NAVFAC
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FINAL
September 2016

Record of Decision

for
Former Lake Hancock Target Range

NAS Whidbey Island
Whidbey Island, Washington

Department of the Navy
Naval Facilities Engineering Command Northwest
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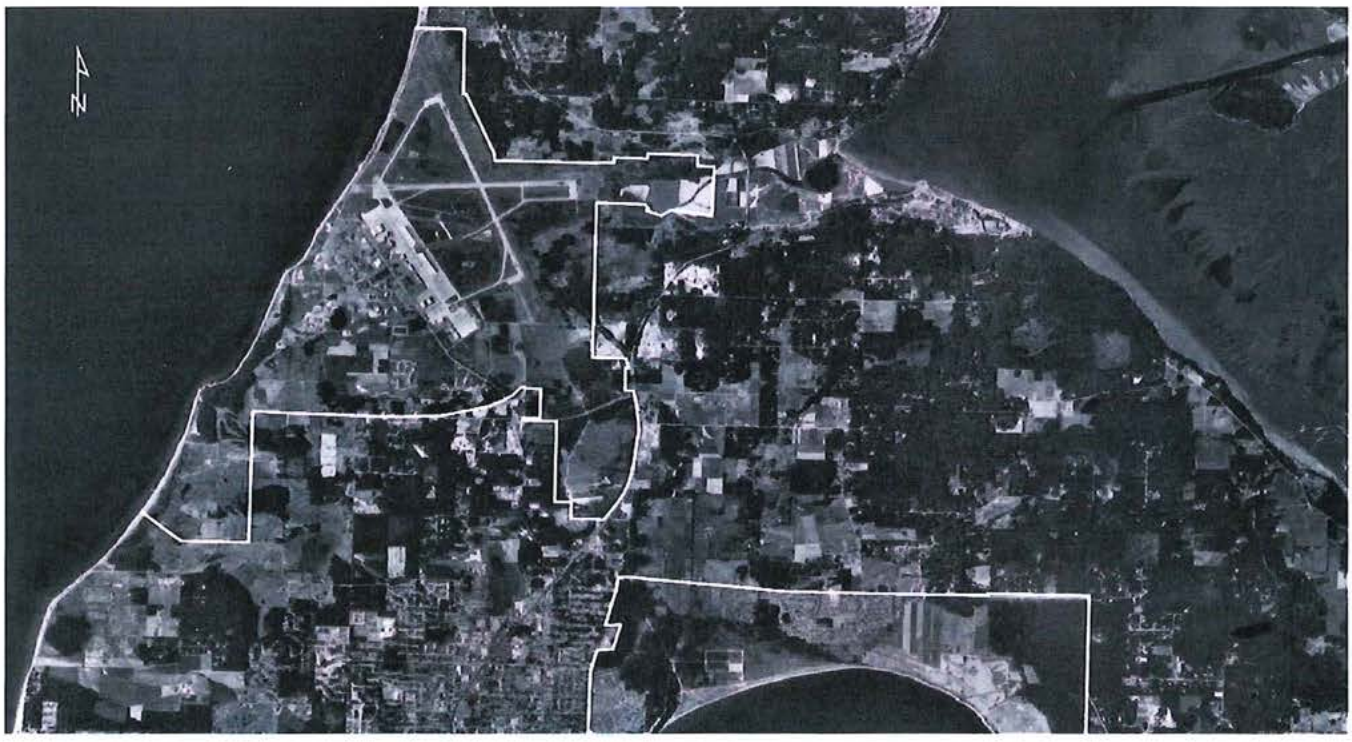

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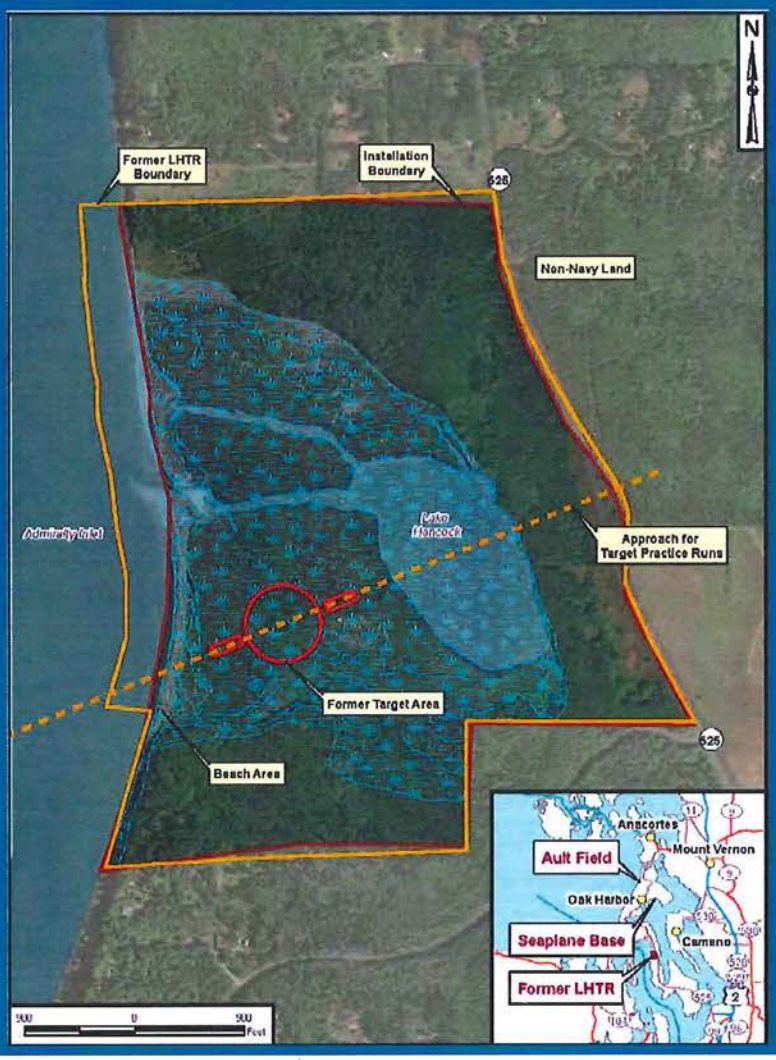
1.0 DECLARATION

1.1 SITE NAME AND LOCATION

Former Lake Hancock Target Range (LHTR), Naval Air Station (NAS) Whidbey Island, Washington.

FIGURE 1-1: LOCATION MAP



1.2 STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents the Selected Remedy for LHTR (see Figure 1-1), which was chosen by the Navy and agreed to by the Washington Department of Ecology (Ecology). Former LHTR is being addressed under the Defense Environmental Restoration Program (DERP) - Military Munitions Response Program (MMRP). The remedy presented in this ROD was selected in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on information

contained in the Administrative Record for the site. This ROD is being issued by the Navy, the lead agency, in conjunction with Ecology, in accordance with CERCLA as required by the DERP.

LHTR is not included on the National Priorities List (NPL) maintained by the United States Environmental Protection Agency (USEPA). Under DERP-MMRP, the Navy is the lead agency establishing this remedy for the site, with regulatory oversight provided by Ecology. Ecology agrees with the Selected Remedy.

1.3 ASSESSMENT OF SITE

Based on the results of past investigations, there is a potential for munitions and explosives of concern (MEC)/material potentially presenting an explosive hazard (MPPEH) at LHTR. The response action selected in this ROD is necessary to protect human health or welfare or the environment from actual or threatened explosive hazards at LHTR based on the current and intended future use of the site. Ecology concurs with this determination.

1.4 DESCRIPTION OF SELECTED REMEDY

The major components of the Selected Remedy for LHTR include the following:

- Surface removal of munitions items
- Annual surface inspections and munitions removals in and around the target area
- Every 5 years surface inspections and munitions removals within the removal action area boundary until no MEC/MPPEH items and less than 10 material documented as safe (MDAS) items are identified during inspections
- Land use controls (LUCs)

The Selected Remedy will protect human and ecological receptors from potential explosive hazards by preventing and/or reducing the potential to contact MEC/MPPEH through the removal of munitions items and LUCs that restrict access to the site. Based on the results of previous site investigations, no remedial action is necessary to address munitions constituents (MC) concentrations in soil, sediment, and surface water at LHTR.

1.5 STATUTORY DETERMINATIONS

The Selected Remedy is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable.

Based on the results of past investigations, it is presumed that MEC/MPPEH is present at LHTR. The Selected Remedy was chosen to control the explosive risks from MEC/MPPEH to mitigate potential physical hazards posed to current and future site receptors from contact with MEC/MPPEH presumably present at the site. The Selected Remedy was chosen over the other remedial alternatives considered, which included subsurface removal, after considering the threshold, balancing, and modifying criteria including overall protection of human health and the environment; compliance with Applicable or Relevant and Appropriate Requirements (ARARs); reduction of toxicity, mobility, or volume through treatment; long- and short-term effectiveness; implementability; cost; and regulatory and community acceptance. The Selected Remedy partially satisfies the statutory preference for remedies that use treatment as a principal element to reduce the toxicity, mobility, or volume of hazardous substances, pollutants, and contaminants. MEC, MPPEH, and other munitions items, if found on site, would be treated on site (e.g., by blow-in-place techniques) as necessary. As part of the Selected Remedy, LUCs will be implemented to prohibit residential use, to require unexploded ordnance (UXO) support during construction activities, and to require perimeter fencing and signage designating the area as a restricted access/UXO area. Based on the results of previous investigations conducted at LHTR, no remedial action is necessary to address MC concentrations in soil, sediment, and surface water; therefore, there are no chemicals of concern (COCs).

Due to the nature of MEC/MPPEH, residual risk from explosive hazard will remain after the initial surface removal is completed. Therefore, follow-on annual and 5-year inspections and munitions removals will be conducted within the target area and the removal action area boundary, respectively, to ensure that the remedy is, or will be, protective of human health and the environment.

1.6 ROD Data Certification Checklist

The locations in Section 2.0, Decision Summary, of the information required to be included in the ROD are summarized in Table 1-1. Additional information can be found in the Administrative Record file for NAS Whidbey Island.

