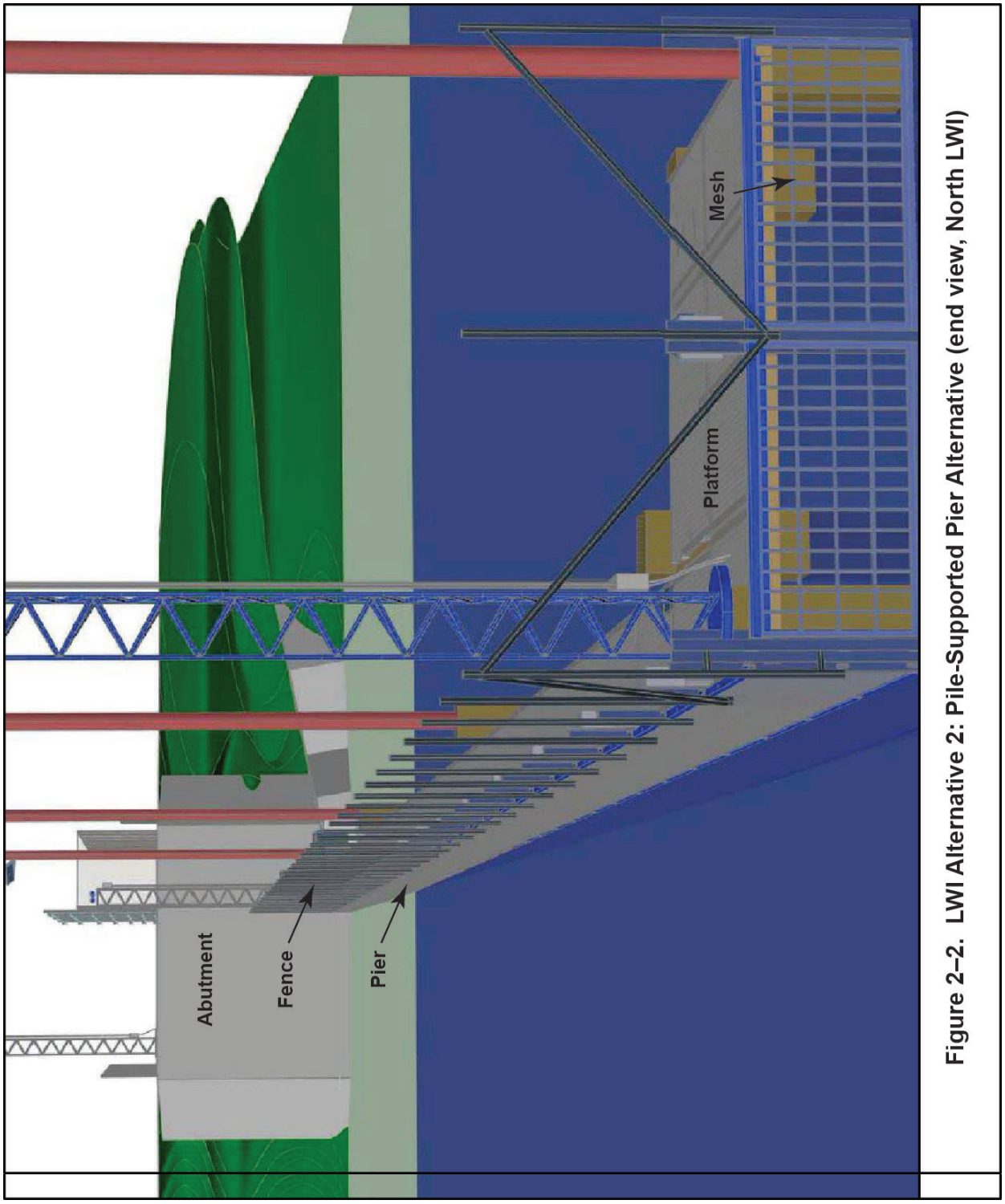


Figure 2–2. LWI Alternative 2: Pile-Supported Pier Alternative (end view, North LWI)

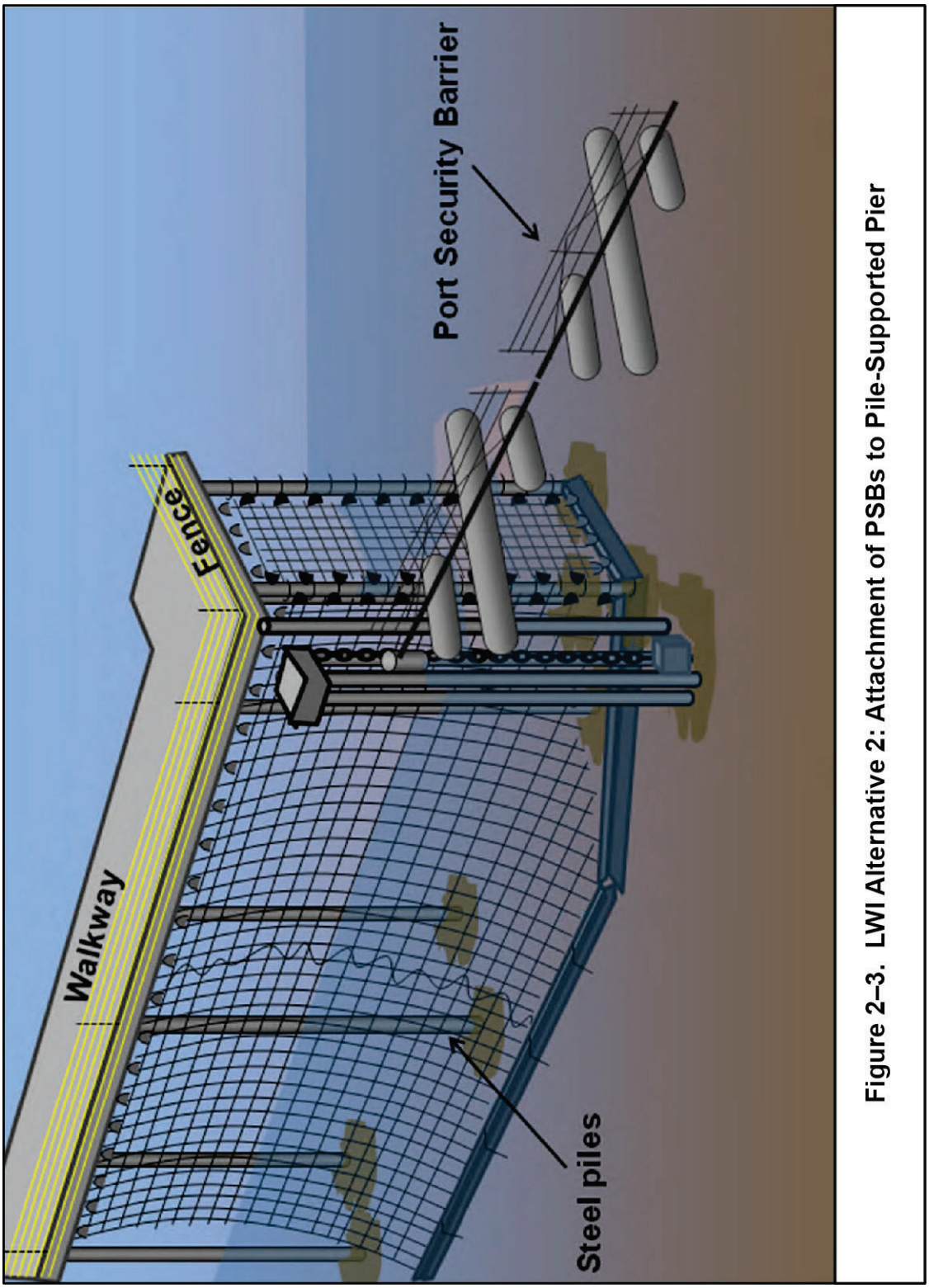


Figure 2–3. LWI Alternative 2: Attachment of PSBs to Pile-Supported Pier

Pile Installation

The pier deck would consist of metal grating that allows 65 percent of the light to pass through. The elevation of the pier deck would be approximately 21.5 feet (6.6 meters) above mean lower low water (MLLW), and the elevation of the bottom of the pier structure would be approximately 17 feet (5.2 meters) above MLLW. There would be a floating dock for small boat access approximately 12 by 35 feet (4 by 11 meters) at the end of each pier, on the inside, or secure side, of the pier. This dock would be anchored with four piles (included in the 136 total number of permanent piles) and would have a metal grating deck. Access to the floating dock from the pier would be by means of a gangway 80 feet long by 3 feet wide (24 by 1 meter). The gangway deck would also consist of metal grating.

The north LWI would require a maximum of 54 hollow steel piles, 24 inches (60 centimeters) in diameter. The south LWI would require a maximum of 82 hollow steel piles, 24 inches in diameter. This equates to an estimated 136 total number of number of permanent piles for the project. Piles primarily would be driven using vibratory methods. An impact hammer would be used to "proof" piles to ensure that they provide the required load-bearing capacity. Where geotechnical conditions do not allow piles to be driven to the required depth using vibratory methods, an impact hammer may be used to drive some piles for part or all of their length. Pile driving is expected to take place on no more than 80 days during the first in-water work season (July 16, 2016, through January 15, 2017).

Piles are expected to be installed primarily using a crane on a floating barge. Pile installation in shallow areas would be tidally dependent, such that the hull of the barge would not be permitted to ground or contact the seafloor at any time during the work. Therefore, the barge would move in and out with the tide as necessary to install the piles and decking. The barge would be positioned by means of spuds and anchors. Because the majority of the piles for the south LWI would be in shallow water above the 5 feet (1.5 meters) below MLLW elevation, the analysis considered that the contractor would build a temporary trestle adjacent to the LWI structure to install the permanent piles and decking in this area. This temporary trestle would be approximately 300 feet (90 meters) long and 20 feet (6 meters) wide; the deck would be of metal grating that allows 65 percent of light to pass through. Approximately 120 temporary 24-inch (60-centimeter) steel piles would be needed. These piles would be driven in the same manner as the permanent piles, within the same 80 days as the permanent piles. The piles would be extracted by vibratory means.