Table 1-1: ROD Data Certification Checklist

Data	Location in ROD
COCs and their respective concentrations	Not Applicable (NA)
Types of MEC/MPPEH identified during previous removal actions	Sections 2.2, 2.5, and 2.7
Baseline risk represented by the COCs	NA
Cleanup levels established for COCs and the basis for these levels	NA
Cleanup levels for MEC/MPPEH are not applicable	NA
How source materials constituting principal threats are addressed	Section 2.11
Current and reasonably anticipated future land use assumptions	Section 2.6
Current and potential future beneficial uses of groundwater used in the risk assessment	NA
Potential land and groundwater uses that will be available at the site as a result of the Selected Remedy	Section 2.12.3
Estimated capital, operations and maintenance (O&M), and total net present worth (NPW) costs; discount rate; and number of years over which the remedy costs are projected	Appendix A
Key factors that led to the selection of the remedy	Section 2.12.1

1.7 AUTHORIZING SIGNATURES

Geoffrey Moore
Captain, U.S. Navy
Commanding Officer
NAS Whidbey Island

18 SEP 16
Date

Mr. Jim Pendowski
Toxic Cleanup Program Manager
Washington Department of Ecology

11/8/16
Date

2.0 DECISION SUMMARY

2.1 SITE NAME, LOCATION, AND BRIEF DESCRIPTION

NAS Whidbey Island is located on Whidbey Island in North Puget Sound north of Seattle between the Olympic Peninsula and the Interstate-5 corridor of western Washington.

The NAS was commissioned on September 21, 1942, originally as a base for seaplane patrol operations, munitions training, torpedo overhaul, and personnel induction training. NAS Whidbey Island is divided into four distinct parcels: (1) Ault Field, the main airfield, (2) Seaplane Base located at Crescent Harbor, (3) the Lake Hancock property, and (4) Outlying Field Coupeville. The mission of NAS Whidbey Island is to provide home-basing support for tenant units, support personnel and accompanying family members.

Former LHTR, which encompasses approximately 423 acres, is located within a large and diverse coastal lagoon system that includes salt marsh, brackish marsh, freshwater marsh, and bog forest subsystems. The site also includes a saltwater lagoon, Lake Hancock (Figure 1-1). A 50-foot-wide channel connects Lake Hancock to Admiralty Inlet, which extends tidal influence to Lake Hancock.

LHTR was used for aerial bombing training from 1943 to 1971. Munitions used at this range included practice bombs and rockets equipped with spotting charges or filled with sand. A spotting charge is explosive filler designed to produce a flash and smoke when detonated. Aircraft would approach the site from the east, make a steep diving approach over the target located on the ground, release the practice bombs, and exit the area westward over Admiralty Inlet (Figure 2-1). The range included a triangular-shaped yellow target with a white bull's-eye, a radar screen, two range and deflection observation shacks, a scoring house, and an observation post with a radio transmitter and receiver. All structures associated with the range have been removed from the site.

The site is no longer used for aerial bombing target practice. The area is still located within restricted air space (R-6701), and a portion of the property is currently being used by the military to monitor training exercises in Admiralty Bay and in the airspace overhead. The Navy uses the area just off shore of the Former LHTR, which is known as operating area Navy 7, for training. The Former LHTR is currently fenced on the northern, eastern, and southern sides with locked gates. Access by the public from the west to the beach is restricted (via signage) by the Navy; however, there are no physical barriers to prevent access to the beach and the site.

NAS Whidbey Island is an active facility, and environmental investigations and remediation at the base are funded under the Environmental Restoration, Navy (ER,N) program. The Navy is the lead agency for CERCLA activities at the facility, and Ecology provides regulatory oversight.

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

The source of potential MEC/MPPEH at LHTR is the munitions that were used during aerial bombing practice. Table 2-1 provides a summary of previous investigations. There have been no cited violations under federal or state environmental law or any past or pending enforcement actions pertaining to the cleanup of LHTR.

TABLE 2-1: PREVIOUS INVESTIGATIONS AND SITE DOCUMENTATION		
INVESTIGATION	DATE	ACTIVITIES
Munitions Removal Actions	1970s	To support potential land transfer options, three munitions clearances were completed between 1972 and 1973. During the first clearance, debris was located primarily near the target area. Divers also cleared the intertidal area from the beach to 50 yards out into Admiralty Inlet. A large number of rocket motors were found in the waters off the beach. Divers also searched the lagoon and determined its depth to be about 2 feet. Approximately 14 tons of munitions debris (consisting of bombs, rockets, and smoke/pyrotechnic devices) were removed during this clearance. All recovered munitions debris was declared inert. A smaller amount of munitions debris was removed during the second and third clearance events. In total, 15 tons of debris was removed. In addition to these three clearances, a fourth clearance was conducted at an unknown date. The occurrence of the clearance was documented in a February 1982 memorandum from the Executive Officer of NAS Whidbey. The document states that several undetonated 25-pound bombs containing spotting charges had been recovered from the site.
Site Hazard Assessment (SHA)	1998	The SHA included ecological, archaeological, and geophysical screening surveys, collection of sediment and surface water samples, and the removal of steel plates from the target area and contaminated sediments from the site. The Navy installed perimeter signs to discourage unauthorized entry into the site and to reduce potential damage to the natural resources (described in Section 2.5.1) in this area (URS Greiner, 1998; URS Consultants, 1996a, 1996b, and 2000; EOD Technology, Inc., 1996).
Preliminary Assessment (PA)	2007	The PA summarized the history of munitions use at several former ranges at NAS Whidbey Island including the Former LHTR (Malcolm Pirnie, 2007). A visual survey of the Former LHTR was conducted, and munitions debris was observed at the site, including along the beach. Previous sample results were summarized in this report and MC were not detected in samples collected from the target area.
Site Investigation (SI)	2010	The SI included surface and subsurface soil, sediment, and surface water sampling for MCs. No MCs were detected at concentrations greater than screening values. The potential threat to human health from MC was evaluated and no risks to human health or the environment were identified It was recommended that the Former LHTR be considered No Further Action (NFA) for MC (Tetra Tech EC, 2010).
Feasibility Study (FS)	2011	An FS was completed to develop, evaluate, and compare several remedial alternatives to address potential explosives risks at the Former LHTR (Tetra Tech, 2011).
Wetland Impact Study	2013	A wetland impact study and delineation field efforts were conducted to evaluate potential impacts to the Former LHTR as a result of implementation of the remedial alternatives described in the FS (Tetra Tech, 2013). The wetland impact study recommended Alternative 2, Surface Removal with LUCs, because it would have the least environmental impact while still providing an increased level of safety.
Proposed Plan	2016	A Proposed Plan was prepared to provide the public information on the preferred remedial alternative for addressing munitions removal at LHTR.

2.3 COMMUNITY PARTICIPATION

The Navy has a comprehensive community relations program for NAS Whidbey Island, and community relations activities are conducted in accordance with the NAS Whidbey Island Community Relations Plan, including the establishment of an Information Repository in the local area for dissemination of information to the community. Documents and other relevant information relied on in the remedy selection process are available for public review at the Information Repository, which includes a copy of the Administrative Record. For additional information about the Installation Restoration (IR) Program at NAS Whidbey

Island, contact: Ms. Leslie Yeunger, Public Affairs Officer, Naval Facilities Engineering Command (NAVFAC) Northwest, 1101 Tautog Circle, Silverdale, WA, 98315-1101, 360-396-6387.

Pursuant to Sections 113 and 117 of CERCLA, the Navy provided a public comment period from June 27 to July 27, 2016, for the proposed remedial action described in the Proposed Plan for LHTR (Tetra Tech, 2016). An Open House to present the Proposed Plan was held on July 11, 2016, at the Greenbank Farm in Greenbank, Washington. Public notice of the Open House and availability of documents were originally published in the following publications on the following dates:

- Whidbey Daily/Weekly News, June 30-July 6, 2016;
- South Whidbey Record, June 29, 2016 and July 2, 2016;
- The Whidbey Examiner, June 30, 2016; and
- Whidbey News-Times, June 29, 2016 and July 2, 2016.

Due to an issue with the Navy's website, the public notice was re-published, with the corrected website in the South Whidbey Record and Whidbey News-Times on July 9, 2016.

2.4 Scope and Role of Response Action

This ROD addresses the selection of a remedial action for the Former LHTR. Investigations at the site indicated the potential presence of MEC/MPPEH that may pose an explosive hazard to current and future site receptors. Previous actions and investigations conducted are summarized in Table 2-1. The Selected Remedy for the Former LHTR is designed to provide protection of human health and the environment based on the current and reasonably anticipated future use of the site by the military for training exercises. The Selected Remedy consists of surface removal of munitions, follow-on annual and five-year surface inspections and removals, and LUCs. The remedy documented in this ROD will achieve the Remedial Action Objectives (RAOs), as listed in Section 2.8.

Consistent with CERCLA guidance and for the purpose of comparison, the cost estimate for this Selected Remedy assumes that LUCs will be maintained for 30 years.

2.5 Site Characteristics

Figure 2-1 presents the LHTR conceptual site model (CSM), which identifies contaminant sources, contaminant release mechanisms, transport routes, and receptors under current and future land use scenarios. Contaminant sources include the MEC/MPPEH that are presumed to be located in the surface and subsurface at Former LHTR. The source of the potential MEC/MPPEH is the munitions that were used during aerial bombing practice. Human health and ecological receptors are discussed in Section 2.7. Detailed information about the site is presented in the FS Report (Tetra Tech, 2011) and Wetlands Impact Study Report (Tetra Tech, 2013).

2.5.1 Physical Characteristics

Although a large portion of the site is virtually level and receives regular tidal flooding, bluffs approximately 100 feet high are present at the northern and southern portions of the site near the beach. The northern and eastern boundaries of the site slope gently to the southwest and west, respectively, and the wooded area in the southwestern corner of the site slopes to the northeast.

Lake Hancock is a shallow permanent lagoon surrounded by marsh habitat. A shoreline bluff separates the marsh habitat from Admiralty Inlet. Two sand spits separate the Lake Hancock lagoon system from the open salt water of Admiralty Inlet and a 50-foot-wide tidal channel connects the lagoon system to Admiralty Inlet. Surface water flow direction in the lowland area varies according to the tidal cycle. Water flows toward the lagoon during the flood cycle and toward Admiralty Inlet during the ebb cycle. Surface water from the beach and bluff faces drains directly into Admiralty Inlet.