PSBs

Existing PSB systems close to the proposed LWIs would be relocated and attached to the end of the new piers. For the north LWI, approximately 1,000 feet (300 meters) of the existing PSBs would be relocated and approximately 200 feet (60 meters) would be removed. For the south LWI, approximately 650 feet (200 meters) of the existing PSBs would be relocated and 550 feet (170 meters) would be removed. Existing PSB units and anchors would be removed using a barge-mounted crane, stored on the barge, and then placed at new locations as needed using the same crane. Existing PSBs that are still serviceable would be configured into the new PSB alignment. When PSBs would be removed, they would be disassembled and recycled as scrap metal. The ends of the remaining PSB systems would be attached to a dolphin near the end of each pier; these dolphins would consist of eight closely spaced 24-inch (60-centimeter) diameter

steel piles supporting an 8 by 8-foot (2.5 by 2.5-meter) concrete platform. For each LWI, two existing PSB buoys and associated anchors would be relocated and one would be removed. Each buoy is attached to three anchor legs. Each leg consists of a 120-foot (40-meter) chain attached to a main 10-ton (9-metric ton) concrete anchor (11 feet long, 5.5 feet wide, 5 feet high [3.5 by 1.8 by 1.6 meters]) and two concrete clump anchors, each 3 by 3 feet (1 by 1 meter) and weighing 2 tons (1.8 metric tons) (Figure 2–4).

Shoreline and Upland Construction

The north abutment would be approximately 38 feet (12 meters) high and 75 feet (23 meters) long. It would extend from an approximate elevation of 13 feet (4 meters) above MLLW to the top of the slope at elevation 50 feet (15 meters). The south abutment would be approximately 12 feet high by 85 feet long (3.7 by 26 meters). This abutment would extend from an elevation of approximately 11 feet (3.4 meters) above MLLW to the top of the slope at elevation 24 feet (7 meters). The upper limit of the intertidal zone is considered to be MHHW, approximately 11 feet (3.4 meters) above MLLW at NAVBASE Kitsap Bangor.

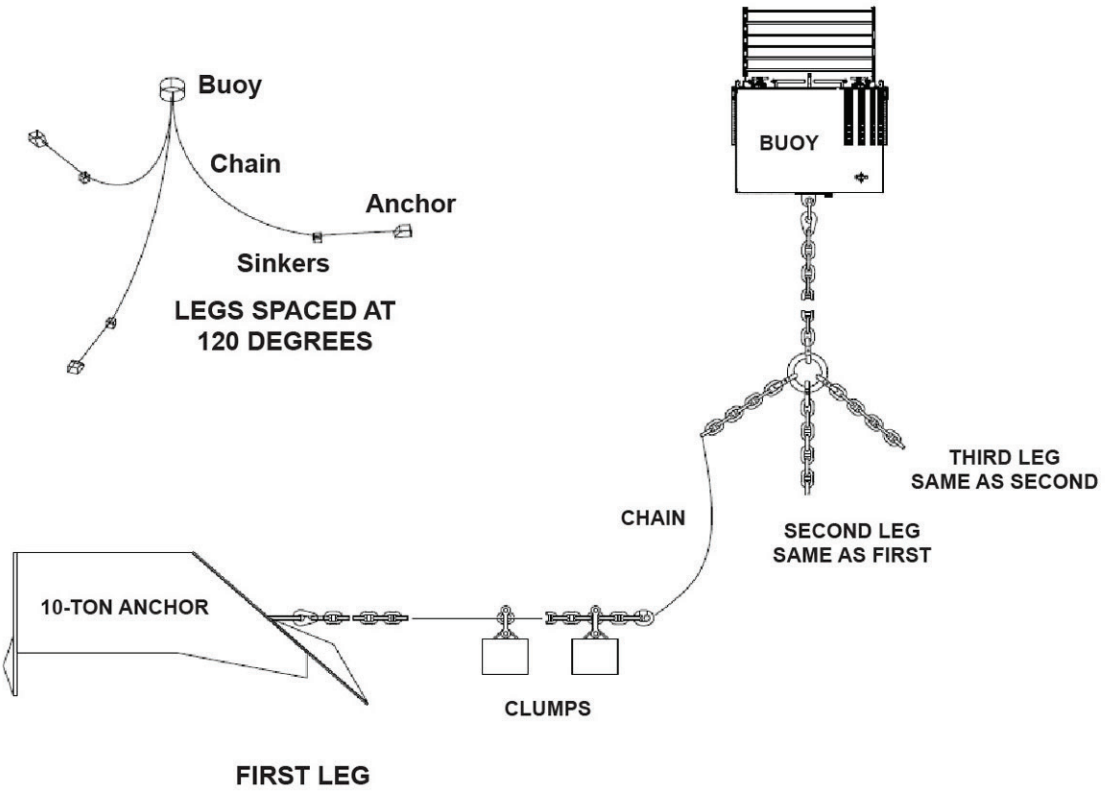


Figure 2–4. Typical 3-Leg Mooring Buoys

The abutments would each be supported on 10 24-inch (60-centimeter) piles driven on land by vibratory and impact methods. Each abutment would include a stairway on one end, from the top of the abutment to the LWI deck and base of the bluff, and on the other end an observation

post would be installed adjacent to the abutment at the base of the cliff. At each abutment the stairs would be attached to the abutment wall or supported on piles driven to grade. Each observation post would be approximately 25 by 45 feet (8 by 14 meters), supported on seven 24-inch diameter steel piles, and include a second stairway to the base of the bluff. The abutment stairways would be supported on 6- by 2-foot (2- by 0.6-meter) concrete pads and the observation post stairways would be supported on 2- by 2-foot concrete pads. The piles for the abutment stairways and observation posts would be driven at low tide ("in the dry") using a crane mounted on top of the bluff.

The abutment stair landings and observation post support piles would lie below MHHW; the area below MHHW occupied by these new structures would be approximately 34 square feet (6 square meters) at each LWI. The area excavated below MHHW during abutment construction would be approximately 4,000 square feet (372 square meters) at each abutment. The volume of material excavated below MHHW would be approximately 300 and 500 cubic yards (229 and 382 cubic meters) at the north and south abutments, respectively. Construction of the abutment and observation post at the south LWI would require removal of approximately 25 feet (7.6 meters) of creosoted timber anti-torpedo baulk at the base of the bluff. Similar to work for the stairway and observation post piles (see above), abutment, stair, and observation post work would also be conducted at low tide in the dry. Beach contours would be returned to pre-construction conditions following construction, except for the areas occupied by the new structures. All bluff slopes disturbed by construction of the abutment would be stabilized using riprap placed above MHHW, approximately 200 cubic yards (153 cubic meters) covering 1,125 square feet (105 square meters) at the north abutment and 235 cubic yards (180 cubic meters) covering 1,275 square feet (119 square meters) at the south abutment. The observation posts would be provided with a potable water line and with a wastewater line connecting to the base sanitary sewer system. These lines would be attached to the walkways/trestles leading to the observation posts.

Construction of the north abutment would clear a total of approximately 8,000 square feet (743 square meters) of upland area and would require excavation of approximately 4,200 cubic yards (3,211 cubic meters) of soil and fill of 4,680 cubic yards (3,578 cubic meters). The south abutment would include a gravel path to Sealion Road and would clear a total of approximately 6,000 square feet (557 square meters) of land; it would require excavation of approximately 900 cubic yards (688 cubic meters) of soil and fill of 1,000 cubic yards (765 cubic meters).

The staging area for both LWI construction sites would be a 5.4-acre (2.2-hectare) site near the intersection of Archerfish and Seawolf Roads (Figure 2–1). This site has been used for staging other construction projects and is highly disturbed.

Construction Schedule

Upland construction would take approximately 540 days; equipment would include backhoes, bulldozers, loaders, graders, trucks, and a crane/pile driver. Overall project construction would begin in May 2016 and end in May 2018. All in-water pile driving and abutment construction would take place in one in-water work season, July 16, 2016, to January 15, 2017, and would minimize potential impacts on Endangered Species Act (ESA)-listed fish species. Other in-water activities such as installation of the mesh material and relocation of PSB units and anchors would begin in January 2017 and end by May 2018, and could occur either within or outside the in-

water work season. Materials and equipment for the in-water work would be brought in by barge, while materials and equipment for abutment construction would be brought in by truck. The number of construction workers is estimated at 100.

2.1.1.3.3. LWI ALTERNATIVE 3: PSB MODIFICATIONS (PREFERRED)

LWI Alternative 3 is the Preferred Alternative, in part because it would have fewer environmental impacts than Alternative 2 and, therefore, it is also the environmentally Preferred Alternative and the Least Environmentally Damaging Practicable Alternative according to the CWA Section 404 (b)(1) guidelines.

Under this alternative, the construction and operation of the LWI structures would consist of modifying the existing PSB system to extend across the intertidal zone to attach to concrete abutments at the shoreline that would be the same as the abutments described above for the Pile-Supported Pier Alternative (Figure 2–5). Two observation posts, installed at the North and South LWI locations, would be the same as described above for the Pile-Supported Pier Alternative. There would be no underwater mesh, which would require a rigid, fixed structure for attachment. As a security requirement, Alternative 3 would use a greater number of security personnel than Alternative 2. However, the frequency of security vessel operations would not increase.

Table 2–1 summarizes LWI Alternative 3. For the north LWI, approximately 1,200 feet (370 meters) of the existing PSB system would be relocated and 100 feet (30 meters) of new PSB would be added (Figure 2–6). Existing PSB units and anchors would be removed using a barge-mounted crane, stored on the barge, and then placed at new locations as needed using the same crane. New components would be brought in by a tug-towed barge and placed by a barge-mounted crane. Four existing buoys and associated anchors would be relocated. The mooring system for two of the four relocated buoys would be reduced from three anchor legs to two anchor legs, each with one 2-ton (1.8-metric ton) clump anchor (3 by 3 feet [1 by 1 meter]) and one 10-ton (9-metric ton) anchor (11 feet long, 5.5 feet wide, 5 feet high [3.5 by 1.8 by 1.6 meters]). For the south LWI, approximately 1,200 feet of the existing PSB system would be relocated and 200 feet (60 meters) of new PSB would be added (Figure 2–7). Three existing buoys and associated anchors would be relocated. One of these would have its anchor legs reduced from three to two, each with one clump anchor and one 10-ton anchor. One new buoy would be installed with two mooring legs (each with one clump anchor and one 10-ton anchor).

Each PSB unit would be 50 feet (15 meters) long and would support an 8-foot (2.5-meter) high fence on a metal frame (Figure 2–8). Each unit would be supported on three pontoons: a center pontoon 18 feet (5 meters) long, and two end pontoons each 6 feet (2 meters) long. The pontoons would be 42 inches (107 centimeters) in diameter. A metal grating (guard panel) 42 inches high would be suspended below the metal frame, between the pontoons. Because the height of this guard panel would be the same as the diameter of the pontoons, it would extend into the water the same distance as the pontoons (less than 1 foot [30 centimeters]). Openings to allow vessel passage through the barrier system would be created by disconnecting adjacent PSB units at strategic locations and towing the barrier out of the way.

Table 2–1. Summary of the Action Alternatives for the LWI Project

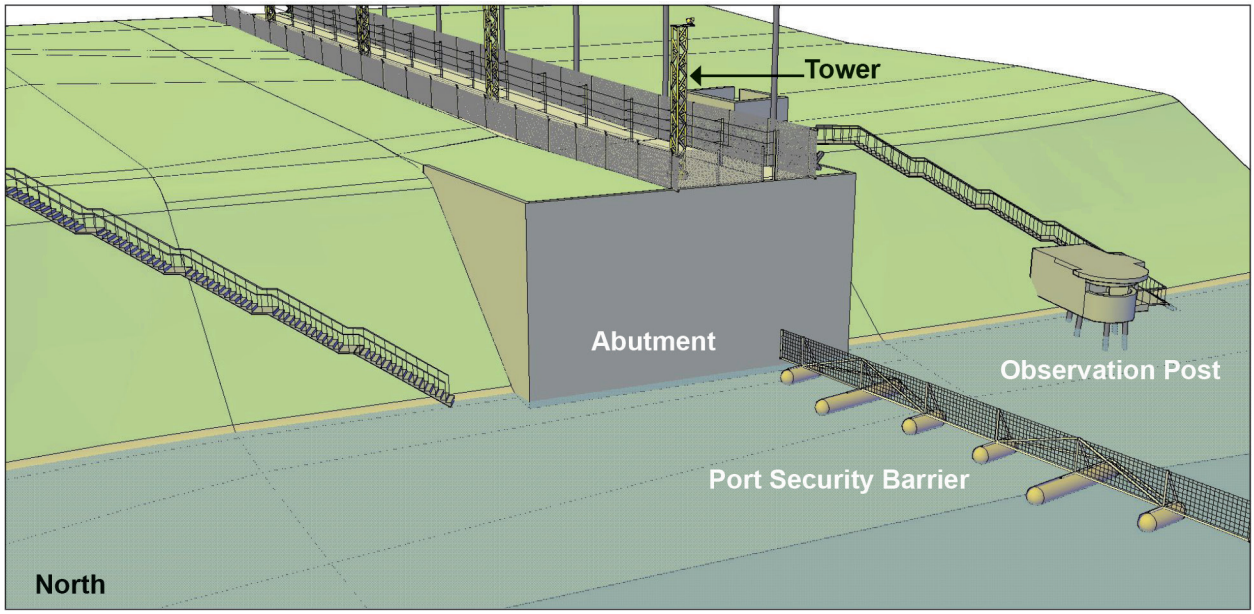
LWI Facility Feature[1]	LWI Alternative 2: Pile-Supported Pier	LWI Alternative 3 (Preferred): PSB Modifications
Length of LWI structure (13 feet [4 meters] wide with last [seaward] 23 feet [7 meters] of each pier 20 feet [6 meters] wide)	North LWI: 280 feet (85 meters) South LWI: 730 feet (223 meters)	Included in total length of PSBs below
Size of floating docks and gangway	At both LWIs at the ends of the piers: 12- by 35-foot (4- by 11-meter) dock with 80- by 3-foot (24- by 1-meter) gangway	N/A
Dolphins	At both LWIs: one 8- by 8-foot (2.4- by 2.4-meter) concrete platform supported by 8 24-inch (60-cm) piles	N/A
On-pier towers	North LWI: 6 40-foot (12-meter) tall towers South LWI: 14 40-foot tall towers	N/A
Length of relocated PSBs	North LWI: 1,000 feet (300 meters) South LWI: 650 feet (200 meters)	North LWI: Total length of PSBs: 1,300 feet (400 meters)[2] South LWI: Total length of PSBs: 1,400 feet (430 meters)[2]
Length of PSBs removed	North LWI: 200 feet (60 meters) South LWI: 550 feet (170 meters)	N/A
Length of PSBs added	N/A	North LWI: 100 feet (30 meters) South LWI: 200 feet (60 meters)
Total number of permanent in-water piles (hollow steel)[3]	North LWI: up to 54 24-inch (60 cm) piles South LWI: up to 82 24-inch piles	N/A
Area displaced by permanent piles (not including abutment piles)	North LWI: 192 sq ft (18 sq m) South LWI: 280 sq ft (26 sq m)	N/A
Size of temporary trestle	300 by 20 feet (90 by 6 meters)	N/A
Number of temporary trestle piles (hollow steel)	North LWI: N/A South LWI: 120 24-inch	N/A
Area displaced by temporary piles	South LWI only: 380 sq ft (35 sq m)	N/A
Area of partial shading[4]	North LWI: 4,590 sq ft (426 sq m) South LWI: 10,500 sq ft (975 sq m)	North LWI: 980 sq ft (91 sq m) South LWI: 2,090 sq ft (194 sq m)
Area of full shading[5]	North LWI: 1,064 sq ft (99 sq m) South LWI: 1,064 sq ft (99 sq m)	North LWI: 1,000 sq ft (93 sq m) South LWI: 1,000 sq ft (93 sq m)
LWI footprint (benthic habitat displaced by structures)	North LWI: 1,700 sq ft (158 sq m) South LWI: 4,290 sq ft (399 sq m)	North LWI: 34 sq ft (3 sq m) South LWI: 34 sq ft (3 sq m)
Area occupied by steel plates anchoring in-water mesh	North LWI: 1,500 sq ft (140 sq m) South LWI: 4,000 sq ft (370 sq m)	N/A
Area below MHHW excavated for abutment	North LWI: 4,000 sq ft (372 sq m) South LWI: 4,000 sq ft (372 sq m)	Same as Alternative 2
Cut volume below MHHW for abutment wall	North LWI: 300 cu yd (229 cu m) South LWI: 500 cu yd (382 cu m)	Same as Alternative 2
Fill volume below MHHW for abutment wall	North LWI: 160 cu yd (122 cu m) South LWI: 420 cu yd (321 cu m)	Same as Alternative 2
PSB anchors 10-ton (9-metric ton) anchors: 11 by 5.5 feet (3.5 by 1.8 meters) 2-ton (1.8-metric ton) clump anchors: 3 by 3 feet (1 by 1 meter)	Both LWIs: relocation of two existing mooring anchor systems and removal of one mooring anchor system; net reduction of three 10-ton anchors and six 2-ton anchors at each LWI	North LWI: relocation of four existing anchor systems with reconfiguration of two of these systems; net reduction of two 10-ton anchors and eight 2-ton anchors

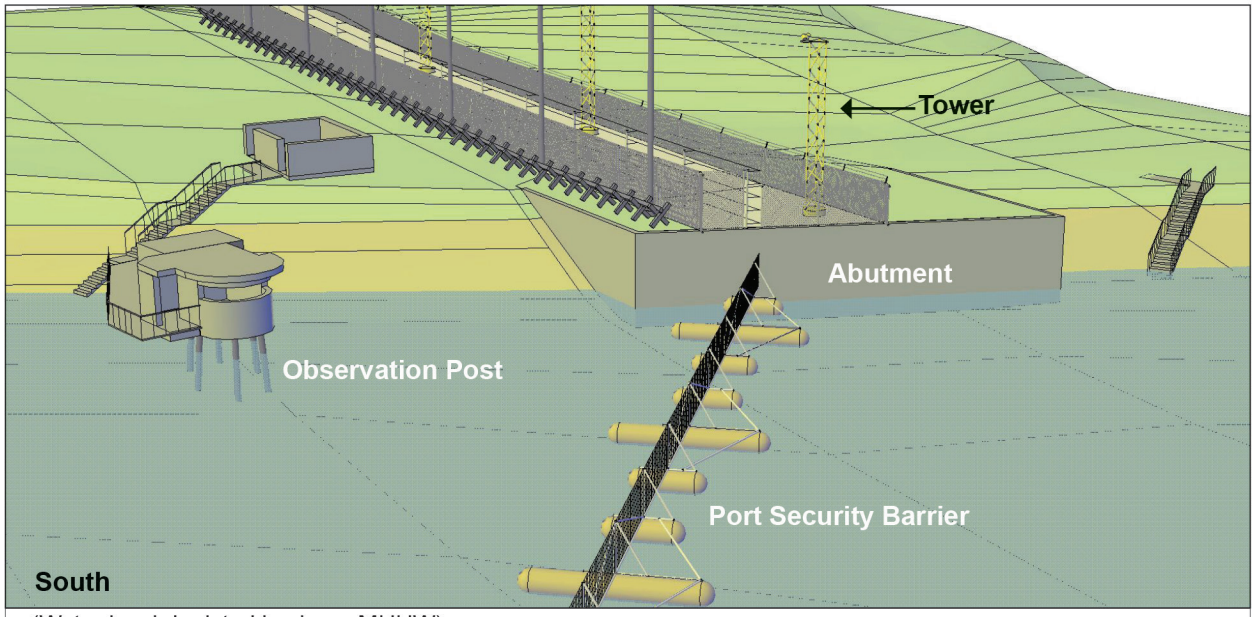
Table 2–1. Summary of the Action Alternatives for the LWI Project (continued)