The soils at the site, primarily within the wetlands, have low permeability and consist of organic and alluvial peat type deposits. The soils at Lake Hancock are glacial in origin, and include parent materials

of glacial till, glacial outwash, glacial drift, and glacio-lacustrine and glacio-marine sediments. The majority of the site, including the former target area, is designated as tidal marsh. The grain size of sediments within the marsh is largely medium to fine. Tidal marsh soils may be completely submerged during high tide and remain marsh-like at low tide. The western portion of the site, bordering Admiralty Inlet, consists of coastal beach soils. The soil in this area is predominantly gravelly with some sand and is covered with driftwood and other debris deposited during storm events. The northern and southern portions of the site are classified as Hoypus gravelly loamy sand, with slopes between 5 and 15 percent.

Vegetation within Lake Hancock consists of a mix of salt marsh and mixed forest, including Douglas fir and alder forest. Vegetated wetland areas at Lake Hancock cover approximately one-third of the site, including the former target area. The wetlands support five major plant community types: high salt marsh, low salt marsh, scrub-shrub wetland, freshwater marsh, and Sitka spruce bog. Upland areas include coniferous and deciduous forests as well as an open grassland area that has been planted with coniferous trees. Upland forest vegetation covers about 38 percent of the area, including areas of mixed forest, Douglas fir, and alder forest.

FIGURE 2-1. CONCEPTUAL SITE MODEL

The Former LHTR site is a large and diverse coastal lagoon system that includes salt marsh, brackish marsh, freshwater marsh, and bog forest subsystems. A total of 17 habitat types that support a variety of wildlife species have been identified within these subsystems. The Former LHTR site contains intertidal saltwater wetlands with a minor amount of adjacent freshwater wetlands and a transitional area of brackish wetland between the freshwater and saltwater wetland areas. Salt pans (small shallow ponds of saline water without emergent vegetation) are present within the southern half of the Former LHTR site

marsh, particularly around the former target area. Some of the larger salt pans may have been created from the impacts of munitions in the area. Salt pans are present to a lesser degree in the northern half of the marsh.

The lack of development at the site has enhanced the biological diversity. A portion of the wetlands at the site is a true salt marsh lagoon, a relatively rare wetland type in the State of Washington (Lefstad and Fonda, 1995). Consequently, this area was listed on the Washington Register of Natural Areas in 1992 under agreement between the Navy and the Nature Conservancy. Washington Department of Natural Resources has identified Lake Hancock as a high-quality wetland/aquatic ecosystem. Most of the wetland area at the site has been designated by the Washington Department of Natural Resource as an element occurrence (i.e., a field observation of a rare species or ecosystem) of "High Salinity Lagoon, Northern Puget Trough" (WDNR 2012). This is a landscape-level element occurrence that incorporates four specific types of rare estuarine marsh occurrences: sandy, high salinity low marsh; sandy, moderate salinity low marsh; silty, moderate salinity low marsh; and transition zone wetland. Coastal lagoons are conferred a higher level of protection than other wetland types by local, state, and federal wetland permitting agencies.

Wetland impact study and delineation field efforts were conducted by Tetra Tech at the Former LHTR site in 2012 (Tetra Tech, 2013). Potential impacts to the Former LHTR as a result of implementation of the remedial actions described in the FS (Tetra Tech, 2011) were evaluated. Per regulations applicable to all wetlands, impacts to the Former LHTR wetland system should first be avoided, and then minimized, to the maximum extent practicable. Where impacts are unavoidable because of a need to balance protection of public safety and environmental impacts, they should be mitigated through restoration of all affected areas. It was determined that selection of a remedial alternative that considered surface removals would result in lower levels of impact over a shorter period of time than selection of alternatives that considered subsurface removals.

Hydrogeologic conditions at Former LHTR are not known. Groundwater monitoring wells have not been installed within the property boundary. Because aquifer elevations generally reflect surface topography and the majority of the site is located at or below sea level, it is anticipated that the surface water present during the low portion of the tidal cycle is likely groundwater discharging to the surface.

Four archaeological sites eligible for listing on the National Register of Historic Places, have been identified within the Former LHTR site. An archaeological survey conducted in 1996, in support of the SHA, confirmed that archaeologically significant sites exist at the Former LHTR (URS Consultants, 1996a). The locations of these sites were recorded, via global positioning system (GPS), during the archaeological survey. The survey recommended that in the event of a major excavation, that an archaeologically trained person be present to determine whether subsurface cultural materials were encountered during excavation.

Several threatened, endangered, and/or sensitive (TES) species are suspected or known to occur within the Former LHTR site. Several sensitive bird species known to occur within the LHTR include the great blue heron (*Ardea herodias*), common loon (*Gavia immer*), and red-necked grebe (*Podiceps grisegena*). The bald eagle (*Haliaeetus leucocephalus*) is also known to frequent the Former LHTR area. The LHTR site has historically been identified as a nesting site for the bald eagle, and the birds may use Lake Hancock as part of their home range. The state and federally threatened marbled murrelet (*Brachyramphus marmoratus*) has been documented foraging offshore of the site; however, suitable nesting habitat of tall old growth forest (Gill, 1994) is not present at the Former LHTR.

2.5.2 Nature and Extent and Fate and Transport of Contamination

The potential threat to human health from MC was evaluated in the SHA and SI, and no unacceptable risks to human health or the environment were identified. There is the presumed potential for MEC/MPPEH to be present at the site as a result of former bombing activities. MEC has been historically identified at the site, primarily near the target area. Munitions debris has also been observed scattered

throughout the site and rocket motors have been found in the waters along the beach and to the west into Admiralty Inlet. Despite the physical evidence, munitions-related activities took place at this site and because munition-related items and munitions debris have been historically identified at the site, there is the potential for MEC/MPPEH to be present. MEC/MPPEH present at this site are not expected to migrate significantly from the point of impact; however, they may migrate towards Admiralty Inlet and from subsurface to the surface as result of erosion and tidal activity.

2.6 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

NAS Whidbey is an active military facility and is expected to remain active for the foreseeable future. The Former LHTR site is no longer used for aerial bombing target practice; however, portions of the property, the restricted air space (R-6701), and water space in Admiralty Bay (Navy 7) are used for military training exercises. The site and these areas will continue to be used for military training for the foreseeable future.

The primary source of drinking water for NAS Whidbey Island is from the Skagit pipeline, which pumps water to Whidbey Island from the Skagit River, located approximately 25 miles northeast of Ault Field.

During the PA, a water well search was conducted within a 4-mile radius of LHTR. A total of 170 wells were documented within the 4-mile radius, with two domestic wells reportedly located on the Former LHTR site. However, the PA determined that these wells were not actually located at the site. There are numerous other domestic wells surrounding the range; it is assumed that these wells will remain in use for the foreseeable future.

2.7 SUMMARY OF SITE RISKS

The potential threat to human health and the environment from MC was evaluated in the SHA and SI, and no risks to human health or the environment were identified.

Munitions-related items and munitions debris have been observed on the ground surface at Former LHTR, and based on site history, munitions items, which may include MEC/MPPEH, are most likely present in the subsurface. Until these munitions items, which have been observed on the surface, are moved and/or removed from the site, it is unknown whether they are MEC/MPPEH or whether they are munitions debris.

The exposure pathway for potential human receptors at this site (which include Navy personnel, contractors, and trespassers) is direct contact with munitions items, which may include MEC/MPPEH, located on the surface, and possibly in the shallow subsurface if items have migrated through erosion and tidal activity. There is a human health hazard associated with potential munitions-related items present at this site because spotting charges and unburned propellants may remain within munitions items and cause injuries if detonated. It is important to note that exposure to MEC/MPPEH does not mean that an incident or injury will occur, since a receptor would have to disturb the MEC/MPPEH item (e.g., apply heat, friction, or shock to the item) in order to be exposed to actual explosive hazards. Similar to the pathway for human health receptors, the exposure pathway for any potential ecological receptors at this site is direct contact of munitions-related items on the surface, and to a lesser extent, in the shallow subsurface.

2.7.1 Basis for Action

As a result of past activities at Former LHTR, munitions items are present on the ground surface and may be present in the subsurface that result in an explosive hazard to human and ecological receptors. The Navy has determined that the Selected Remedy is necessary to protect human health and the environment from actual or threatened explosive hazards.

2.8 REMEDIAL ACTION OBJECTIVES

RAOs are goals that define the objective of conducting remedial actions to protect human health and the environment. RAOs typically serve as the design basis for the remedial alternatives described in Section 2.9. Note that cleanup levels for MEC/MPPEH are not applicable. The RAOs are as follows:

RAO No. 1: Prevent and/or reduce the potential for site receptors to come in direct contact with MEC/MPPEH items remaining at Former LHTR.

RAO No. 2: Minimize the impact to wetlands and other natural and archaeological resources located at Former LHTR.

2.9 DESCRIPTION OF ALTERNATIVES

To address safety hazards associated with contact with potential MEC/MPPEH, a preliminary technology screening evaluation was conducted in the FS. The general response actions are presented in Table 2-2.

TABLE 2-2: GENERAL RESPONSE ACTIONS

GENERAL RESPONSE ACTION	TECHNOLOGY	PROCESS OPTIONS
No action	None	Not applicable
Limited action	LUCs	Administrative controls: site use restrictions
Detection	Visual observation and instrument-aided detection	Visual observation and use of hand-held/man-portable magnetometer/ferrous and all-metals detectors
Removal	Surface removal	Manual removal from ground surface
	Subsurface removal up to 1 foot below ground surface (bgs)	Manual excavation/intrusive investigation and removal
Treatment and Disposal	MEC/MPPEH	Treatment by blow-in-place/consolidate and blow/MEC residual processing
	Munitions-related debris	Treatment and transport of munitions-related scrap for off-site disposal

The technologies and process options retained after detailed screening were assembled into four alternatives. Consistent with the NCP, the no action alternative was evaluated as a baseline for comparison with other alternatives during the comparative analysis. Table 2-3 describes the major components and provides estimated costs for each remedial alternative identified. In order to be consistent with CERCLA guidance and for the purpose of comparison, the cost estimate for this Selected Remedy assumes that LUCs will be maintained for 30 years. It is assumed that all of the remedial alternatives evaluated below will require follow-on removal actions to account for residual risks that will remain on site and the migration of munitions items throughout the site and from the subsurface to the surface due to erosion and tidal activity. Therefore, conducting annual surface munitions removals within the target area and surface munitions removals within each alternative's removal action area boundary every 5 years would address residual risks from explosive hazards that may remain on site after the initial munitions removal is completed.

TABLE 2-3: SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED

ALTERNATIVE	COMPONENTS	DETAILS	COST
1 - No Action *No action to address potential presence of MEC/MPPEH*	None	No action	No cost

TABLE 2-3: SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED

ALTERNATIVE	COMPONENTS	DETAILS	COST
2 - Surface Removal with LUCs *Removal of surface items, primarily in area near the former target, along the aircraft target approach line, and along the beach, and LUCs*	Surface removal	Surface munitions items and metallic non-munitions debris would be manually removed from the removal action area (the area most likely to include munition items including the area around the former target, approach line, and beach area). Annual surface inspections and munitions removals within the target area and surface inspections and munitions removals within the removal action area boundary every 5 years will be conducted, as necessary, until no MEC/MPPEH items and less than 10 MDAS items are identified during inspections to account for items that may migrate over time as a result of erosion and/or tidal activity. If MEC or MPPEH are identified on the surface within 50 feet of the edge of the removal action area, additional surveys would be conducted outward.	**Capital**: $388,000 **30-Year NPW of O&M Cost**: $877,000 **30-Year NPW**: $1,265,000 **Discount Rate**: 2.3% **Time Frame**: 0.8 months (initial removal and implementation of LUCs) 10 years for follow-on removals (assuming three annual follow-on inspections and two five-year follow-on inspections)
	LUCs	LUCs to prevent exposure to MEC/MPPEH would include prohibiting residential use, requiring UXO support during construction activities, and requiring perimeter fencing and signage designating Former LHTR as a restricted access area and potential UXO area.	
3- Surface and Subsurface Removal (to 1 foot bgs) with LUCs *Removal of surface and subsurface items, primarily in the area near the former target, along the aircraft target approach line, and along the beach, and LUCs*	Surface and subsurface removal	Surface and subsurface (to 1 foot bgs) munitions items and metallic non-munitions debris would be manually removed from the removal action area (same area as under Alternative 2). Annual surface inspections and munitions removals within the target area and surface inspections and munitions removals within the removal action area boundary every 5 years will be conducted, as necessary, until no MEC/MPPEH items and less than 10 MDAS items are identified during inspections to account for items that may migrate over time as a result of erosion and/or tidal activity. If MEC or MPPEH are identified on the surface within 50 feet of the edge of the removal action area, additional surveys would be conducted outward.	**Capital**: $561,000 **30-Year NPW of O&M Cost**: $877,000 **30-Year NPW:** $1,483,000 **Discount Rate**: 2.3% **Time Frame**: 1.2 months (initial removal and implementation of LUCs) 10 years for follow-on removals (assuming three annual follow-on inspections and two five-year follow-on inspections)
	LUCs	LUCs would be the same as under Alternative 2.	
4 - Expanded Surface and Subsurface Removal (to 1 foot bgs) with LUCs *Removal of surface and subsurface items over an expanded area surrounding the former*	Surface and subsurface removal	Surface and subsurface (to 1 foot bgs) munitions items and metallic non-munitions debris would be manually removed from an expanded removal action area (same area as under Alternative 2 plus the area from the channel connecting Lake Hancock to Admiralty Inlet to the southern treeline). Annual surface inspections and munitions	**Capital**: $907,000 **30-Year NPW of O&M Cost**: $898,000 **30-Year NPW:** $1,806,000 **Discount Rate**:

TABLE 2-3: SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED			
ALTERNATIVE	COMPONENTS	DETAILS	COST
target and aircraft target approach line and along the beach and LUCs		removals within the target area and surface inspections and munitions removals within the removal action area boundary every 5 years will be conducted, as necessary, until no MEC/MPPEH items and less than 10 MDAS items are identified during inspections to account for items that may migrate over time as a result of erosion and/or tidal activity. If MEC or MPPEH are identified on the surface within 50 feet of the edge of the removal action area, additional surveys would be conducted outward.	2.3% **Time Frame**: 2.2 months (initial removal and implementation of LUCs) 10 years for follow-on removals (assuming three annual follow-on inspections and two five-year follow-on inspections)
	LUCs	LUCs would be the same as under Alternative 2.	

2.10 COMPARATIVE ANALYSIS OF ALTERNATIVES

Table 2-4 and subsequent text in this section summarize the comparison of the active remedial alternatives with respect to the nine CERCLA evaluation criteria outlined in the NCP at 40 Code of Federal Regulations (CFR) 300.430(e)(9)(iii) and categorized as threshold, primary balancing, and modifying criteria. Further information on the detailed comparison of remedial alternatives is presented in the FS.

Threshold Criteria

Overall Protection of Human Health and the Environment. The no action alternative would not achieve the RAOs and therefore does not protect human health and the environment. It will therefore not be considered further in this ROD. Alternatives 2 and 3 would include surface removal over the same area, but Alternative 3 would also remove munitions in the subsurface, thereby providing more protection than Alternative 2 initially. Alternative 4 would cover an expanded removal action area and would include surface and subsurface munitions removal, thereby providing the most protection initially. Follow-on removals will be conducted for all three active alternatives to address residual risks thereby providing the same protection under each alternative. The same LUCs would be required under all three active alternatives to prohibit residential use, require UXO support during construction activities, and require perimeter fencing and signage designating Former LHTR as a restricted access area and potential UXO area thereby being equally protective.

Compliance with ARARs. MC concentrations in all environmental media are associated with acceptable human health and ecological risks. Therefore, there are no COCs or chemical-specific ARARs for Former LHTR. Alternatives 2, 3, and 4 would comply equally with all location- and action-specific ARARs.

Primary Balancing Criteria

Long-Term Effectiveness and Permanence. Alternative 2 would provide long-term effectiveness and permanence through the surface removal of munitions items. Alternatives 3 and 4 would provide additional long-term effectiveness and permanence through a combination of surface and shallow subsurface removal of munitions items. Also, conducting annual surface inspections and munitions removals within target areas and conducting surface inspections and munitions removals within each alternative's removal action area boundary every 5 years under Alternatives 2, 3, and 4 would reduce risks from residual explosive hazards that may remain on site after the initial munitions removal is completed. LUCs for Alternatives 2, 3, and 4 would provide equal long-term effectiveness and permanence. Overall, Alternative 4 would provide the highest degree of long-term effectiveness and permanence because more munitions would be removed initially and follow-on removals would also be

conducted over an expanded removal action area. Alternative 3 would provide the next highest level of long-term effectiveness and permanence followed by Alternative 2.

TABLE 2-4: SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

CERCLA CRITERION	1 – NO ACTION	2 – SURFACE REMOVAL WITH LUCS	3 – SURFACE AND SUBSURFACE REMOVAL (TO 1 FOOT BGS) WITH LUCS	4 – EXPANDED SURFACE AND SUBSURFACE REMOVAL (TO 1 FOOT BGS) WITH LUCS
Overall Protection of Human Health and the Environment	○	●	●	●
Compliance with ARARs	●	●	●	●
Long-Term Effectiveness and Permanence	○	◐	◐	●
Reduction of Toxicity, Mobility, and Volume through Treatment	○	◐	●	●
Short-Term Effectiveness	○	◐	◐	◐
Implementability	NA	●	●	●
Total Cost (Present Net Worth)	NA	$1,265,000	$1,483,000	$1,806,000
State Acceptance	○	●	○	○
Community Acceptance	The Navy received no significant objections from the public to the Proposed Plan during the comment period or Open House.			

● - High. ◐ - Medium. ○ - Low.

Reduction in Toxicity, Mobility, or Volume through Treatment. Because NFA for MC has been recommended for this site, reduction of toxicity, mobility, or volume through treatment of chemical contaminants is not applicable. However, munitions items that present an explosive safety hazard remain at Former LHTR. Alternatives 2, 3, and 4 would reduce the volume of munitions items present at former LHTR by manually removing these items from the site and/or treating these items on site. Alternative 4 would remove the most munitions items initially, followed by Alternative 3 and then Alternative 2. Follow-on annual and five-year inspections and munitions removal actions would continue to reduce the volume of munitions items that may remain at the site after the initial munitions removal is completed.

Short-Term Effectiveness. The differences between Alternatives 2, 3, and 4 are the areas and depths over which the munitions removals would take place. These differences would affect the length of time for completion for the initial munitions removal for each alternative. It is assumed that Alternative 2 would be completed within the shortest amount of time, Alternative 3 would be next, and Alternative 4 would take the most time to complete. However, follow-on annual and five-year inspections and munitions removals would be required for Alternatives 2, 3, and 4.

Alternatives 2, 3, and 4 would reduce the explosive safety hazards in the short term because risks to human receptors and the environment would be reduced as soon as the first munitions item was removed from the site. Implementation of Alternatives 2, 3, and 4 might result in exposure of site workers to

explosive hazards during remedial activities; however, these explosive hazards would be controlled by compliance with site-specific health and safety and other explosive safety procedures. Alternative 4 would pose the greatest explosive risk to site workers, followed equally by Alternative 3 and Alternative 2 which would have the lower risk.

Activities performed under Alternatives 2, 3, and 4 would be conducted to mitigate damage to wetlands and other natural resources at the site. Alternative 2 would have the least impact on wetlands because munitions removal would only be conducted on the surface, impacts would be greater for Alternative 3 because removal would be conducted in the subsurface over the same area, and impacts would be greatest in Alternative 4 because it would involve surface and subsurface removal over a larger area then Alternative 3. To mitigate damage to archeological resources, an archeologist would also be on site during implementation of all three active alternatives to ensure that potential archeological resources are not disturbed, thereby providing equal protection for all alternatives.

Implementation of Alternatives 2, 3, and 4 would have slight adverse impacts, to the same degree, on the surrounding community and the environment if munitions detonations occur during remedial activities due to noise and potential damage to wetlands. Alternatives 2, 3, and 4 would also have short-term impacts associated with transport of metallic items for off-site metal recycling due to increased truck traffic with Alternative 4 having the most impact following by Alternative 3 and Alternative 2 would have the least impact. Alternative 4 would have the greatest greenhouse gas (GHG) emissions and energy demand from site transportation, followed by Alternative 3, and Alternative 2 would have the lowest GHG emissions and energy demand from site transportation.