LWI Facility Feature[1]	LWI Alternative 2: Pile-Supported Pier	LWI Alternative 3 (Preferred): PSB Modifications
		South LWIs: relocation of three existing mooring anchor systems plus addition of one mooring anchor system; net addition of one 10-ton anchor and reduction of two 2-ton anchors
Barge trips (total round trips)	16	3
Size of abutment	North LWI: 38 feet high by 75 feet long (12 by 23 meters) South LWI: 12 feet high by 85 feet long (4 by 26 meters)	Same as Alternative 2
Number of piles for abutment, stairs, and observation posts (driven in the dry)	North LWI: 17 24-inch piles South LWI: 17 24-inch piles	Same as Alternative 2
Upland area cleared for abutment	North LWI: 8,000 sq ft (743 sq m) South LWI: 6,000 sq ft (557 sq m)	Same as Alternative 2
Upland excavation volume for abutment	North LWI: 4,200 cu yd (3,211 cu m) South LWI: 900 cu yd (688 cu m)	Same as Alternative 2
Upland fill volume for abutment	North LWI: 4,680 cu yd (3,578 cu m) South LWI: 1,000 cu yd (765 cu m)	Same as Alternative 2
On-land towers	N/A	One 30-foot (9-meter) tower on each abutment
New impervious surface	North LWI: 830 sq ft (77 sq m) South LWI: 1,930 sq ft (179 sq m)	Same as Alternative 2
Riprap volume	North LWI: 200 cu yd (153 cu m) South LWI: 235 cu yd (180 cu m)	Same as Alternative 2
Riprap area	North LWI: 1,125 sq ft (105 sq m) South LWI: 1,275 sq ft (119 sq m)	Same as Alternative 2
Upland staging area (already disturbed)	5.4 acres (2.2 hectares)	Same as Alternative 2
Overall construction duration	24 months, including up to 80 days of pile driving; upland construction 540 days	24 months, including up to 30 days of pile driving; upland construction 540 days
Duration of in-water work[6]	In-water pile driving and abutment construction in one in-water work season; mesh installation and relocation of PSBs and anchors could occur up to 24 months. Two in-water work seasons would be needed for all in-water work.	One in-water work season would be needed for PSB modifications and in-water abutment construction.

cm = centimeter; cu m = cubic meter; cu yd = cubic yard; MHHW = mean higher high water; N/A = not applicable; sq ft = square feet; sq m = square meter

1. Numbers are based on preliminary design and are approximate and subject to change.
2. Total length is slightly greater than total length of LWI plus PSBs under Alternative 2 to allow for slack in the PSB systems.
3. Number includes the potential for a modest increase in the number of piles in the final design.
4. Partial shading for Alternative 2 would be from the piers, floating docks, gangways, and observation post and abutment stairs; partial shading for Alternative 3 would be from the nearshore PSB pontoons and observation post and abutment stairs.
5. Full shading for Alternative 2 would be from the observation posts and dolphins; full shading for Alternative 3 would be from the observation posts.
6. In-water work season would be July 16 to January 15. Installation of mesh and relocation of PSB units and anchors would occur in the range of May 2016 – May 2018 and could occur either within or outside the in-water work season.





(Water level depicted is above MHHW)

Figure 2-5. LWI Alternative 3: PSB Modifications

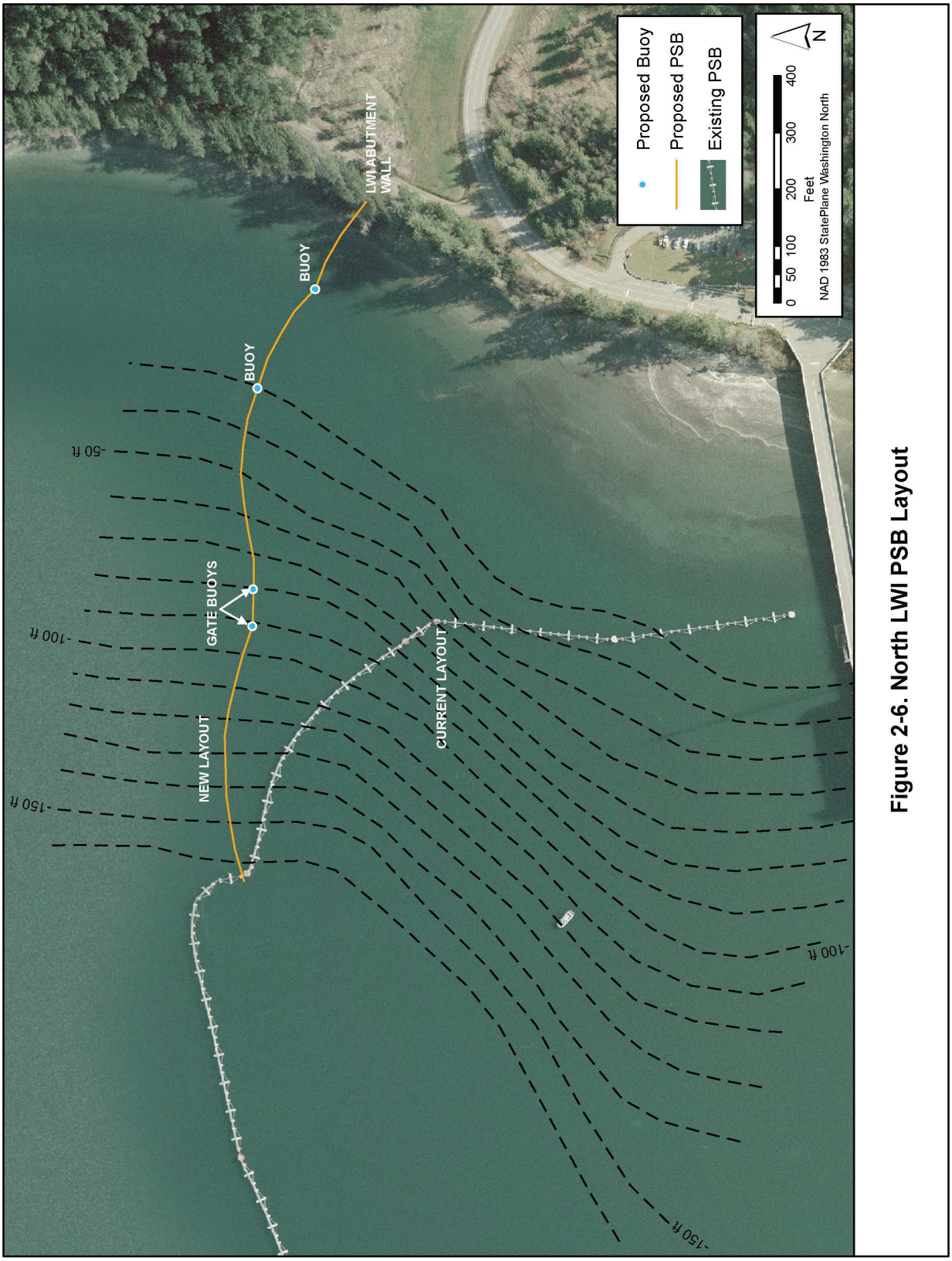


Figure 2-6. North LWI PSB Layout

Figure 2-7. South LWI PSB Layout

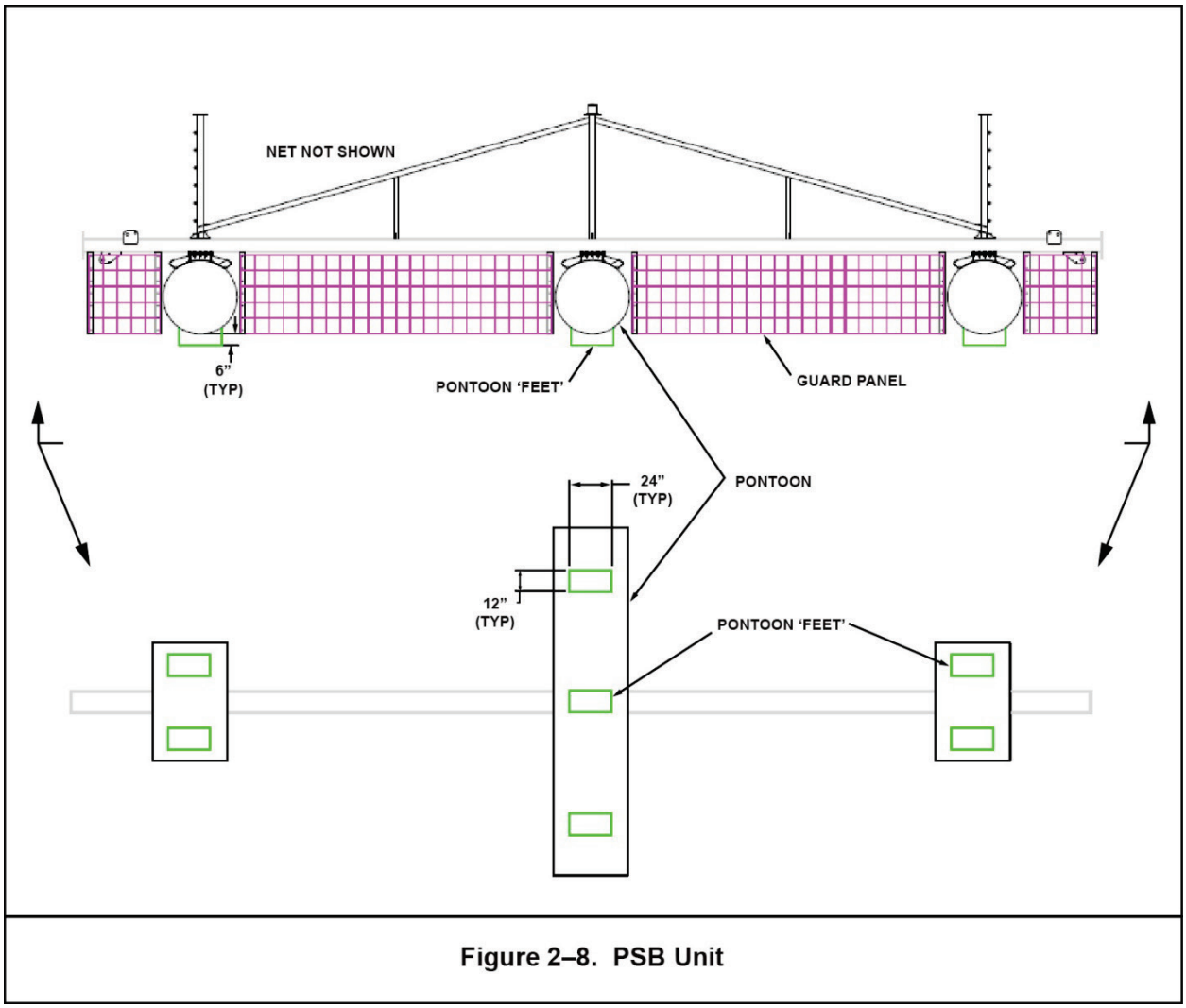


Figure 2–8. PSB Unit

PSBs at Low Tide

On an average low tide, approximately 11 PSB units including 33 pontoons (north and south LWI combined) would "ground out" in the intertidal zone. Over the long term, which would include extreme low tides, approximately 18 PSB units including 54 pontoons would ground out in the intertidal zone. Five of these PSB units would ground out at the north LWI and 13 would ground out at the south LWI. To minimize the resulting disturbance of the intertidal zone, each center pontoon would be fitted with three "feet" and the outer pontoons would be fitted with two feet that would prevent an entire pontoon from contacting the sediment surface (Figure 2–8). These feet would be 12 by 24 inches (30 by 60 centimeters) in size and constructed of high-density polyethylene, a durable, inert plastic often used for water mains and sewer systems. Considering a total of 126 such feet (18 intertidal PSBs with 7 feet each), and that these feet would not always ground out at the same location, it is estimated that approximately 2,520 square feet (234 square meters) of the intertidal zone would be disturbed over the long term (700 square feet [65 square meters] at the north LWI, and 1,820 square feet [169 square meters] at the south LWI). In addition, one buoy at the south LWI would ground out on an average low tide. Over the long term, including extreme low tides, three buoys (one at the north

LWI and two at the south LWI) would ground out at low tide. These buoys are 30 inches (76 centimeters) in diameter. Over the long term, grounding out by these buoys would disturb approximately 74 square feet (7 square meters) of seafloor.

Shoreline and Upland Construction

For each abutment, 10 piles would be driven from land using vibratory methods, with impact methods as needed, such as for proofing. Likewise, each observation post would require 7 piles that would be driven from land using vibratory methods and impact methods as needed. Driving of all piles for LWI Alternative 3 would require a maximum of 30 days of pile driving.

With one exception, the abutment and other upland features would be the same as described above for LWI Alternative 2. The exception is that two 30-foot (9-meter) tall, on-land towers would be installed by bolting them to concrete foundations, one at the north LWI and one at the south LWI. These towers would be located within the extension of the WSE; no additional ground would be disturbed for the towers.

Construction Schedule

The construction schedule for LWI Alternative 3 would be the same as described above for LWI Alternative 2 except that only one in-water construction season would be needed.

2.1.1.3.4. LWI OPERATIONS

Operation of the LWI would consist primarily of maintenance of the in-water and upland structures, including routine inspections, cleaning, repair, and replacement of facility components (no pile replacement) as required. Operation would also include opening and closing of the PSBs for boat traffic, using small tug boats. The presence of the LWI would result in changes in patterns of security vessel movements, but such movements would be within the WRA and would not increase in frequency. For both alternatives, cleaning and replacement of the PSB guard panels (unbolted and re-bolted out of the water) would occur as needed. Cleaning would be accomplished by power washing. Measures would be employed to prevent discharges of contaminants to the environment (see BMPs, Section 2.3.2). For Alternative 2 (Pile-Supported Pier), annual cleaning would include removal of fouling organisms from the in-water mesh. Maintenance would require infrequent visits by vehicles to the upland portions and by small boats to the LWI structures (tying up to the floating docks). Operational lighting at the abutments for both alternatives would not exceed one foot candle to a distance of 50 feet (15 meters) from the abutments; these lights would operate continuously. For Alternative 2, operational lighting levels would not exceed 10 foot candles along the immediate pier structure, 0.5 foot candle out to a distance of 50 feet (15 meters) from the LWI structure, and 0.05 foot candle to a distance of 100 feet (30 meters). These lights would operate only during security responses. For Alternative 3, there would be no lighting on the PSB units, only on the abutment towers.

2.2. SPE PROPOSED ACTION

The SPE Proposed Action would add an extension to the existing Service Pier and construct related land-based support facilities. These actions are required to accommodate the proposed

relocation of the SEAWOLF Class submarines SSN-21 (SEAWOLF) and SSN-22 (CONNECTICUT) from NAVBASE Kitsap Bremerton to join SSN-23 (JIMMY CARTER) at NAVBASE Kitsap Bangor. The relocation would result in the consolidation of SEAWOLF Class submarines at NAVBASE Kitsap Bangor. There would be no changes to facilities at NAVBASE Kitsap Bremerton. Construction would occur from July 2018 to July 2020. Construction in the water is planned for July 16 through January 15 of each year, beginning in July 2018 and concluding in January 2020. Operational changes would include berthing and maintenance of the two additional SEAWOLF Class submarines at Service Pier, including transfer of employees from NAVBASE Kitsap Bremerton to NAVBASE Kitsap Bangor. The design life of the SPE Proposed Action is 50 years. Figure 2–1 shows the location of the Proposed Action. The existing Service Pier is approximately 500 feet (152 meters) long, 85 feet (26 meters) wide, and consists of a concrete deck supported on steel piles, with wood fender piles.

2.2.1. SPE Alternatives

2.2.1.1. ALTERNATIVES DEVELOPMENT AND SCREENING CRITERIA

Screening criteria were developed to determine if a potential alternative was reasonable, whether it met the purpose and need, and if it should be carried forward for detailed analysis in the EIS. The screening criteria listed below were used in the identification and evaluation of SPE action alternatives:

- Supports master planning considerations and does not impact other operational missions on NAVBASE Kitsap,
- Avoids or minimizes environmental impacts to the maximum extent practicable,
- Integrates pier and support facilities into existing facilities and infrastructure to the extent practicable, and
- Provides unrestricted access to the ocean.

2.2.1.2. ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

Using the above screening criteria, the following alternatives were considered but eliminated from further analysis in the EIS.

- *Pier placement on NAVBASE Kitsap Bangor separate from existing Service Pier.* Because of the requirements of other missions at Bangor, the waterfront is constrained from new pier development south of Carlson Spit and north of the Service Pier (Figure 2–1). This alternative was not carried forward for further analysis because it would impact other operational missions and could not be integrated into existing facilities and infrastructure.
- *Alternative building layouts for Service Pier Extension.* The Navy considered constructing a 19,000-square foot (1,765-square meter) pile-supported Waterfront Support Building on the south side of the pier extension. This alternative was eliminated because of the greater environmental impacts compared to the proposed on-land facility, particularly overwater shading impacts.

2.2.1.3. SPE ALTERNATIVES EVALUATED IN EIS

Two action alternatives were identified as meeting the purpose and need and the screening criteria. These alternatives consist of a short pier configuration and a long pier configuration. These action alternatives and the No Action Alternative are described below.

2.2.1.3.1. SPE ALTERNATIVE 1: NO ACTION

Under SPE Alternative 1, the No Action Alternative, no additional pier construction or operation would occur at Service Pier or other piers at NAVBASE Kitsap Bangor, and SSN-21 and SSN-22 would remain homeported at NAVBASE Kitsap Bremerton. This alternative would not meet the purpose and need for the Proposed Action. Operational conflicts between submarines and the homeported aircraft carrier at Pier D at NAVBASE Kitsap Bremerton would continue. Deployment schedules would remain restricted and Commander, Submarine Development Squadron Five (CSDS-5) units at NAVBASE Kitsap Bremerton would continue to be under-utilized. No environmental impacts would result from the No Action Alternative, as no construction or physical alteration to the waterfront would occur, and there would be no changes in operations. The No Action Alternative is carried forward for analysis because it is required by NEPA and constitutes baseline conditions for environmental analysis of the Proposed Action.

2.2.1.3.2. SPE ALTERNATIVE 2: SHORT PIER CONFIGURATION (PREFERRED)

SPE Alternative 2 is the Preferred Alternative, in part because it would have fewer environmental impacts than Alternative 3 and, therefore, it is also the environmentally Preferred Alternative and the Least Environmentally Damaging Practicable Alternative according to the CWA Section 404 (b)(1) guidelines. Table 2–2 (presented at the end of Section 2.2.1.3.3) summarizes SPE Alternative 2.[2]

Under SPE Alternative 2, the Navy would construct and operate an approximately 540-foot (165-meter) long and 68 feet (21 meters) wide, 44,000-square foot (4,090-square meter) surface area extension to the existing Service Pier (Table 2–2) that would be capable of a double-breasted (side-by-side) berthing configuration for submarine maintenance. The new total length of the Service Pier would be 1,040 feet (317 meters). Proposed new facilities would include a pier crane on a 28- by 60-foot (9- by 18-meter) foundation, a 2,100-square foot (195-square meter) Pier Services and Compressor Building located on the Service Pier, an upland 50,000-square foot (4,645-square meter) Waterfront Ship Support Building, a 421-car parking lot, an 1,800-square foot (174-square meter) shoreside emergency generator facility, and roadway and utility improvements (transmission line upgrades, and installation of generators, switch gear, and a new substation) (Figure 2–9). The Waterfront Ship Support Building would be designed and constructed to be eligible to receive a minimum Leadership in Energy and Environmental Design (LEED) certification of Silver. LEED is a third-party certification program and nationally accepted benchmark for the design, construction, and operation of high-performance green buildings developed by the U.S. Green Building Council. BMPs and impact reduction measures that would be implemented to avoid or minimize potential environmental impacts associated with the SPE Proposed Action are discussed in Section 2.3.