Implementability. Alternative 4 would be the most difficult to implement because surface and subsurface munitions removal would be conducted over a larger area, Alternative 3 would be the next most difficult because it would involve removal over a smaller area than Alternative 4, Alternative 2 would be the easiest to implement because it would only involve surface removal. Ease of implementation of LUCs under Alternatives 2, 3, and 4 would be the same.

Cost. Estimated NPW costs are $1,265,000 for Alternative 2, $1,483,000 for Alternative 3, and $1,806,000 for Alternative 4.

Modifying Criteria

State Acceptance. State involvement has been solicited throughout the CERCLA process. Ecology, as the designated state support agency in Washington, has requested that the proposed remedy be protective of the wetland ecosystem and protect the public from any possible explosive hazards. Ecology concurred with Alternative 2 as the final remedy.

Community Acceptance. The Navy received a few written objections from the public to the Proposed Plan during the comment period or Open House Meeting. The responses to their comments are included in Section 3.1.

2.11 PRINCIPAL THREAT WASTE

The NCP at 40 CFR 300.430(a)(1)(iii)(A) establishes an expectation that treatment will be used to address the principal threats posed by a site wherever practicable. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or that would present a significant risk to human health or the environment should exposure occur. A source material is a material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or air, or acts as a source for direct exposure. There are no highly toxic or highly mobile contaminants; therefore, principal threat wastes are not present at the site.

2.12 SELECTED REMEDY

2.12.1 Rationale for Selected Remedy

The Selected Remedy for LHTR is Alternative 2, which includes surface removal of munitions items, annual surface inspections and munitions removals within the target area and surface inspections and munitions removals within the removal action area boundary every 5 years, as necessary, until no MEC/MPPEH items and less than 10 MDAS items are identified during inspections to account for items that may migrate over time as a result of erosion and/or tidal activity, and LUCs.

The Selected Remedy achieves the RAOs by preventing exposure to MEC/MPPEH through munitions removals and the implementation of LUCs, providing the lowest level of impacts to wetlands, and mitigating impacts to natural resources and archaeological resources. The Selected Remedy meets the threshold criteria, and provides the best balance of tradeoffs with respect to the balancing and modifying criteria and will also allow for continued use of the site by the military for training exercises. Based on a risk management decision, the Selected Remedy provides the most appropriate balance between reducing explosive safety hazards and protecting existing habitat. The selected RA is also consistent with CERCLA.

2.12.2 Description of Selected Remedy

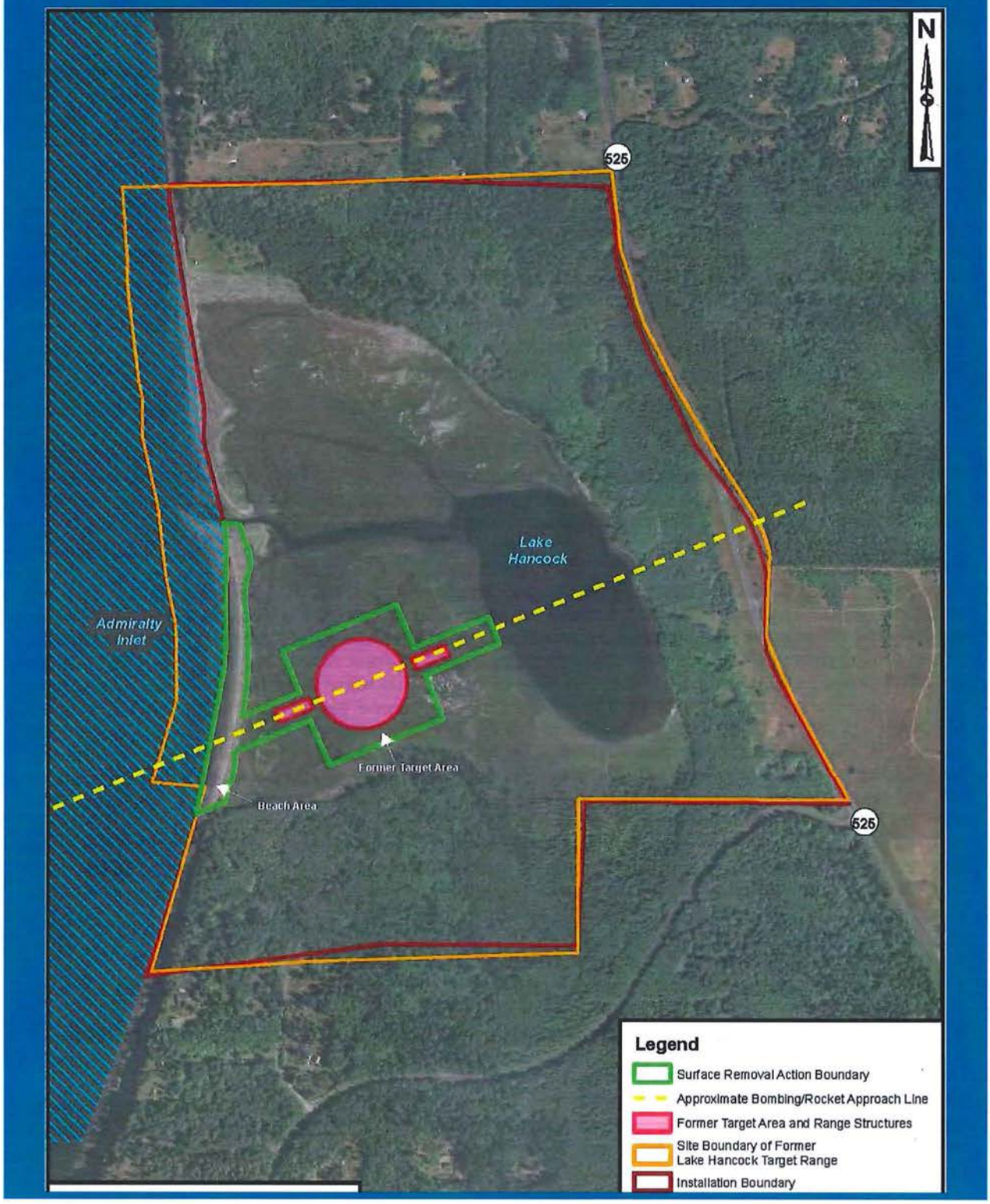
The Selected Remedy includes three major components: (1) surface removal of munitions items, (2) annual and five-year surface inspections and munitions removals, as necessary, until no MEC/MPPEH items and less than 10 MDAS items are identified during inspections, and (3) LUCs.

Because archeological sites have been identified at the site, an archeologist will be on site during remedial activities to ensure that potential archeological resources are not present and if so, are not disturbed. Visual and metal-detecting surveys will be conducted to locate surface munitions items within the removal action area (see Figure 2-2), and these items will be manually removed. Surface metallic non-munitions debris will also be manually removed from the removal action area. If MEC or MPPEH are identified on the surface within 50 feet of the edge of the removal action area, additional step-out surveys will be conducted outward to ensure that a 50 foot buffer around the removal action area is clear of MEC/MPPEH. If, as determined by the Team Leader, MEC/MPPEH are identified that are not safe to move, MEC, MPPEH, and other munitions items will be treated on site (e.g., by blow-in-place techniques). Metallic debris will be transported off site to a metal recycler for disposal. Disturbance to wetlands will be minimal because only surface remedial activities will be conducted. Annual surface inspections and munitions removals within the target area and surface inspections and munitions removals within the removal action area boundary every 5 years will be conducted, as necessary, until no MEC/MPPEH items and less than 10 MDAS items are identified during inspections to account for items that may migrate over time as a result of erosion and/or tidal activity. The application of LUCs to the entire Former LHTR site would include:

- Residential use restrictions. Land use would be restricted to military uses.
- UXO support during intrusive/construction activities in this area. UXO support would be necessary during any ground-disturbing activities (up to 10 feet bgs).
- Perimeter fencing and signage designating area as restricted access area and potential UXO area.
- Annual monitoring of LUCs.

These restrictions would be incorporated into the base master plan and any real estate property documents associated with future sale or lease of the site. If a violation of these LUCs occurs, a description of the violation and the corrective actions to be taken to restore protectiveness will be provided to Ecology.

FIGURE 2-2: REMOVAL ACTION AREA



2.12.3 Expected Outcomes of Selected Remedy

The Selected Remedy will be protective of human health and the environment based on reduction of and elimination of the presumed MEC/MPPEH exposure pathway through surface removals, follow-on annual surface inspections and munitions removals within the target area and surface inspections and munitions removals within the removal action area boundary every 5 years, as necessary, until no MEC/MPPEH items and less than 10 MDAS items are identified during inspections, and implementation and maintenance of LUCs. The current non-residential land use, which will be supported by the Selected Remedy, is expected to continue, and there are no other planned land uses in the foreseeable future. Groundwater at the site is not used and is not expected to be used in the future, and the Selected Remedy will have no impact on current or future groundwater uses available at the site. There are no socio-economic, community revitalization, or economic impacts or benefits associated with implementation of the Selected Remedy. It is estimated that the RAOs will be achieved within approximately 0.8 months of implementation of the remedy, once the LUCs have been put in place. Table 2-5 describes how the Selected Remedy will achieve the RAOs.

TABLE 2-5: HOW SELECTED REMEDY WILL ACHIEVE THE RAOS

RISK	RAO	COMMENTS
Explosive safety hazard	Prevent and/or reduce the potential for site receptors to come in direct contact with MEC/MPPEH items remaining at Former LHTR.	The Selected Remedy will prevent exposure to MEC/MPPEH through munitions removals and the implementation of LUCs.
	Minimize the impact to wetlands and other natural and archaeological resources located at Former LHTR.	Based on a risk management decision, the Selected Remedy provides the most appropriate balance between reducing explosive safety hazards and protecting existing habitat. The impacts are minimized, because no subsurface removals are included in the Selected Remedy.

2.13 STATUTORY DETERMINATIONS

In accordance with the NCP, the Selected Remedy meets the following statutory determinations:

- **Protection of Human Health and the Environment** – The Selected Remedy is needed to mitigate explosive safety risks associated with exposure to MEC/MPPEH potentially located at Former LHTR. The Selected Remedy will begin to reduce explosive safety risks at Former LHTR as soon as the first munitions item is removed from the site. Based on a risk management decision, the Selected Remedy provides the most appropriate balance between reducing explosive safety hazards and protecting existing habitat.