[2] Under SPE Alternative 1, the No Action Alternative, there would be no change to the environment due to construction and operation of an SPE. Therefore, the No Action Alternative is not included in Table 2–2.

The proposed Pier Services and Compressor Building would house the compressor and would be located at the south end of the existing Service Pier (Figure 2–9). The Pier Services and Compressor Building is needed to house sewage lift stations, and "high pressure" and "low pressure" compressors that would provide an off-hull source of air for charging submarine air banks, as well as breathing quality air needed for purging the ship's ballast tanks to allow entry for maintenance. The compressors need to be located as near to the ship as possible to minimize the accumulation of moisture in the air lines.

Pile Installation and Wave Screen

The existing Service Pier is approximately 500 feet long by 85 feet wide (152 by 26 meters). The proposed extension of the Service Pier would be approximately 68 by 540 feet (21 by 165 meters) and would require installation of approximately 230 36-inch (92-centimeter) diameter steel pipe support piles. After construction of the SPE, the pier would be 1,040 feet (317 meters) long. Approximately 50 24-inch (60-centimer) diameter steel pipe piles would be used for small craft mooring and for mooring camels for the SSNs. Approximately 105 18-inch (45-centimeter) square concrete fender piles would also be installed. Driving of the steel support piles would use a combination of vibratory (primary) and impact methods and would require pile driving on no more than 125 days during the first in-water work season. Driving of the concrete piles would use impact methods only and would require pile driving on no more than 36 days during the second in-water work season. The pier extension would extend to the southwest from the south end of the existing Service Pier and would parallel Carlson Spit in water depths of 30 to 50 feet (9 to 15 meters) below MLLW, such that the berthing areas for the new submarines would be in water depths of approximately 50 to 85 feet (15 to 26 meters) below MLLW. A concrete float 150 feet (46 meters) long and 15 feet (4.6 meters) wide would be attached to the south side of the SPE (Figure 2–10). The existing PSB system would be re-configured slightly to attach to the end of the new pier extension, with approximately 540 feet (165 meters) removed. Removal and disposal of existing PSBs would be done as described for the LWI project. Construction is expected to require one barge with a crane, one supply barge, a tugboat, and work skiffs.

Construction would be preceded by removal of an existing wave screen (including piles) and other existing piles from the Service Pier. A total of 36 existing creosote timber piles (19 18-inch [45-centimeter] and 17 15-inch [38-centimeter] piles) would be removed by cutting at the mudline. A floating boom and other measures would be used to protect water quality during this activity (Section 2.3.2). In addition, a new wave screen would be installed under the SPE (Figure 2–10). This screen would be approximately 200 feet (60 meters) long and 27 feet (8 meters) high (20 feet [6 meters] below to 7 feet [2 meters] above MLLW), made of concrete or steel, and attached to steel support piles for the SPE.

Upland Construction

The proposed Waterfront Ship Support Building would be located on an existing 36,000-square foot (330-square meter) parking lot which has 107 parking spaces on the east side of Wahoo Road. Based on loss of this lot, transfer of 322 SEAWOLF personnel from Bremerton to Bangor, and related relocation of personnel at Bangor, a new parking lot of 421 spaces would be

needed.[3] This parking lot would be located approximately 1,200 feet (370 meters) south of the proposed Waterfront Ship Support Building within a vegetated area. A utility pad for the shoreside emergency generator facility, 1,800 square feet (174 square meters) in size, would be installed adjacent to Sealion Road. Road improvements to accommodate changes in traffic patterns along Wahoo and Sealion Roads, as well as repairs to existing roads damaged from construction activity, would also be included under this alternative. The area permanently occupied by new project elements would be approximately 7 acres (2.8 hectares). Approximately 4 acres (1.6 hectares) would be disturbed temporarily for a construction laydown area and other construction-related disturbance and revegetated with native species following construction. The parking lot, utilities, and laydown area would be located within the area between Sturgeon Street and Sealion Road, as shown on Figure 2–9.

Construction Schedule

Upland construction would take approximately 400 days; equipment would include backhoes, bulldozers, loaders, graders, trucks, and paving equipment. Construction of all proposed facilities is anticipated to take approximately 24 months. Construction would begin in July 2018 and conclude in July 2020. Pile driving would occur within the in-water work windows (July 16 to January 15) to minimize potential impacts on ESA-listed fish species. It is not expected that completion of pile driving would require two full 6-month in-water work seasons. Relocation of existing PSB units and anchors could occur outside the in-water work window. There would be no work in the intertidal zone. The number of construction workers is estimated at 225.

2.2.1.3.3. SPE Alternative 3: Long Pier Configuration

Under this alternative the pier extension would be approximately 975 feet (297 meters) long and 68 feet (21 meters) wide and would have a surface area of approximately 70,000 square feet (6,500 square meters) (Figure 2–11). The new total length of the Service Pier would be approximately 1,475 feet (450 meters). This design would allow two submarines to be berthed in an in-line configuration rather than breasted (side-by-side). Table 2–2 summarizes SPE Alternative 3. The total number of 24-inch (60-centimeter) diameter steel support piles would be approximately 500, including those for small craft and camel mooring; there would be approximately 160 18-inch (40-centimeter) square concrete fender piles. Driving of steel piles would require driving on no more than 155 days and would take place during the first in-water construction season. Driving of concrete piles would require driving on no more than an additional 50 days and would take place during the second in-water work season. The PSB relocation would differ from the relocation under SPE Alternative 2 so as to connect the PSBs to the end of the longer pier extension; approximately 975 feet (297 meters) of existing PSBs would be removed. All other aspects of SPE Alternative 3 would be the same as SPE Alternative 2, including upland features and overall construction schedule. It is expected that completion of in-water work would require two full in-water work seasons. Alternative 3 would meet the purpose and need and screening criteria, but would have greater environmental impacts (Section 2.4.2) and cost more than Alternative 2.

[3] Parking requirements would be: 273 spaces for SSN 21 class parking, 22 for Altgration Installation Team, 120 for Port Operations, and 6 for Nuclear Regional Maintenance Detachment.

Table 2–2. Summary of the Action Alternatives for the SPE Project

SPE Facility Feature[1]	SPE Alternative 2 (Preferred): Short Pier Configuration	SPE Alternative 3: Long Pier Configuration
Length and width of pier extension	540 feet (165 meters) long 68 feet (21 meters) wide	975 feet (297 meters) long 68 feet (21 meters) wide
Number of steel support piles	230 36-inch (90 cm)	500 24-inch (60 cm)
Number of concrete fender piles	105 18-inch (45 cm)	160 18-inch (45 cm)
Number of small craft mooring steel piles	50 24-inch (60 cm)	50 24-inch (60 cm)[2]
Number of creosote-treated timber piles removed	19 18-inch (45-cm) 17 15-inch (38-cm)	Same as SPE Alternative 2
Total area displaced by piles[3]	1,965 sq ft (183 sq m)	1,876 sq ft (174 sq m)
Size of float	150 feet long by 15 feet wide (46 by 4.6 meters), 2,250 sq ft (209 sq m)	Same as SPE Alternative 2
Total over-water area	44,000 sq ft (4,090 sq m)	70,000 sq ft (6,500 sq m)
New wave screen	Approx. 200 feet (60 meters) long and 27 feet (8 meters) high, concrete or steel, attached to existing piles	Same as SPE Alternative 2
Barge trips (round trips)	6 per month on average	Same as SPE Alternative 2
Upland area permanently occupied by new structures (maximum)	7 acres (2.8 hectares)	Same as SPE Alternative 2
Upland area temporarily disturbed by construction (maximum)	4 acres (1.6 hectares)	Same as SPE Alternative 2
New facilities	• Pier crane • 2,100 sq ft (195 sq m) Pier Services & Compressor Building • 50,000 sq ft (4,645 sq m) Waterfront Support Building • 421-space parking lot • 1,800 sq ft (174 sq m) Shoreside Emergency Generator Facility	Same as SPE Alternative 2
Roadway and utilities improvements	Transmission line upgrades, installation of generators, switch gear, and new substation (included in upland area disturbed above)	Same as SPE Alternative 2
Overall construction duration	24 months	Same as SPE Alternative 2
Duration of in-water work[4]	Two in-water work seasons including up to 125 days of driving of steel support piles and 36 days of driving concrete fender piles	Two in-water work seasons including up to 155 days of driving of steel support piles and 50 days of driving concrete fender piles

cm = centimeter; cu yd = cubic yard; N/A = not applicable; sq ft = square feet; sq m = square meter

1. Numbers are based on preliminary design and are approximate and subject to change.
2. Included in the total number of 24-inch steel support piles.
3. Includes the area displaced by the proposed pier extension piles minus the area of piles being removed from the existing Service Pier.
4. In-water work season would be July 16 to January 15.