- **Compliance with ARARs** – The Selected Remedy will attain all identified federal and state ARARs, as presented in Appendix B.

- **Cost-Effectiveness** – The Selected Remedy is the most cost-effective alternative and represents the most reasonable value for the money. The costs are proportional to overall effectiveness by achieving a significant amount of short-term and long-term effectiveness and permanence and reduction in volume through treatment within a reasonable time frame. Detailed costs for the Selected Remedy are presented in Appendix A.

- **Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable** – The Selected Remedy represents the maximum extent to which permanent solutions and alternative treatment technologies can be used in a practical manner. As necessary, if found on site, MEC, MPPEH, and other munitions items will be treated on site (e.g., by blow-in-place techniques), and any remaining debris along with other items that did not require treatment will be permanently removed from the site. The Selected

Remedy provides the best balance of tradeoffs for long-term effectiveness and permanence with ease of implementation for reasonable cost.

- **Preference for Treatment as a Principal Element** – The Selected Remedy partially satisfies the statutory preference for remedies that use treatment as a principal element to reduce the toxicity, mobility, or volume of hazardous substances, pollutants, and contaminants because, as necessary if found on site, MEC, MPPEH, and other munitions items would be treated on site (e.g., by blow-in-place techniques).

- **Five-Year Review Requirement** – Because the Selected Remedy will result in explosive hazards remaining on the site and LUCs will be implemented, a statutory review will be conducted within five years after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

2.14 Documentation of Significant Changes

CERCLA Section 117(b) requires an explanation of significant changes from the Selected Remedy presented in the Proposed Plan that was published for public comment. No significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

3.0 RESPONSIVENESS SUMMARY

3.1 Stakeholder Comments and Lead Agency Responses

Participants in the Open House held on July 22, 2016, included representatives of the Navy and Ecology and local community members. Multiple comments were received during the Open House or public comment period (June 27 to July 27, 2016). Public notice of the Open House and availability of documents were originally published in the following publications on the following dates:

- Whidbey Daily/Weekly News, June 30-July 6, 2016;
- South Whidbey Record, June 29, 2016 and July 2, 2016;
- The Whidbey Examiner, June 30, 2016; and
- Whidbey News-Times, June 29, 2016 and July 2, 2016.

Due to an issue with the Navy's website, the public notice was re-published, with the corrected website in the South Whidbey Record and Whidbey News-Times on July 9, 2016.

The following written comments were submitted during the comment period:

1. NAS Whidbey appears to have a good plan to continue with appropriate level of cleanup at Lake Hancock. I appreciate their good stewardship of this valuable habitat.

Response: Noted.

2. I would like to receive email updates about the project as it progresses.

Response: Restoration Advisory Board (RAB) meetings are held periodically in Oak Harbor and provide a forum for exchange of information and partnership among citizens, the NASWI, EPA, and the State of Washington. Public announcements are published in local newspapers one week prior to a RAB meeting announcing the meeting date and time, location, and topics to be discussed.

3. I would like the Navy to implement Alternative 3. Reasons: I feel this alternative strikes the balance between removing as much of the munitions as possible, in a reasonable time frame and cost, with minimal wetland impact.

Response: Alternative 3 differs from Alternative 2 only in the depth of the initial munitions removal; Alternative 3 would remove MPPEH to a depth of 1 foot below ground surface, while Alternative 2

includes only surface removal. Alternative 2 provides the least amount of disturbance to the wetland, while still providing removal of MPPEH. Yearly inspections and surface removals (after the initial removal action) will allow for the removal of items that work their way up the soil profile to the surface under tidal fluctuations or other natural phenomena.

4. I support the chosen preferred alternative (2). Thank for holding this informative Open House.

Response: Noted.

5. I am writing regarding the Navy plans for Lake Hancock. I have lived in the area for many years, as early as the 1980s, children and adults camped and explored in the Lake Hancock area. At no time did anyone discover explosive material or debris. I would urge you to obtain an independent environmental assessment of the area, as it is an environmentally significant wetlands area home to many birds and mammals. Second, the area is also of archeologist significance as there have been Native artifacts found in the area in the past, and a current archeological study should be required before any action is decided upon. In light of the above, I urge you to take No Action in the area.

Response: Access is restricted as the Navy uses the property to conduct training and due to the potential for explosive safety risk from contact with items that present an explosive hazard. Access will not be granted in the future as this area is still part of an active Training Area. At the request of Ecology, the Navy conducted a wetland delineation and impact study prior to the development of afore mentioned remedial alternatives. Alternative 2 was chosen, collaboratively with Ecology, as it provides the least ground disturbance to the site. Additionally, pursuant to Section 106 of the National Historic Preservation Act, NASWI has consulted with local tribal organizations and the State Historic Preservation Officer regarding this remedial action. In order to mitigate any potential impacts to culturally-sensitive areas, the Cultural Resource Program Manager for NASWI will flag off a 50-meter buffer zone around sites prior to the field activities that are part of this remedial action.

6. I would like to offer a suggestion as part of the environmental cleanup proposed for Hancock Target Range on Whidbey Island: Would you consider constructing a trail across the northern limit of this area to connect the coast to the highway bordering on the east? This would allow people to walk along the coast from the Coupeville ferry to Lake Hancock, then via the proposed trail to the highway, then by Island Transit bus back to the Coupeville ferry. Also, a connecting trail along the southern limit of the Lake Hancock Area would allow coast hikers coming from the south to do the same. Both trails would allow hikers the opportunity to view wildlife in this wetland area safely and without disturbance. Thanks for proposing this cleanup, and considering my suggestion.

Response: Access is restricted as the Navy uses the property to conduct training and due to the potential for risk from contact with any items that present an explosive hazard. The Navy will continue to assess the protectiveness of the proposed remedies at least every five years after the remedy is implemented.

7. Thank you for coming to Greenbank this week. I'm sure you will make the best decision for environmental concerns. My concerns about Lake Hancock have to do with the abundance of mosquitos originating from the lake and surrounding waters and marshes. For some local residents, their properties are highly negatively affected. Mosquitos rule (sp?)! Read correct information on Zika. Thank you.

Response: The proposed remedial action addresses potential explosive safety hazards and does not include the mitigation of natural populations of mosquitos and other irritating insects. Killing adult mosquitos by fogging pesticide would require vehicle access to every mosquito-impacted body of water, which would damage the integrity of the wetland. Additionally, using a bio-control is not very effective in tidally-influenced areas due to the cyclic recharge of surface and ground water. Biocontrol may also harm juvenile salmonids. Currently, the Zika virus is not carried by the species of mosquitoes present in Washington State. If a public health issue arises where mosquitoes may carry a disease, the Navy will work with Island County to determine a strategy for mosquito abatement.

8. Alternatives 2 thru 4 require some sort of land use controls. I assume LUC is a fence. I further assume that a fence will not be effective 100% of the time. My thought is the cleanup should be thoroughly done or not at all. I agree with Alt. 4. I also believe that any plan should include the elimination of the mosquito population. Ideally, the land should revert back to public use.

Response: The Former Lake Hancock Target Range contains both freshwater and saltwater marshes that are unique in Washington State and after discussions with stakeholders (WADNR & Nature Conservancy), complete MPPEH removal, or subsurface removal, was not considered a viable alternative, as it would destroy the integrity of the wetland. The proposed remedial action addresses potential explosive safety hazards and does not include the mitigation of natural populations of mosquitos and other irritating insects. Lastly, this site continues to be an active training range and contains MEC and MPPEH from historical operations. Ultimately, access is restricted to protect the public.

9. My preferred remedy is Alternative 4. Although this is the most expensive, you will be incurring additional costs at higher levels in future years if you do less that Alternative 4. This plan should have been done in 1971 which would have meant less long term environmental hazards, less cost in today's capital and NPW costs. It is not cost effective in the long term to do anything less than Alternative 4. My property is nearly adjacent to LHTR. I expect you to restore the county road and contiguous land to its current condition if you use Rocky Way as one of your access points. There was damage done to the road when you removed the metal tower a few years ago but it was not repaired by the Navy. While you are working on the clean-up, regardless of which alternative you chose, the mosquito infestation needs to be addressed. Every year those of us who live near LHTR suffer from mosquito invasions. I know there must be something you can do to mitigate the problem. A few years ago there was the threat of West Nile. Now there is Zika. While not prevalent in Washington yet, these mosquitos only have to move north from California to take hold here in Washington. Thank you for your consideration.

Response: The Former Lake Hancock Target Range contains both freshwater and saltwater marshes that are unique in Washington State and after discussions with stakeholders (WADNR & Nature Conservancy), complete MPPEH removal, or subsurface removal, was not considered a viable alternative, as it would destroy the integrity of the wetland. The proposed remedial action addresses potential explosive safety hazards and does not include the mitigation of natural populations of mosquitos and other irritating insects. When the remedial action is complete, any disturbance of non-Navy property will be restored to original or, if possible, better condition. Lastly, this site continues to be an active training range and contains MEC and MPPEH from historical operations. Ultimately, access is restricted to protect the public.

10. Thank you for the opportunity to review and comment on the Proposed Plan for the Former Lake Hancock Target Range. The Department of Defense's Military Munitions Response Program is an example of their continued commitment to environmental stewardship. It is encouraging to see that the former Lake Hancock Target Range (LHTR) is being addressed as part of this program. The Department of Defense has performed munitions removal between 1972 and 2012. In reviewing the possible alternative for the further proposed removal of material that may present an explosive hazard at the former LHTR, it appears that the preferred alternative provides the best balance between addressing ongoing safety concerns and environmental considerations. The surface removal of any munitions, continued surface inspections, and limited use of the habitat can reduce risk to humans and wildlife while limiting impact on the diverse coastal lagoon system. Your engagement with the Washington State Department of Ecology, the Department of Archeology and Historic Preservation, and other state agencies on this and other issues is greatly appreciated. Thank you for the continued vigilance in maintaining Washington's natural beauty.

Response: Noted.

3.2 TECHNICAL AND LEGAL ISSUES

No technical or legal issues associated with the LHTR ROD were identified.

ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	chemical of concern
CSM	conceptual site model
DERP	Defense Environmental Restoration Program
Ecology	Washington Department of Ecology
ER, N	Environmental Restoration, Navy
FS	Feasibility Study
GPS	global positioning system
GHG	greenhouse gas
LHTR	Lake Hancock Target Range
LUC	land use control
MC	munitions constituents
MDAS	material documented as safe
MEC	munitions and explosives of concern
MMRP	Military Munitions Response Program
MPPEH	material potentially presenting an explosive hazard
NA	not applicable
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Command
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFA	No Further Action
NPL	National Priorities List
NPW	net present worth
O&M	operation and maintenance
PA	Preliminary Assessment
RAO	Remedial Action Objective
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SHA	Site Hazard Assessment
SI	Site Investigation
TES	threatened, endangered, and/or sensitive
USEPA	United States Environmental Protection Agency
UXO	unexploded ordnance

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APPENDIX A

SELECTED REMEDY COSTING INFORMATION

CLIENT: NAS WHIDBEY ISLAND			JOB NUMBER: 112G02853.FS.RA.DF
SUBJECT: Lake Hancock Target Range			
BASED ON:			DRAWING NUMBER:
BY:	TJR	CHECKED BY:	APPROVED BY: DATE:
Date:	8-29-11	Date:	

Assumptions

All site labor is from out of area. Travel (mobilization & demobilization) of site personnel and per diem is included in estimate. Per diem @ $151 per day, mob/demob @ $1,400 per trip ($800 travel: $600 labor).

All site labor is set as a 10 hour day.

No MEC/MDEH will be located on the site.

All removed materials can be moved be site personnel.

No restoration of wetlands is included in the estimate.

Standard crew of 12 is used for the cleanup including superintendent for initial removal.

Standard crew of 6 is used for the cleanup including superintendent for removals during years 1, 2, 3, 5, & 10.

Metal drums are used to transport and dispose of removed materials. Maximum weight per drum is 400 pounds.

Install/replace 6 perimeter signs upon completion of first removal.

Time to complete and volume of removed material:

Initial Removal
Alternative 2: 22 days and 10 drums

Follow-up Removal (years 1, 2, & 3)
20 days and 1 drum

Follow-up Removal (years 5 & 10)
Alternative 2: 20 days and 1 drum

NAS WHIDBEY ISLAND
Whidbey Island, Washington
Lake Hancock Target Range
Alternative 2: Surface Removal with Land Use Controls
Capital Cost (First Removal)

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
1 PROJECT PLANNING & DOCUMENTS											
1.1 Prepare Documents & Plans	220	hr			$38.00		$0	$0	$8,360	$0	$8,360
1.2 Prepare Work Plans	300	hr			$38.00		$0	$0	$11,400	$0	$11,400
1.3 Prepare LUCs	150	hr			$38.00		$0	$0	$5,700	$0	$5,700
2 MOBILIZATION AND DEMOBILIZATION											
2.1 Site Support Facilities (trailers, etc.)	1	ls		$1,000.00		$3,500.00	$0	$1,000	$0	$3,500	$4,500
2.2 Equipment Mobilization/Demobilization	1	ls			$183.00	$518.00	$0	$0	$183	$518	$701
2.3 Personnel Mobilization/Demobilization	12	ea		$800.00	$600.00		$0	$9,600	$7,200	$0	$16,800
3 FIELD SUPPORT											
3.1 Storage Trailer	1.5	mo				$94.00	$0	$0	$0	$141	$141
3.2 Pickups, 2 each	44	day				$100.00	$0	$0	$0	$4,400	$4,400
4 SURVEY AND REMOVAL											
4.1 Site Superintendent including per diem	22	day		$151.00	$360.00		$0	$3,322	$7,920	$0	$11,242
4.2 UXO Technician including per diem, 11 each	242	day		$151.00	$310.00		$0	$36,542	$75,020	$0	$111,562
4.3 Hand Equipment & Tools	22	day				$450.00	$0	$0	$0	$9,900	$9,900
4.4 Field Transportation, 2 each	44	day				$30.00	$0	$0	$0	$1,320	$1,320
5 DISPOSAL											
5.1 Drums & Pallets	10	ea		$175.00			$0	$1,750	$0	$0	$1,750
5.2 Transportation and Disposal	4,000	lb	$2.95				$11,800	$0	$0	$0	$11,800
6 LAND USE CONTROLS											
6.1 Perimeter Signs	6	ea		$69.50			$0	$417	$0	$0	$417
7 POST CONSTRUCTION COST											
7.1 Contractor Completion Report	150	hr			$38.00		$0	$0	$5,700	$0	$5,700
Subtotal							$11,800	$52,631	$121,483	$19,779	$205,693
Overhead on Labor Cost @ 30%									$36,445		$36,445
G & A on Labor, Material, Equipment, & Subs Cost @ 10%							$1,180	$5,263	$12,148	$1,978	$20,569
Tax on Materials and Equipment Cost @ 6.5%								$3,421		$1,286	$4,707
Total Direct Cost							$12,980	$61,315	$170,076	$23,043	$267,414
Indirects on Total Direct Cost @ 15%											$40,112
Profit on Total Direct Cost @ 10%											$26,741
Total Field Cost											$334,267
Engineering on Total Field Cost @ 6%											$20,056
Contingency on Total Field Cost @ 10%											$33,427
TOTAL CAPITAL COST											**$387,750**

NAS WHIDBEY ISLAND
Whidbey Island, Washington
Lake Hancock Target Range
Alternative 2: Surface Removal with Land Use Controls
Capital Cost (Removal Years 1, 2, 3, 5, and 10)

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
1 PROJECT PLANNING & DOCUMENTS											
1.1 Prepare Documents & Plans	100	hr			$38.00		$0	$0	$3,800	$0	$3,800
1.2 Prepare Work Plans	150	hr			$38.00		$0	$0	$5,700	$0	$5,700
2 MOBILIZATION AND DEMOBILIZATION											
2.1 Site Support Facilities (trailers, etc.)	1	ls		$1,000.00		$3,500.00	$0	$1,000	$0	$3,500	$4,500
2.2 Equipment Mobilization/Demobilization	1	ls			$183.00	$518.00	$0	$0	$183	$518	$701
2.3 Personnel Mobilization/Demobilization	6	ea		$800.00	$600.00		$0	$4,800	$3,600	$0	$8,400
3 FIELD SUPPORT											
3.1 Storage Trailer	1	mo				$94.00	$0	$0	$0	$94	$94
3.2 Pickup	20	day				$100.00	$0	$0	$0	$2,000	$2,000
4 SURVEY AND REMOVAL											
4.1 Site Superintendent including per diem	20	day		$151.00	$360.00		$0	$3,020	$7,200	$0	$10,220
4.2 UXO Technician including per diem, 5 each	100	day		$151.00	$310.00		$0	$15,100	$31,000	$0	$46,100
4.3 Hand Equipment & Tools	20	day				$450.00	$0	$0	$0	$9,000	$9,000
4.4 Field Transportation, 2 each	40	day				$30.00	$0	$0	$0	$1,200	$1,200
5 DISPOSAL											
5.1 Drum	1	ea		$175.00			$0	$175	$0	$0	$175
5.2 Transportation and Disposal	1	ls	$3,300.00				$3,300	$0	$0	$0	$3,300
6 POST CONSTRUCTION COST											
6.1 Contractor Completion Report	50	hr			$38.00		$0	$0	$1,900	$0	$1,900
Subtotal							$3,300	$24,095	$53,383	$16,312	$97,090
Overhead on Labor Cost @ 30%									$16,015		$16,015
G & A on Labor, Material, Equipment, & Subs Cost @ 10%							$330	$2,410	$5,338	$1,631	$9,709
Tax on Materials and Equipment Cost @ 6.5%								$1,566		$1,060	$2,626
Total Direct Cost							$3,630	$28,071	$74,736	$19,003	$125,440
Indirects on Total Direct Cost @ 15%											$18,816
Profit on Total Direct Cost @ 10%											$12,544
Total Field Cost											$156,800
Engineering on Total Field Cost @ 4%											$6,272
Contingency on Total Field Cost @ 10%											$15,680
TOTAL CAPITAL COST											**$178,753**

NAS WHIDBEY ISLAND
Whidbey Island, Washington
Lake Hancock Target Range
Alternative 2: Surface Removal with Land Use Controls
Annual Cost

Item	Item Cost yearly	Notes
Site Inspection & Report	$2,650	One-day visit to verify LUCs
Subtotal	$2,650	
Contingency @ 10%	$265	
TOTAL	**$2,915**	

NAS WHIDBEY ISLAND
Lake Hancock Target Range
Whidbey Island, Washington
Alternative 2: Surface Removal with Land Use Controls
Present Worth Analysis

Year	Capital Cost	Annual Cost	Total Year Cost	Annual Discount Rate 2.3%	Present Worth
0	$387,750		$387,750	1.000	$387,750
1	$178,753	$2,915	$181,668	0.978	$177,583
2	$178,753	$2,915	$181,668	0.956	$173,591
3	$178,753	$2,915	$181,668	0.934	$169,688
4		$2,915	$2,915	0.913	$2,662
5	$178,753	$2,915	$181,668	0.893	$162,143
6		$2,915	$2,915	0.872	$2,543
7		$2,915	$2,915	0.853	$2,486
8		$2,915	$2,915	0.834	$2,430
9		$2,915	$2,915	0.815	$2,376
10	$178,753	$2,915	$181,668	0.797	$144,717
11		$2,915	$2,915	0.779	$2,270
12		$2,915	$2,915	0.761	$2,219
13		$2,915	$2,915	0.744	$2,169
14		$2,915	$2,915	0.727	$2,120
15		$2,915	$2,915	0.711	$2,073
16		$2,915	$2,915	0.695	$2,026
17		$2,915	$2,915	0.679	$1,980
18		$2,915	$2,915	0.664	$1,936
19		$2,915	$2,915	0.649	$1,892
20		$2,915	$2,915	0.635	$1,850
21		$2,915	$2,915	0.620	$1,808
22		$2,915	$2,915	0.606	$1,768
23		$2,915	$2,915	0.593	$1,728
24		$2,915	$2,915	0.579	$1,689
25		$2,915	$2,915	0.566	$1,651
26		$2,915	$2,915	0.554	$1,614
27		$2,915	$2,915	0.541	$1,578
28		$2,915	$2,915	0.529	$1,542
29		$2,915	$2,915	0.517	$1,507
30		$2,915	$2,915	0.506	$1,474
				TOTAL PRESENT WORTH	**$1,264,862**