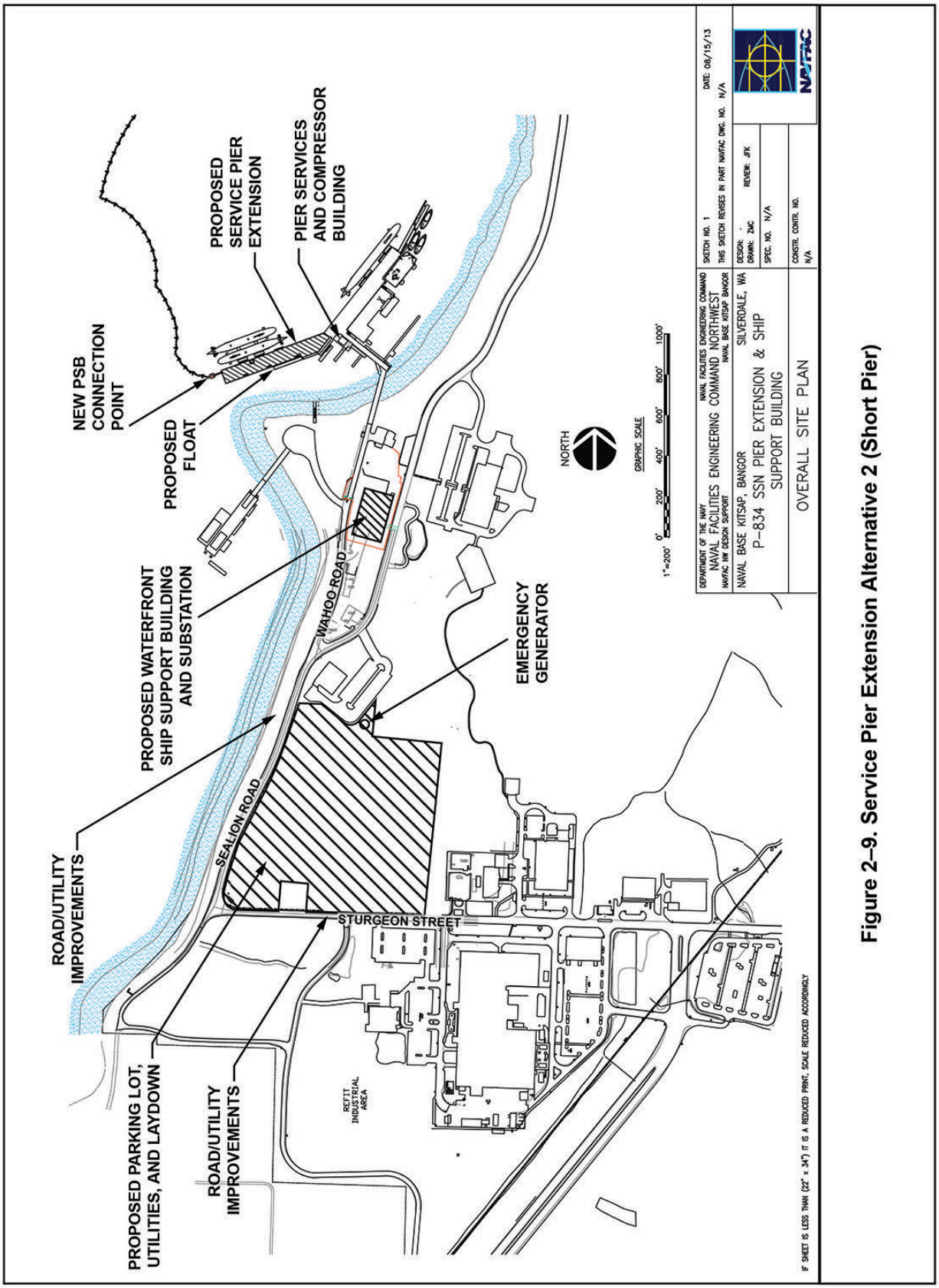


Figure 2–9. Service Pier Extension Alternative 2 (Short Pier)

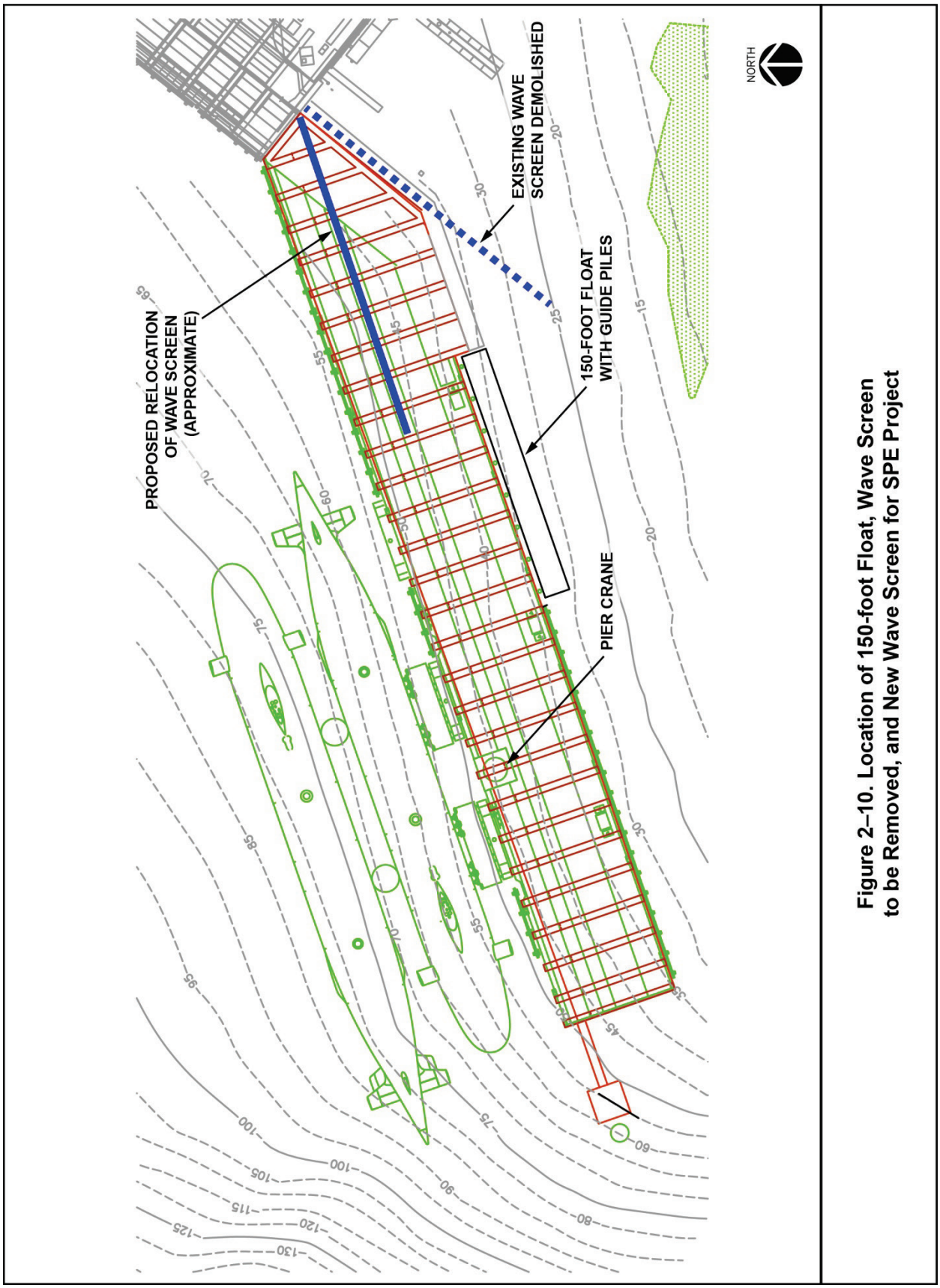


Figure 2–10. Location of 150-foot Float, Wave Screen to be Removed, and New Wave Screen for SPE Project

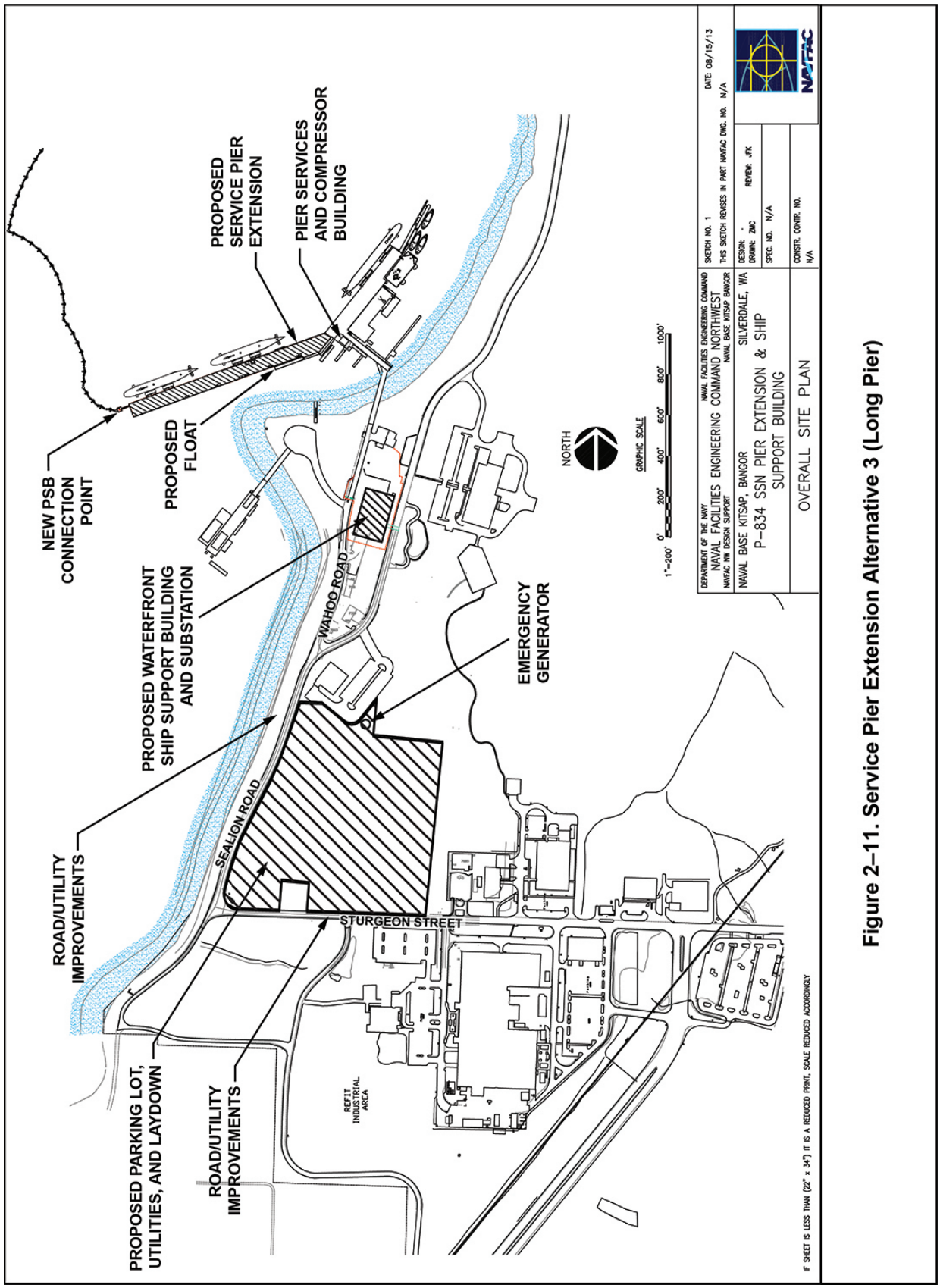


Figure 2–11. Service Pier Extension Alternative 3 (Long Pier)