APPENDIX B

ARARs

LOCATION-SPECIFIC ARARs AND TBCs
FORMER LAKE HANCOCK TARGET RANGE
NAS WHIDBEY ISLAND
WHIDBEY ISLAND, WASHINGTON

Requirement/ Criteria	Citation	Synopsis	Status	Evaluation/Action to be Taken
Federal				
Coastal Zone Management Act	16 USC 1451 et seq.	Applies to actions that affect coastal resources. Ensures that remedial action/corrective measures protect coastal resources.	Applicable	A Coastal Zone Consistency Determination will be prepared to identify that the Navy's actions are consistent to the maximum extent practicable with the enforceable policies of the State's Shoreline Management Program.
Floodplain Management and Protection of Wetlands	44 CFR 9	FEMA regulations that set forth the policy, procedure and responsibilities to implement and enforce Executive Order 11988 Floodplain Management and Executive Order 11990, Protection of Wetlands.	Applicable	Remedial actions will take place in a floodplain and near wetlands, alternatives would be considered that would reduce the risk of loss and restore and preserve the floodplain and wetlands.
CWA Section 404(b)(1) Guidelines for Specifications of Disposal Sites for Dredged or Fill Material	33 USC 40 CFR Part 230 and 33 CFR 320-323	Regulates the placement of fill materials in waters of the United Sates including wetlands. No activity which adversely affects an aquatic ecosystem, including wetlands, shall be permitted if a practicable alternative that has less adverse impact is available. If there is no other practical alternative, impacts must be minimized.	Applicable	The Navy will take steps to minimize adverse impacts to wetlands.
Fish and Wildlife Coordination Act	16 USC Part 661 et seq.	Requires any federal agency proposing to modify a body of water to coordinate with the US Fish and Wildlife Service or National Marine Fisheries Service and appropriate state agencies if an alteration of a body of water will occur as a result of remedial activities.	Applicable	Agencies will be consulted, and remedial activities will be conducted to avoid disturbance of affect fish and wildlife and their habitat.

LOCATION-SPECIFIC ARARs AND TBCs
FORMER LAKE HANCOCK TARGET RANGE
NAS WHIDBEY ISLAND
WHIDBEY ISLAND, WASHINGTON

Requirement/ Criteria	Citation	Synopsis	Status	Evaluation/Action to be Taken
Endangered Species Act	16 USC 1531 et seq.; 50 CFR 17 and 402	Provides for consideration of the impacts on federally-listed endangered/threatened species and their habitats. Requires federal agencies to ensure that any action carried out by the agency is not likely to jeopardize the continued existence of any endangered/threatened species and their habitats.	Applicable	Threatened and/or endangered species have been reported at LHTR as well as nearby LHTR. Site surveys will be conducted prior to beginning remedial activities to determine if any threatened or endangered species are present. If ESA species are present and Navy actions will have an effect on the listed species, then Navy will consult with USFWS and NMFS.
The Bald and Golden Eagle Protection Act	16 USC 668-668(d)	Requires project activities to protect and preserve eagle habitat.	Applicable	Bald eagles have been observed at and near LHTR, and the area has been identified as a current and past nesting site. Appropriate actions will be taken during remedial action to ensure that no eagles and their habitat are affected. Site surveys will be conducted prior to beginning remedial activities to determine if any bald eagles or potential nesting areas are present.
Migratory Bird Treaty Act	16 USC 703-712	Provides protection for migrating birds, nests, and eggs. Makes it illegal for people to "take" migratory birds, their eggs, feathers, or nests.	Applicable	Appropriate actions will be taken during remedial action to ensure that no migratory birds or nests are affected. Site surveys will be conducted prior to beginning remedial activities to determine if any birds and nesting areas are present.

LOCATION-SPECIFIC ARARs AND TBCs
FORMER LAKE HANCOCK TARGET RANGE
NAS WHIDBEY ISLAND
WHIDBEY ISLAND, WASHINGTON

Requirement/ Criteria	Citation	Synopsis	Status	Evaluation/Action to be Taken
National Historic Preservation Act	16 USC 470 et seq; 36 CFR 800	Preserves sites with archaeological and historic significance. Section 106 of the Act requires consultation with appropriate agencies to identify historic properties potentially affected by the site activities, assess the effects, and seek ways to avoid, minimize, or mitigate adverse effects on historic properties.	Applicable	Archaeological sites eligible for listing on the National Register of Historic Places have been identified at the site and therefore the Navy will consult with the State Historic Preservation Office in accordance with Section 106. Additionally an archeologist will be on site during remedial activities.
State				
Shoreline Management Act and State of Washington Coastal Zone Management Program	Chapter 173-27 WAC and Chapter 90.58 RCW	The SMA regulates most shorelines of the state including marine waters, streams and rivers (with a mean annual flow of 20 cfs or more), lakes and reservoirs or water areas of the state (larger than 20 acres), associated wetlands, and portions of the flood plain. The CZMP applies to activities which may impact Washington's coastal resources (within 15 counties specified).	Applicable	Navy will comply with the enforceable policies of the Shoreline Management Act.
Water Quality Standards For Surface Waters	Chapter 173-201A WAC	Regulates wetland water quality and antidegradation.	Applicable	Remedial actions will take place near wetlands, alternatives would be considered that would reduce the risk of loss and restore and preserve wetlands according to Ecology guidance.

Notes:

ARARs	Applicable or Relevant and Appropriate Requirements.	RCW	Revised Code of Washington.
CFR	Code of Federal Regulations.	SMA	Shoreline Management Act.
CWA	Clean Water Act.	TBCs	To Be Considered Criteria.

LOCATION-SPECIFIC ARARs AND TBCs
FORMER LAKE HANCOCK TARGET RANGE
NAS WHIDBEY ISLAND
WHIDBEY ISLAND, WASHINGTON

CZMP	Coastal Zone Management Program.	USC	Unites States Code.
LHTR	Lake Hancock Target Range.	WAC	Washington Administrative Code
NMFS	National Marine Fisheries Service		

ACTION-SPECIFIC ARARs AND TBCs
FORMER LAKE HANCOCK TARGET RANGE
NAS WHIDBEY ISLAND
WHIDBEY ISLAND, WASHINGTON

Requirement/ Criteria	Citation	Synopsis	Status	Evaluation/Action to be Taken
Federal				
RCRA - Identification and Listing of Hazardous Waste	40 CFR 261, subparts A, B, C, and D	Identifies those solid wastes that are subject to regulation as a hazardous waste.	Applicable	Materials removed during removal action will be analyzed by appropriate test methods and, if applicable, managed in accordance with the substantive requirements of the hazardous waste regulations.
RCRA -Standards Applicable to Generators of Hazardous Waste	40 CFR 262 Subparts A, B, C, and D	Establishes standards for generators of hazardous waste.	Applicable	Any hazardous waste that is generated from during remedial activities would be managed in compliance with these standards prior to disposal.
Military Munitions Rule	40 CFR 266 Subpart M	Regulations identify when military munitions become solid waste, and if hazardous, how they are managed.	Applicable	Military munitions to be disposed of off-site are solid waste. A hazardous waste determination will be made prior to disposal.
LUC Guidance	Principles and Procedures for Specifying, Monitoring, and Enforcement of Land Use Controls and Other Post-ROD Actions (DoD/Navy, October, 2003)	Provides a framework for the efficient implementation of land use controls at DoD installations.	To be considered	Land use controls, to restrict residential use, for UXO construction support, and signage, if required, would be developed in the ROD with clear objectives including when and where LUCs will be implemented, and identifying the responsibilities for implementation, monitoring, reporting, and enforcement of LUCs. Implementation actions, operation, maintenance, and enforcement actions would be described in subsequent design documents.

ACTION-SPECIFIC ARARs AND TBCs
FORMER LAKE HANCOCK TARGET RANGE
NAS WHIDBEY ISLAND
WHIDBEY ISLAND, WASHINGTON

Requirement/ Criteria	Citation	Synopsis	Status	Evaluation/Action to be Taken
State				
Washington Clean Air Act - General Regulations for Air Pollution Sources	RCW 70.94; WAC 173-400-040 (3) and (8)	Establishes standards and rules generally applicable to the control and/or prevention of the emission of air contaminants.	Applicable	Fugitive dust may be generated during munitions and soil excavation, handling, or treatment activities.
Designation of Dangerous Waste	WAC 303-060-070	Identifies those solid wastes that are subject to regulation as a hazardous waste.	Applicable	Wastes may be generated depending on MEC/MPPEH findings and type of treatment.
Requirements for Generators of Dangerous Waste	WAC 303-060-170	Establishes standards for generators of hazardous waste.	Applicable	Any hazardous waste that is generated from during remedial activities would be managed in compliance with these standards prior to disposal.
Dangerous Waste Regulations (Military Munitions)	WAC Chapter 173-303-578	Washington state has adopted portions of the federal MR and amended other portions by developing state-specific military munitions regulations. Military munitions regulations for the State of Washington are located with the state's hazardous waste program regulations, Chapter 173-303 – Dangerous Waste Regulations	Applicable	Munitions will be managed and disposed of according to these regulations.
Model Toxics Control Act (MTCA)	WAC Chapter 173-340-100, -110, -200, -360, -370, -400, -410, -420, -800, -810, and -840	Creates a comprehensive regulatory scheme to identify, investigate, and clean up contaminated properties that are, or may be, a threat to human health or the environment. MTCA requires owners and operators to report the discovery of hazardous substances that had been previously released on or under their property.	Applicable	Selection of and implementation of remedial actions will be conducted according to MTCA.

ACTION-SPECIFIC ARARs AND TBCs
FORMER LAKE HANCOCK TARGET RANGE
NAS WHIDBEY ISLAND
WHIDBEY ISLAND, WASHINGTON

Notes:

ARARs	Applicable or relevant and appropriate requirements.
CFR	Code of Federal Regulations.
DoD	Department of Defense.
LUC	Land Use Control.
MEC	Munitions and Explosives of Concern.
MPPEH	Material Potentially Presenting an Explosive Hazard.
MTCA	Model Toxics Control Act
RCRA	Resource Conservation and Recovery Act.
RCW	Revised Code of Washington.
ROD	Record of Decision.
TBCs	To Be Considered Criteria.
UXO	Unexploded Ordnance
WAC	Washington Administrative Code.