2.2.1.3.4. SPE OPERATIONS

Operation of the SPE that would occur following project completion and submarine relocation would be similar to existing day-to-day operations that currently occur with one submarine (SSN-23) homeported at NAVBASE Kitsap Bangor. SSN-21 and SSN-22 each would come with a crew of approximately 140. In addition, shore-based personnel (approximately 182), many of whom currently spend their time at both NAVBASE Kitsap Bangor and NAVBASE Kitsap Bremerton, would be permanently transferred to NAVBASE Kitsap Bangor. In total, the average daily number of employees on site at the Service Pier would increase from 390 to 712 (an increase of 322). There would be a corresponding increase in equipment operations, maintenance activities, transfer of materials on and off the submarines, and vehicular traffic. Facilities such as transit, food service, maintenance, housing, and training are already in place to accommodate two additional submarines and associated personnel at NAVBASE Kitsap Bangor. The proposed changes would allow maintenance activities to be performed on three submarines simultaneously (although only two are anticipated to be in port at any one time). All waste discharges from the submarines would be pumped ashore to the existing base waste treatment systems. Drainage water from the SPE would be collected in a trench drain on the pier, treated using an in-line canister system designed to meet the basic treatment requirements of the Washington Department of Ecology (WDOE) *Stormwater Management Manual for Western Washington*, and then discharged to Hood Canal in accordance with a National Pollutant Discharge Elimination System (NPDES) permit.

The average number of one-way Hood Canal transits of SEAWOLF Class submarines to or from Service Pier would increase from approximately 0.5 per month currently to 2 per month. These submarines are not escorted to and from NAVBASE Kitsap Bangor like the TRIDENT Class submarines, but there would be an increase in small support vessel traffic at Service Pier.

Operational lighting levels would not exceed 10 foot candles on the pier deck, 0.5 foot candle from the pier deck to a distance of 50 feet (15 meters) from the pier deck, and 0.05 foot candle to a distance of 100 feet (30 meters).

2.3. DESIGN AVOIDANCE AND MINIMIZATION MEASURES, BMPS, AND CURRENT PRACTICES

The proposed projects would incorporate the following design avoidance and minimization measures, BMPs, and current practices as part of construction and operation to avoid or minimize potential environmental impacts. The proposed measures and practices are based on previous consultations with regulatory agencies for similar projects.

2.3.1. Design Avoidance and Minimization Measures

For both the LWI and SPE, the Navy carefully analyzed all alternatives and modified their design to minimize environmental impacts to the extent feasible. For both projects, the preferred alternative was selected in part because it would have fewer environmental impacts than the other alternatives carried forward for detailed analysis in this EIS. Therefore, the two preferred alternatives are also the environmentally preferred alternatives. In addition, impact avoidance and minimization measures were included in the design of the various alternatives, as listed below:

- For both projects, the number of piles and anchors was minimized while still meeting structural, safety, and security requirements.
- For LWI Alternative 2, the piers were designed to minimize overwater coverage and maximize light transmittance. The pier was limited to pedestrian access, which allows it to be narrower and have a grated deck, as well as fewer, more widely spaced piles.
- For LWI Alternative 2, a mesh anchoring system was developed that did not require dredging.
- For LWI Alternative 2, the mesh size was maximized to facilitate fish passage while still meeting security requirements.
- For LWI Alternative 3, the PSB pontoons would be fitted with "feet" to minimize disturbance of the seafloor when the pontoons bottom out at low tide.
- For both SPE alternatives, the pier extension was placed in deep water to minimize impacts on marine vegetation and habitat, and interference with nearshore fish migration.
- For both SPE alternatives, as many facilities as possible were sited on land versus on the pier to minimize the size of the pier.

2.3.2. BMPs and Current Practices

This section summarizes BMPs and current practices that would be implemented as part of the Proposed Actions to minimize environmental impacts. More detailed descriptions of these measures can be found in the various resource sections (Sections 3.1, 3.2, etc.) of Chapter 3 and in the Mitigation Action Plan (Appendix C).

2.3.2.1. CONSTRUCTION

- To reduce the likelihood of any petroleum products, chemicals, or other toxic or deleterious materials from entering the water, fuel hoses, oil or fuel transfer valves, and fittings would be checked regularly for drips or leaks and would be maintained and stored properly to prevent spills from construction and pile driving equipment into state waters.
- To limit soil erosion and potential pollutants contained in stormwater runoff, a Storm Water Pollution Prevention Plan (SWPPP) would be prepared and implemented in conformance with the *Stormwater Management Manual for Western Washington* (WDOE 2012) (applies to Operations also).
- Oil booms would be deployed around in-water construction sites as required by a Clean Water Act (CWA) Section 401 Water Quality Certification for the projects, to minimize water quality impacts during construction.
- Debris would be prevented from entering the water during all demolition or new construction work. During in-water construction activities, floating booms would be deployed and maintained to collect and contain floatable materials released accidentally. Any accidental release of equipment or materials would be immediately retrieved and removed from the water. Following completion of in-water construction activities, an underwater survey would be conducted to remove any remaining construction materials that may have been missed previously. Retrieved debris would be disposed of at an upland disposal site.

- Removed creosote-treated piles and associated sediments (if any) would be contained on a barge or, if a barge is not utilized, stored in a containment area near the construction site. All creosote-treated material and associated sediments would be disposed of in a landfill that meets the liner and leachate standards of the Washington Administrative Code (WAC).
- Piles would be removed by cutting below the mudline and filling the resulting hole with clean sediment.
- To minimize impacts on marine habitat, limitations would be placed on construction vessel operations, anchoring, and mooring line deployment. A mooring and anchoring plan would be developed and implemented to avoid dragging anchors and lines in special status areas. Spudding/anchoring in existing eelgrass habitat would be avoided whenever possible. Vessel operators would be provided with maps of the construction area with eelgrass beds clearly marked. Resulting seafloor disturbance would be confined to a 100-foot (30-meter) wide corridor on each side of the structure under construction.
- Barges and other construction vessels would not be allowed to run aground. Additionally, vessel operators would be instructed to avoid excess engine thrust in water depths shallower than 30 feet (9 meters) to the extent possible.
- To minimize impacts on ESA-listed fish species, in-water construction would be conducted within the in-water work window (July 16 through January 15). The exception is that mesh installation (LWI Alternative 2), relocation of PSBs, and placement of anchors could occur outside the work window.

2.3.2.2. OPERATIONS

- For LWI Alternative 2, the in-water mesh would be cleaned regularly by power washing to minimize impacts on migrating fish. For both alternatives, the guard panels between PSB pontoons would be cleaned regularly.
- Applicable measures described above for Construction (Section 2.3.2.1) to protect water quality and habitats would be implemented during operational procedures.
- Low impact development and integrated management practices would be developed and implemented.

2.3.3. Mitigation Measures

- Pile driving of steel piles would be done using vibratory rather than impact methods whenever feasible, which would reduce noise levels by approximately 20 decibels root mean square (dB RMS) at 33 feet (10 meters) from the source.
- Bubble curtains would be used around steel piles being driven by impact methods to attenuate in-water sound pressure of the pile driving activity. The Navy would also consider other equally or more effective noise attenuation methods that may become available. Noise attenuation would not be used for driving concrete piles (SPE only), because of the much lower noise levels generated by driving of concrete piles compared to steel piles and the resulting much lower potential for impacts to biota.
- During impact pile driving, a soft-start approach would be used to induce marine mammals to leave the immediate area. This soft-start approach requires contractors to initiate noise from hammers at reduced energy, followed by a waiting period. Due to mechanical

limitations, soft starts for vibratory driving will be conducted only with drivers equipped with variable moment features. Typically, this feature is not available on larger, high power drivers. The Navy will use the driver model most appropriate for the geologic conditions at the project location, and will perform soft starts if the hammer is equipped to conduct them safely.

- Construction activities would not be conducted during the hours of 10:00 p.m. and 7:00 a.m. Between July 16 and September 23, impact pile driving would only occur between 2 hours after sunrise and 2 hours before sunset to protect foraging marbled murrelets during the breeding season. Between September 24 and January 15, in-water construction activities would occur during daylight hours (sunrise to sunset). The Navy would notify the public about upcoming construction activities and noise at the beginning of each construction season.
- Construction in the upper intertidal zone (LWI abutments and observation posts) would be conducted at low tide ("in the dry") to minimize impacts to marine water quality and underwater noise.
- To avoid impacts on marine mammals protected by ESA and Marine Mammal Protection Act (MMPA) and marine birds protected by ESA, monitoring of injury (shutdown) and buffer zones around in-water pile driving locations would be implemented. Pile driving would be stopped whenever a protected animal enters the shutdown zone. Detailed marine mammal and marbled murrelet monitoring plans would be developed and implemented in consultation with National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS).
- A revegetation plan would be developed with the objective of restoring native vegetation to the areas temporarily cleared for the construction laydown area and construction of new roads. A monitoring and maintenance program (such as once a month) would be implemented until the native plants are sufficiently established to minimize invasion by noxious weeds.
- The Navy would develop a local Notice to Mariners to establish uniform procedures to facilitate the safe transit of vessels operating in the project vicinity. Barge trips and associated bridge openings would be scheduled to avoid peak commuting hours. The Notice to Mariners would also serve to notify divers, including tribal divers, of potential underwater noise impacts.
- The Navy would, as part of the Proposed Actions, undertake marine habitat mitigation in accordance with the Mitigation Action Plan (Appendix C). This habitat mitigation action, including mitigation of eelgrass impacts, would compensate for impacts of the Proposed Actions on marine habitats. The Navy would purchase habitat credits from the Hood Canal In-Lieu Fee Program, which would implement appropriate mitigation in the Hood Canal watershed.

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